

**GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.**

(An Autonomous Institute of Govt. of Maharashtra)

**ODD TERM END EXAM NOV/DEC -2017****EXAM SEAT NO.**

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**LEVEL: FIRST****PROGRAM: COMMON****COURSE CODE:CCF108 /R110/X107/110/CCE108****COURSE NAME: ENGINEERING DRAWING -II****MAX. MARKS: 80****TIME: 4 HRS.****DATE: 22/11/2017**

Instruction:-

- 1) Answer to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>course outcome

QN	S Q N	Question Text	R U A	CO CCF108-	Marks
Q.1		Attempt any <b>TWO</b>			(08)
	a)	Illustrate following joints with their symbols i) Spot weld ii) Single- J butt weld	U	3	
	b)	Draw free hand sketch for 'V' thread.	U	3	
	c)	Draw free hand sketch for wing nut.	U	3	
Q.2		Attempt any <b>TWO</b>			(16)
	a)	Draw the following orthographic views of the object as shown in fig.1. i) Sectional F.V (03 marks) ii) Side view from left (03 marks) iii) Top view (02 marks)	U	1	
	b)	Fig.2 shows pictorial view of an object using first angle projection method, draw i) Front view (03 marks) ii) Top view (02 marks) iii) Sectional left hand side view(03 marks) iv) Give important dimensions.	U	2	
	c)	Fig 3.Shows pictorial view of an object, Draw i) Sectional F.V(03 marks) ii) Top view (02 marks) iii) Right hand side view (03 marks)	U	2	
Q.3		Attempt any <b>TWO</b>			(16)
	a)	Fig.4 shows pictorial view of an object. Draw following views of an object by using first angle method. i) F.V. in the direction X (03 marks) ii) Top view (02 marks) iii) Right hand side view (03 marks)	U	2	
P.T.O					

	b)	By using first angle method, draw i) F.V. in the direction X (03 marks) ii) Top view (02 marks) iii) Left hand side view (03 marks) Refer Fig.5	U	2	
	c)	Fig 6 show pictorial view of an object using first angle method of projection, draw i) Front view (03 marks) ii) Top view (02 marks) iii) Right hand side view(03 marks)	U	2	
<b>Q.4</b>		Attempt any <b>ONE</b>			(08)
	a)	Figure no.4 (a) shows two views of an object. Draw by using first angle projection method the following views. i) Sectional elevation (section A-A) (04 marks) ii) Left hand side view (missing view) (04 marks)	U	4	
	b)	Fig.4 (b). Shows elevation and plan of a machine part. Draw the following views, by using first angle method of projection. i) Sectional elevation (section A-A) (04 marks) ii) Left hand side view (missing view) (04 marks)	U	4	
<b>Q.5</b>		Attempt any <b>ONE</b>			(16)
	a)	Fig. no 5 (a). Shows two views of an object. Draw its isometric view, taking 'O' as an origin. Use natural scale.	U	5	
	b)	i) Construct isometric scale upto 150mm (02 marks) ii) Fig. no 5 (b) (ii) shows two views of an object. Draw its isometric projection taking 'O' as an origin by isometric scale. (14 marks)	U	5	
<b>Q.6</b>		Attempt any <b>TWO</b>			(16)
	a)	Figure no. 6 (a) shows front view and top view of an a square prism, having a circular hole in the center. Draw its development of the surface.	U	6	
	b)	Figure no 6 (b) shows front view of cone, resting in H.P in first quadrant, cut by three different planes I, II, III. Draw the development of the lateral surface of this cut cone.	U	6	
	c)	Figure no 6 (c) shows front view of a right square pyramid with the sides of base equally inclined to V.P, resting on its base H.P. It is cut by two sectional planes A&B at $60^0$ to each other as shown in fig. no 6(c). Draw the development of the lateral surface of the pyramid.	U	6	
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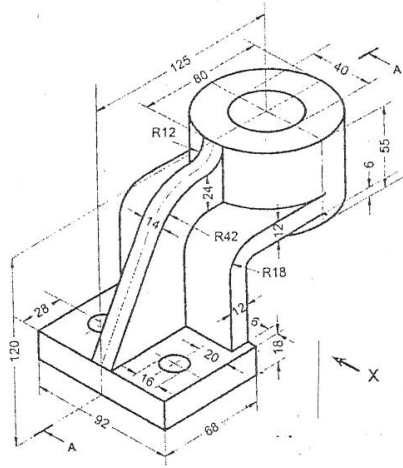


Fig. 1 ↗  
Q. 2 Ⓐ

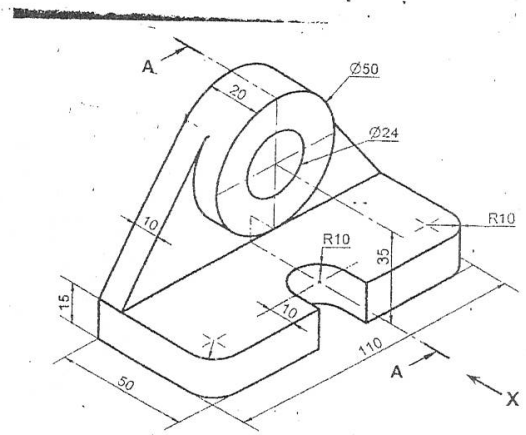


Fig. 2 ↗  
Q. 2 Ⓑ

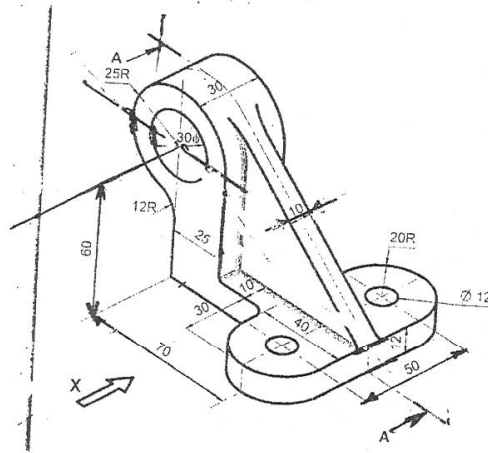


Fig. 3 ↗  
Q. 2 Ⓒ



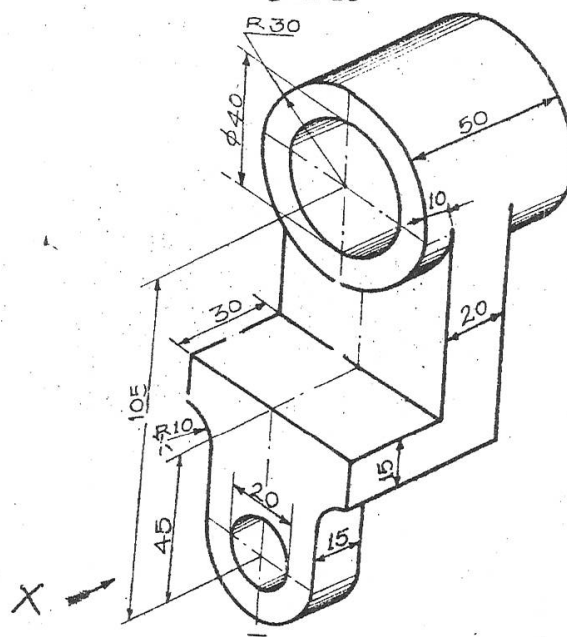
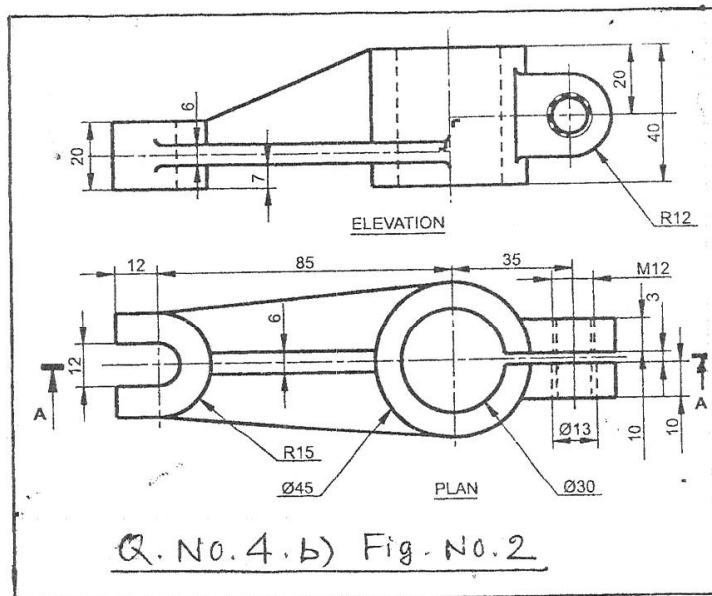
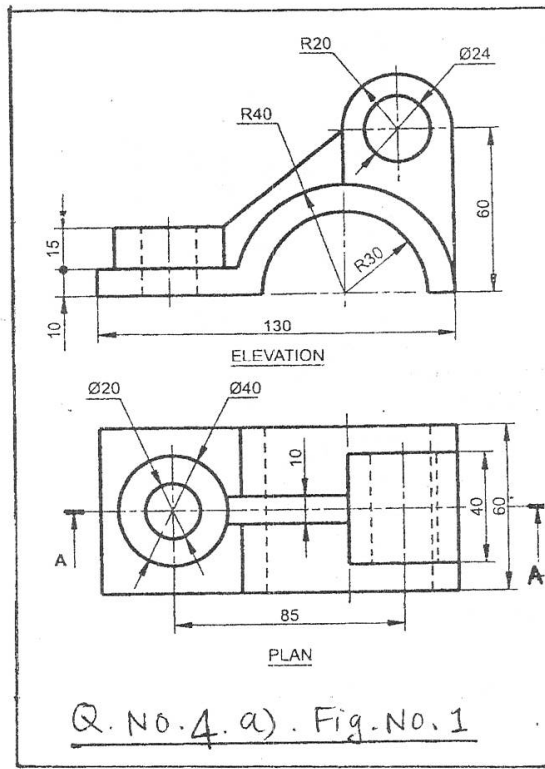
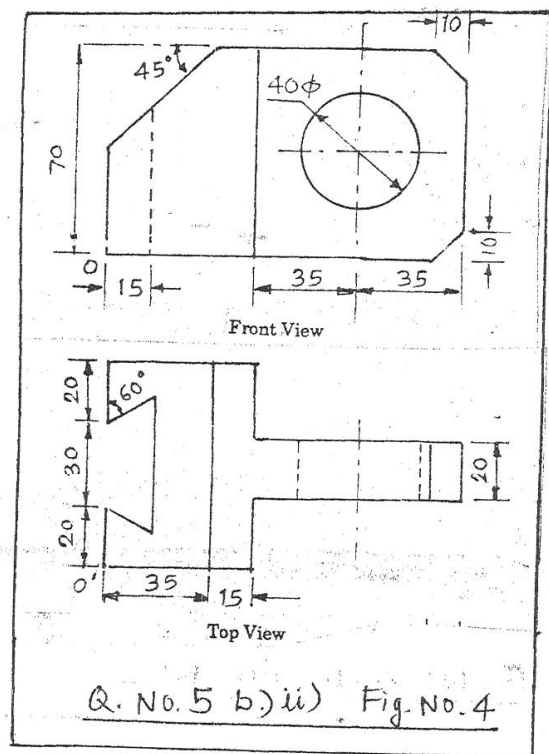
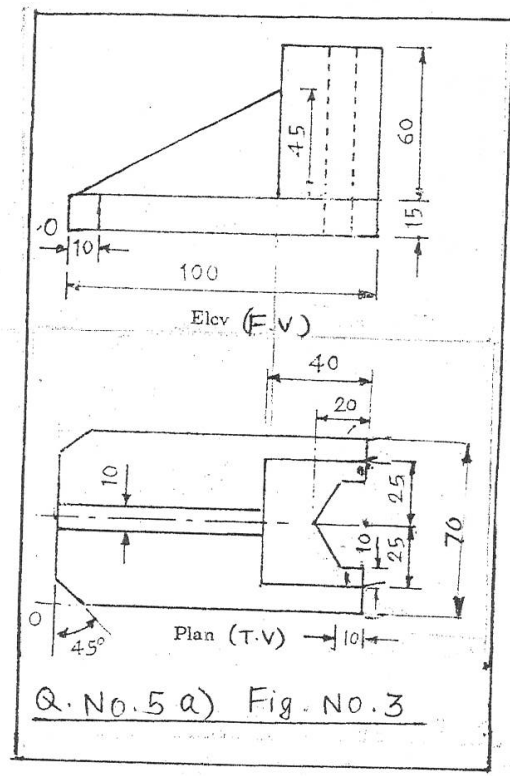
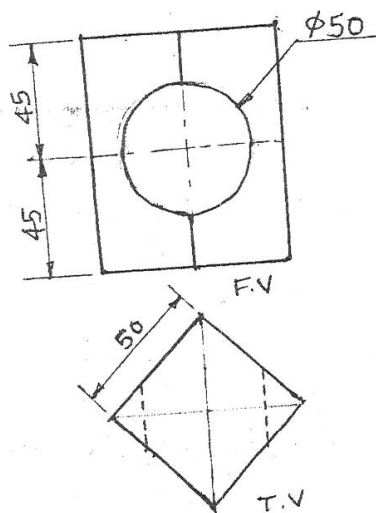


Fig. 6  
Q. 3 ©

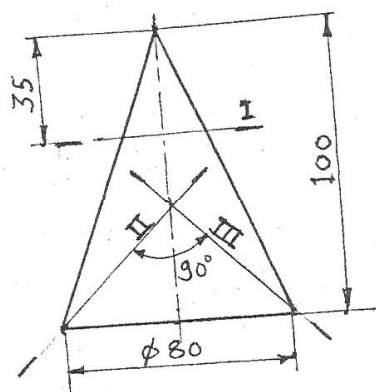




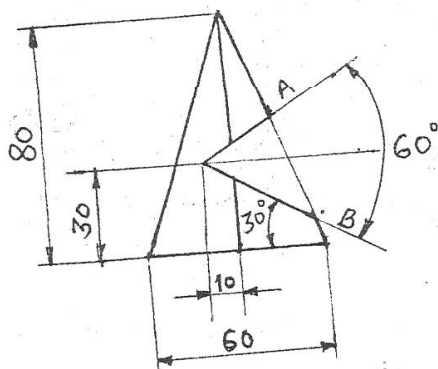
⑥



Q. No. 6(a) Fig. No. 5



Q. No. 6(b) Fig. No. 6



Q. No. 6(c) Fig. No. 7



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**ODD TERM END EXAM NOV/DEC -2017****EXAM SEAT NO.**

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LEVEL: **FIFTH**COURSE CODE: **IEE502**MAX. MARKS: **80**PROGRAM: **INDUSTRIAL ELECTRONICS**COURSE NAME: **EMBEDDED SYSTEMS**TIME: **3 HRS.**DATE: **13/12/2017**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I****Marks****Q.1 Attempt any FOUR****(08)**

- a) State the advantages of 'C' programming over assembly language programming.
- b) Draw the format of SCON Register.
- c) Enlist interrupts of 8051 with their vector addresses.
- d) Draw and label internal structure of timer /counter control logic.
- e) Draw the format of TMOD register.
- f) State the significance of TI & RI flag in serial communication.

**Q.2 Attempt any FOUR****(16)**

- a) Write a 'C' language program to send message 'GPKP' serially at baud rate 4800 bps, 8 bit data & 1 stop bit. Assume crystal frequency =11.0592MHz
- b) Write alternate pin functions of port 3 of 8051.
- c) Draw and explain format of IP resister.
- d) Write a 'C' language program to toggle all bits of port 0 continuously using timer  $\phi$  at an interval of 10 msec. Assume crystal frequency =12MHz
- e) Consider a 1Hz frequency is fed to T $\phi$  pin of 8051. Write a 'C' program to count the pluses and send its value at port  $\phi$ , while simultaneously create a square wave of 2KHz frequency of P2. $\phi$ . Assume crystal frequency =12 MHz.
- f) Write and execute 'C' language program to input data from port-2 and display on port -3 for every 5msec. Assume crystal frequency= 12MHz.

**Q.3 Attempt any FOUR****(16)**

- a) Write a 'C' language program to toggle all bits of port 1 using logical operations continuously.
- b) Draw and explain the format of TCON register.
- c) Write a 'C' program for 8051 to simultaneously transmit the data read from port  $\phi$  and also receive the data serially at baud rate =1200. Crystal frequency =11.0592 MHz
- d) Draw and explain format of IE register.
- e) Write a 'C' program to transfer letter 'A' serially at baud rate 4800 continuously. Use 8 bit data & 1 stop bit. Assume crystal frequency = 11.0592MHz

**P.T.O**

- f) Write and execute 'C' program to perform OR and EX-OR operations on 89h and 54h.

## Section – II

Marks

(08)

**Q.4** Attempt any **FOUR**

- Write the functions of following pins of LCD i) RS ii) VEE
- For a given ADC 0804, if  $V_{ref}/2$  pin is applied with 1.28 V. what will be the step size in mv?
- Enlist the points for efficient writing of 'C' program (Any two)
- For DAC 0808, find out the current  $I_{out}$  for the digital input of  $\phi EH$ . Assume  $I_{ref}=2mA$ .
- Write the functions of following pins of RTC DS12887
  - AS
  - $\overline{CS}$
- For a stepper motor with step angle  $2^\circ$ , how many steps will be required to rotate motor  $60^\circ$  using 4- step sequence.

**Q.5** Attempt any **FOUR**

(16)

- Draw a neat interfacing diagram of DC motor with 8051 microcontroller.
- Draw the format of register B of RTC DS12887 & explain the significance of each bit.
- Consider the ADC MAX1112 is interfaced with 8051. Write a 'C' code for sending a control byte to MAX1112 ADC.
- Explain in detail the selection criteria for an ADC in any application.
- Consider a switch is connected to pin  $P\phi.\phi$ . write a 'C' program for 8051 to perform the following. Assume DAC0808 is interfaced with 8051.
  - When switch =0, generate a staircase wave at DAC output.
  - When switch =1, generate a sawtooth wave at DAC output.
- Consider ADC 0808 is interfaced with 8051 microcontroller. Write a 'C' program to read the digital output from ADC & send the value on port1 continuously with an interval of 100msec.

**Q.6** Attempt any **TWO**

(16)

- Consider a stepper motor is interfaced with 8051 microcontroller and a switch (SW) is connected to P2.7. Write a 'C' program to monitor the status of SW & perform the following.
  - If SW=0, the stepper motor rotates clockwise.
  - If SW=1, the stepper motor rotates anticlockwise.Also draw the interfacing diagram of stepper motor with 8051.
- Consider a LCD is interfaced with 8051 microcontroller. Write a 'C' program to display "GPKP" on LCD. Also draw a neat interfacing diagram of LCD with 8051 microcontroller.
- Design a 8051 microcontroller based Data Acquisition system that will collect the information from different sensors like temperature & pressure and display it on LCD. ( Draw the complete hardware schematic and 'C' program).

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**ODD TERM END EXAM NOV. / DEC. -2017**

**EXAM SEAT NO.**

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**LEVEL :- FIRST**

**PROGRAM : IE & E & TC**

**COURSE CODE :- EIF101 / IEE/ETE101**

**COURSE NAME :- ELECTRONIC COMPONENTS AND APPLICATIONS**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 12/ 12 / 2017**

**Instruction :-**

- 1) Answers must be written in the main answer book provided.( and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN > Question No., SQN> Question No. R> Remembering, U> Understanding, A> Application.

QN	S Q N	Question Text	R/ U/ A	CO Cod e EIF101	Marks
Q.1		Attempt any <b>FOUR</b>			
	a)	Enlist specifications of inductor. ( any four)	R	2	08
	b)	Define term resistor with symbol	R	2	
	c)	List any four applications of resistors.	R	1,2	
	d)	State the term power factor with its unit.	R	2	
	e)	Define linear and non-linear resistors.	R	2,3	
	f)	Enlist the types of dielectrics.	R	2	
Q.2		Attempt any <b>FOUR</b>			
	a)	Explain the term C/V Ratio and insulation resistance in detail.	U	2	16
	b)	Explain standard wire wound resistors with its construction.	U	2,3	
	c)	Explain ferrite core inductor with neat diagram.	U	2	
	d)	Identify the colour codes for following resistors. i) 560 K $\pm$ 02 % ii) 23.4 K $\pm$ 10% .	A	3	
	e)	Explain the following terms. i) Self inductance ii) Mutual inductance.	U	2	
	f)	Identify the capacitors from colour code i) Orange Orange Blue ii) Yellow violet yellow.	A	3	
Q.3		Attempt any <b>FOUR</b>			
	a)	Draw and explain characteristic curves of LDR.	U	2	16
	b)	Identify the colour code for the following capacitors. i) 0.034f ii) 47 nf.	A	3	
	c)	Explain Air core inductor with construction.	U	2	

P.T.O.

QN	S Q N	Question Text	R/ U/ A	Code EIF101	Marks
	d)	Explain the terms i) Linear potentiometer ii) Logarithmic potentiometer.	U	1,2	
	e)	Draw equivalent circuit of inductor and explain colour coding of inductor using colour Band systems.	A	3	
	f)	Explain Aluminium electrolytic capacitor.	U	2	
Q.4		Attempt any <b>FOUR</b>			<b>08</b>
	a)	List advantages of PCB ( any two)	R	4	
	b)	State any four specification of connectors.	R	2	
	c)	Define i) Operating time ii) Release time of relay.	R	1,2	
	d)	Define switch. State different types of switches.	R	2	
	e)	List general specification of cables.	R	2	
	f)	List two methods for transferring the layout on the laminate in PCB manufacturing.	R	4	
Q.5		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Explain the co-axial cable with diagram and name different parts. State two specifications of it.	U	2,3	
	b)	Explain TNC connector.	U	2	
	c)	State the basic difference between a switch and relay. State main advantages of relay over a switch.	U	3	
	d)	Draw the diagram of common anode seven segment LED display. State the working principle.	U	2	
	e)	Define laminate. State the basic elements of laminate. List properties of laminates. ( any two)	R	4	
	f)	Explain the dip soldering technique used in PCB's.	U	4	
Q.6		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Explain high impedance and low impedance cable with diagram.	U	2,3	
	b)	Draw the constructional diagram of BNC connector and explain it.	U	2	
	c)	Describe the construction of dry reed relay and explain its principle of operation.	U	2,3	
	d)	Draw a neat sketch of Rotary switch and explain it.	U	2,3	
	e)	Compare LED's and LCD's.	U	2,3	
	f)	Explain the method screen-printing.	U	4	

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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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LEVEL: **FOURTH**

PROGRAM: **INDUSTRIAL ELECTRONICS / ET**

COURSE CODE: **IEE 406/IX308/IE311/ ETE406**

COURSE NAME: **ELECTRONICS CIRCUIT DESIGN**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **09/12/2017**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) Give any four specification of zener diode.
- b) Draw a circuit diagram of IC723 high voltage regulator.
- c) List any four specification of transistor.
- d) Draw a diagram of transistor series voltage regulator.
- e) Draw a diagram of dual power supply using IC 78XX and IC79XX
- f) Explain necessity of voltage regulator in power supply.

**Q.2 Attempt any FOUR**

**(16)**

- a) Explain any four important specification of JFET.
- b) Explain design steps with diagram in transistorized in series voltage regulator.
- c) Design a shunt regulator using zener diode to provide 6V output from a 15V unregulated power supply, also calculate line and load regulation.
- d) Design a single stage common emitter amplifier for peak output voltage of 3 V at 5 k $\Omega$  band width =20 Hz to 20 KHz. use  $V_{CC} = 12$  V and  $R_s = 600$   $\Omega$  (only DC analysis)
- e) Draw a constructional diagram of unipolar Junction transistor. Give any four specification of UJT.
- f) Give the design steps for two stage RC-coupled common emitter amplifier for AC analysis.

**Q.3 Attempt any TWO**

**(16)**

- a) Design a voltage regulator for variable output voltage which varies from 2V to 7V with the output current upto 1A and  $V_{in} = 12 \pm 2$  V
- b) Design a single stage common emitter amplifier for the quiescent condition of (7.0 V, 2 mA). If bandwidth is 25 Hz – 20 KHz and  $R_i \geq 5$  k $\Omega$ .

- c) Design a source follower circuit to provide an input impedance of  $5\text{m}\Omega$  and output impedance of  $200\ \Omega$ , load resistance  $R_L=2.2\ \text{k}\Omega$ , lower 3 dB frequency of 40 Hz. Use  $V_{CC}=20\ \text{V}$ .

## Section – II

Marks

**Q.4** Attempt any **FOUR**

(08)

- a) Write classification of power amplifier.
- b) Draw circuit diagram of transformer coupled class A amplifier.
- c) Write any two advantages of complementary symmetry power amplifier over class B amplifier.
- d) Draw clock diagram of an oscillator.
- e) Write two requirements for oscillations.
- f) What do you mean by “normally on” load and “normally off” load with respect to IC555?

**Q.5** Attempt any **FOUR**

(16)

- a) Design transformer coupled class A amplifier for  $P_0=4\text{W}$ ,  $R_L=4\Omega$ ,  $V_{CC}=12\text{V}$
- b) Write design steps for phase shift oscillator using op-amp. Draw circuit diagram.
- c) Design Wien bridge oscillator using op-amp, for variable output frequency  $f_0=1\text{KHz}$  to  $5\ \text{KHz}$  for peak output of  $5\ \text{V}$ .
- d) Design Hartley oscillator using transistor, for  $f_0=5\text{MHz}$ ,  $V_{0(p)}=5\text{V}$ ,  $R_L=2\text{k}\Omega$ . DC analysis only.
- e) Design an circuit that generates a  $100\ \mu\text{sec}$  pulse at a frequency of  $1\text{KHz}$  using op-amp. Supply voltage is  $\pm 14\ \text{V}$ .
- f) Design astable multivibrator using IC 555 for maximum output frequency of  $4\text{KHz}$  with duty cycle of 60% Given  $V_{CC}=14\text{V}$

**Q.6** Attempt any **TWO**

(16)

- a) Design complementary symmetry power amplifier to deliver a power of  $700\ \text{MW}$  to a load of  $4\Omega$ . The lower 3 dB cut off frequency is  $25\ \text{Hz}$ .
- b) Design Wien bridge oscillator using transistor for  $f_0=20\text{Hz} - 200\ \text{KHz}$  with peak output of  $5\text{V}$  at  $R_L=1\text{KHz}$ ,  $V_{CC}=12\text{V}$ .
- c) Design a timer circuit using IC555 that operates with  $12\text{V}$  supply and turns on solid state relay for  $100\ \text{msec}$ , when triggered, the maximum voltage required to turn on relay is  $3\text{V}$  and the control range of relay is  $5$  to  $13\ \text{mA}$ . The coil resistance is  $300\ \Omega$ . Also draw the circuit diagram.

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Table 1 : Standard Resistance Values  $\pm 1\%$ ,  $\pm 5\%$ ,  $\pm 10\%$ 

Ohms ( $\Omega$ )	Kilohms (K $\Omega$ )			Megohms (M $\Omega$ )		
	10	100	1.0	10	100	1.0
0.10	10	100	1.0	10	100	1.0
0.11	11	110	1.1	11	110	1.1
0.12	12	120	1.2	12	120	1.2
0.13	13	130	1.3	13	130	1.3
0.15	15	150	1.5	15	150	1.5
0.16	16	160	1.6	16	160	1.6
0.18	18	180	1.8	18	180	1.8
0.20	20	200	2.0	20	200	2.0
0.22	22	220	2.2	22	220	2.2
0.24	24	240	2.4	24	240	2.4
0.27	27	270	2.7	27	270	2.7
0.30	30	300	3.0	30	300	3.0
0.33	33	330	3.3	33	330	3.3
0.36	36	360	3.6	36	360	3.6
0.39	39	390	3.9	39	390	3.9
0.43	43	430	4.3	43	430	4.3
0.47	47	470	4.7	47	470	4.7
0.51	51	510	5.1	51	510	5.1
0.56	56	560	5.6	56	560	5.6
0.62	62	620	6.2	62	620	6.2
0.68	68	680	6.8	68	680	6.8
0.75	75	750	7.5	75	750	7.5
0.82	82	820	8.2	82	820	8.2
0.91	91	910	9.1	91	910	9.1

Table 2 : Standard Capacitor Values

Pico Farad ( $\mu F \rightarrow 10^{-12}$ )	Micro Farad ( $\mu F \rightarrow 10^{-6}$ )		
	0.01	0.1	1.0
10	0.01	0.1	1.0
12	0.015	0.15	1.5
15	0.022	0.22	2.2
22	0.033	0.33	3.3
27	0.047	0.47	4.7
33	0.056	0.56	5.6
39	0.068	0.68	6.8
47	0.082	0.82	8.2
56	0.1	1.0	10
68	0.15	1.5	15
82	0.22	2.2	22
100	0.33	3.3	33
120	0.47	4.7	47
150	0.68	6.8	68
220	1.0	10	100
330	1.5	15	150
470	2.2	22	220
680	3.3	33	330
820	4.7	47	470
1000	6.8	68	680
1500	10	100	1000
2200	15	150	1500
3300	22	220	2200
4700	33	330	3300
6800	47	470	4700
8200	68	680	6800
10000	100	1000	10000

Table 3 : Rectifier Diode Specification Sheet

Type No.	Material (S/G)	$V_R(PV)$ (V)	$I_F$ (A)	$V_F$ (V)	$I_R$ ( $\mu A$ )
1N4001	S	50	1.0	1.1	5
1N4002	S	100	1.0	1.1	5
1N4003	S	200	1.0	1.1	5
1N4004	S	400	1.0	1.1	5
1N4005	S	600	1.0	1.1	5
1N4006	S	800	1.0	1.1	5
1N4007	S	1000	1.0	1.1	5
1N4148	S	75	0.1	1.0	10
1N5060	S	400	2.5	1.25	0.2
1N5061	S	600	2.5	1.25	0.2
1N5062	S	800	2.5	1.25	0.2
1N5391	S	50	1.5	1.4	250
1N5393	S	200	1.5	1.4	250
1N5397	S	600	1.5	1.4	250
1N5399	S	1000	1.5	1.4	250
1N5402	S	200	3.0	1.0	10
1N5408	S	1000	3.0	1.0	10
1N5409	S	200	2.5	1.25	0.2
OA 47	G	75	0.05	0.6	20
OA 85	G	115	0.05	0.1	4.5
OA 90	G	30	0.038	0.1	2.4
OA 95	G	115	0.05	0.1	4.5
BA 100	G	40	0.02	0.1	4.5
BA 102	G	30	0.02	0.1	4.5
BY 100	S	1250	1.0	1.5	10
BY 125	S	150	1.0	1.5	10
BY 126	S	650	1.0	1.5	10
BY 127	S	1250	1.0	1.5	10
DR 25	G	25	0.25	1.5	10
Switching and Detector Diodes :					
1N914	S	75	10	-	5
1N915	S	50	10	-	5
OA 70	G	22.5	50	0.1	30
OA 72	G	45	16	0.2	0.8
OA 73	G	30	50	0.1-0.2	18
OA 79	G	45	35	0.15-0.2	0.1-2.8

### Appendix - 3

Table 4 : Zener Diode Specification Sheet

Type No.	Zener Voltage ( $V_Z$ at $I_{ZT}$ )	Zener Test Current ( $I_{ZT}$ in $\mu A$ )	Zener Impedance ( $Z_{ZT}$ in $\Omega$ )	Max. Zener Current ( $I_{ZM}$ in $\mu A$ )
1N4370	2.4	20	30	150
1N4371	2.7	20	30	135
1N4372	3.0	20	29	120
1N746	3.3	20	28	110
1N747	3.6	20	24	100
1N748	3.9	20	23	95
1N749	4.3	20	22	85
1N750	4.7	20	19	75
1N751	5.1	20	17	70
1N752	5.6	20	11	65
1N753	6.2	20	7	60
1N754	6.8	20	5	55
1N755	7.5	20	6	50
1N756	8.2	20	8	45
1N757	9.1	20	10	40
1N758	10	20	17	35
1N759	12	20	30	30
1N957A	6.8	18.5	4.5	47
1N960A	9.1	14	7.5	35
1N962A	11	11.5	9.5	25
1N964A	13	9.5	13	24
1N965A	15	8.5	16	21
1N966A	16	7.8	17	19
1N968A	20	6.2	25	15
1N972A	30	4.2	49	10
1N980A	62	2.0	185	4.9
1N983A	82	1.5	330	3.7
1N985A	100	1.3	500	3.0
1N3993	3.9	640	2	2360
1N3994	4.3	580	1.5	2130
1N3995	4.7	530	1.2	1940
1N3996	5.1	490	1.1	1780
1N3997	5.6	445	1.0	1620
1N3998	6.2	405	1.1	1460
1N3999	6.8	370	1.2	1330
1N4000	7.5	355	1.3	1210
1N 4370 series $\pm 10\%$ suffix A for $\pm 5\%$ units, C for $\pm 2\%$ , D for $\pm 1\%$				
1N 746 series $\pm 10\%$ suffix A for $\pm 5\%$ units, C for $\pm 2\%$ , D for $\pm 1\%$				
1N 795 series $\pm 10\%$ suffix A for $\pm 10\%$ units, C for $\pm 2\%$ , D for $\pm 1\%$				

### Appendix - 4

Table 5 : Transistor Data Sheet

Transistor No	Material and Type	$V_{CE}$ (V)	$V_{CE}$ (V)	$V_{CE}$ (V)	$I_{C(max)}$ (mA)	P <sub>T</sub> (mW)	$h_{FE}$	$f_T$ (MHz)
AC105	PG	40	18	10	1 A	400	15	0.5
AC110	PG	20	15	10	50	30	75	1
AC126	PG	32	12	10	100	500	100	1.5
AC127	NG	32	12	10	500	340	45/165	1
AC128	PG	32	16	10	1 A	67	50	2
AC130	PG	20	15	10	100	145	50	-
AC131	PG	45	32	10	1 A	75	40/120	-
AC153	PG	32	18	10	2 A	1 W	50	1
AC163	PG	32	24	10	200	900	80	0.8
AC166	PG	32	20	6	800	200	45	150
BC107	NS	50	45	6	100	300	110	150
BC108	NS	30	20	5	100	300	120	150
BC109	NS	30	20	5	100	300	180	150
BC115	NS	40	30	5	100	300	80	40
BC116	PS	45	40	5	100	300	35	130
BC119	NS	60	30	5	1 A	800	40	40
BC126	PS	35	30	5	600	800	40	40
BC138	NS	60	40	5	1 A	800	35	40
BC139	PS	80	60	5	500	700	40	100
BC142	NS	20	20	4	1 A	800	20	40
BC146	NS	50	45	6	50	50	80	150
BC147A	NS	50	45	6	200	250	110/220	150
BC147B	NS	50	45	6	200	250	200/330	150
BC148	PS	30	20	5	200	250	110	150
BC151	PS	23	20	5	100	200	90/150	120
BC158	PS	30	25	5	100	300	70	100
BC161	PS	60	30	5	1 A	3.2 W	40	50
BC177	PG	45	45	5	100	300	70	130
BC178B	PG	30	25	5	200	300	180	100
BC179A	PS	25	20	5	50	300	120	100
BC180	NS	30	25	5	500	300	100	150
BC194	NS	30	25	5	800	100	40/250	250
2N109	PG	35	25	12	150	165	65	0.15
2N244	NS	60	60	20	60	750	59	4
2N271	PG	30	10	15	200	150	45	4
2N312	NG	15	15	15	200	150	50	2
2N329B	PS	50	30	20	100	400	36/88	5
2N334A	NS	45	45	4	25	500	18/86	300
2N914	NS	40	15	5	200	360	30/120	300

P.T.O

(5)

Appendix A-5

Transistor No	Material and Type	$V_{CE}$ (V)	$V_{CE}$ (V)	$V_{BE}$ (V)	$I_{C(max)}$ (mA)	PT (mW)	$h_{FE}$	$f_T$ (MHz)
2N918	NS	30	15	3	50	200	20	60
2N930	NS	45	45	5	30	300	100	30
2N934	PS	25	8	25	50	250	10	16
2N1711	NS	75	50	7	600	600	100	70
2N1779	NG	25	-	15	200	100	20/60	3
2N1893	NS	120	80	7	500	800	40/120	50
2N2219	NS	60	30	5	800	800	100	250
2N2396	NS	60	40	5	350	450	40/120	40
2N2905	NS	60	30	7	50	300	125	60
2N2906	PS	60	40	5	600	600	100	200
2N2909	NS	60	40	5	1A	400	40/120	50
2N2922	PS	25	25	4	500	400	30/130	100
2N2937	PG	30	15	0.3	50	75	40/500	400
2N2976	NS	45	45	60	30	250	60/240	60
2N3015	NS	60	30	5	500	800	30/120	30
2N3903	NS	60	40	6	200	310	50/150	250
2N3905	PS	40	5	3.5	300	2W	50/150	200
2N5837	NS	10	40	5	1A	600	50/150	200
2N5843	PS	50	60	5	1A	750	50/300	15
2N5855	PS	60	60	5	1A	750	50/300	200
2N5856	NS	60	60	5	1A	750	50/300	200

## High Frequency Transistors

AF115	PG	32	15	2	10	75	50	75
AF116	PG	32	15	2	10	75	50	75
AF121	PG	25	25	-	10	140	30	270
AF121	PG	30	30	-	20	155	20	105
AF187	PG	18	-	12	100	185	25	3
AF194	PG	20	-	0.5	10	80	60	50
AF200	PG	25	-	0.3	10	225	30	100
AF202	PG	25	-	0.3	30	225	20	100
AF239S	PG	15	15	0.3	10	60	10	450
BH137	NS	160	160	5	100	680	25	50
BH154	NS	30	20	4	50	300	25	200
BH160	NS	30	12	2	50	200	20	400
BH179B	NS	220	115	5	50	600	20	60
BH183	NS	25	20	3	15	150	10	400
BH194	NS	30	20	5	30	250	30	130
BH195	NS	30	20	5	30	250	30	130
BF104	PS	20	18	4	50	250	50/250	250
BH246	NS	30	23	3	600	400	30/300	180
BH249	PS	30	25	3	600	400	30/300	180
BH415	PS	20	20	4	100	360	60	300

A-6

A Practical Approach to Electronic Circuit Design

Transistor No	Material and Type	$V_{CE}$ (V)	$V_{CE}$ (V)	$V_{BE}$ (V)	$I_{C(max)}$ (A)	PT (W)	$h_{FE}$	$f_T$ (MHz)
Power transistors								
AD136/4	PG	40	30	10/5	10	11	30	0.5
AD140	PG	55	35	-	3	35	30	0.2
AD143-5	PG	45	35	10	10	30	50/110	0.45
AD156V	PG	32	16	10	2	8	50/100	1
AD157V	NG	32	16	10	2	8	50/100	1
AD161	NG	32	20	10	1	4	80	1
AD162	PG	32	20	10	1	6	50	1
AD165	NG	25	20	10	1	5	60	0.5
AD262	PG	35	20	10	4	10	30	0.45
ADY12	PG	60	45	10	0.6	0.25	60/100	0.35
BD115	NS	245	180	5	0.15	6	22	80
BD124	NS	70	45	-	2	15	35	60
BD132	PS	45	45	6	3	11	40	60
BD135	NS	45	45	5	1	12	40/250	50
BD136	PS	45	45	5	1	12	40/250	50
BD137	NS	60	60	5	1	12	40/160	50
BD138	PS	60	60	5	1	12	40/180	50
BD141	NS	140	120	7	8	117	20/70	-
BD145	NS	60	60	5	5	15	45	50
BD151	PS	35	30	5	3	25	30/150	-
BD152	NS	50	45	5	3	25	30/150	-
BD165	NS	45	45	5	1.5	20	40	3
BD166	PS	45	45	5	1.5	20	40	3
BD181	NS	55	40	7	10	25	20/78	-
BD182	NS	70	60	7	15	117	20/70	-
BD187	NS	55	45	5	4	40	40	2
BD188	PS	55	45	5	4	40	40	2
BD232	NS	55	50	5	0.25	11	25/150	20
SL100	NS	60	50	6	0.5	4	40/300	-
SK100	PS	60	50	6	0.5	4	40/300	-
SK102	NS	30	30	3.5	1	3	50/280	-
SK102	PS	30	30	3.5	1	3	50/280	-
TIP29C	NS	100	100	5	1	30	40/200	3
TIP30C	PS	100	100	5	1	30	40/200	3
TIP31	NS	40	40	5	3	40	20/100	3
TIP32	PS	40	40	5	3	40	20/100	3
TIP33	NS	40	40	5	3	40	20	3
TIP34	PS	40	40	5	3	40	20	3
TIP41	NS	40	40	5	6	80	15/75	3
TIP42	PS	40	40	5	6	80	15/75	3

P.T.O

Transistor No.	Material and Type	$V_{ce}$ (V)	$V_{ce}$ (V)	$V_{ce}$ (V)	$I_{cm}$ (A)	PT (W)	$h_{FE}$	$f_T$ (MHz)
TIP52	PS	40	40	5	2	40	15/100	3
TIP120	NS	60	60	5	5	60	1000	-
TIP125	PS	60	60	5	5	60	1000	-
TS45	NS	40	15	5	0.2	250	30/120	300
2N1481	NS	60	40	12	1.5	5	35/100	1
2N1721	NS	150	100	-	1	15	40/120	16
2N1722	NS	120	80	10	7.5	50	20/90	10
2N2067	PG	40	25	20	3	10	20	-
2N2033	NS	80	60	-	3	5	20/60	1
2N2017	NS	60	60	8	1	1	50/200	80
2N3053A	NS	80	60	5	700 mA	5	50	100
2N3055	NS	100	60	7	15	115	20/70	0.2
2N3140	NS	140	140	-	2	25	10	10
2N3180	PS	60	60	-	5	85	10/30	1
2N3878	NS	120	50	7	4	35	20	40
ECN100	NS	-	60	-	0.7	5	50	-
ECN149	NS	50	40	6	4	30	10	-
ECN149	PS	50	40	6	4	30	10	-

Table 6 : Field Effect Transistors

Type	Channel	VDS (V)	$I_g$ (mA)	$I_{cex}$ (mA)	$V_{GS(on)}$ (V)	$I_{OS}$ (mA)	$V_{DS}$ (V)	$Y_{OS}$ ( $\mu S$ )	$I_T$ (W)
2N3821	N-CH	50	10	0.1	4	2.5	1.5-4.5	10	0.3
2N3922	"	50	10	0.1	6	2.1	3-6.5	20	0.3
2N4091	"	40	10	0.2	5-10	30	-	-	0.3
2N4221	"	30	15	-0.1	-6	-	2.5	20	0.3
2N4122	"	30	15	-0.1	-8	-	2.5-6	40	0.3
2N4416	"	30	10	0.1	6	-	4.5-7.5	50	0.3
2N4356	"	40	-	-0.25	-4, -10	50	-	-	0.36
2N5457	"	25	10	-1.0	-6	3	3000	10-50	0.31
2N5458	"	25	10	-1	-7	6-9	4000	10-50	0.31
BFV10	"	15	-	0.1	8	820	3.2 mA/V	50	0.3
BFV11	"	15	-	0.1	6	810	3.2 mA/V	-	0.3

Table 7 : Uni Junction Transistor

Type	$I_A$ (A)	$\eta$	$I_p$ ( $\mu A$ )	$I_A$ (mA)	$V_{AK}$ (V)	$P_o$ (W)	$R_{th}$ ( $K^\circ C$ )
2N2646	2	0.56-0.78	1-5	6	3.5	0.3	4.7-9.1
2N3980	1.5	0.68-0.82	2	1-10	3	0.36	4-8
2N4851	1.5	0.56-0.75	2	2	2.5	0.3	-
2N4918	1	0.55-0.82	0.5	4	2.5	0.36	4-12

78XX Voltage Regulator Datasheet :- (3)

Device Type with Input Voltage	Output Voltage (V)	Output Current (mA)	Quiescent Current (mA)	Line Regulation (mV)	Load Regulation (mV)	Ripple Rejection (dB)
78XXC (35)	5	1A	8	2.5	50	80
	12	1A	8	60	120	72
	15	1A	8	75	150	70
78LXXC (35)	5	100 mA	2 to 5	10	5	62
	12	100 mA	3 to 5	20	10	54
	15	100 mA	3 to 5	25	12	51
78LXXC (35)	5	100 mA	3 to 6	10	5	60
	12	100 mA	3 to 6.5	20	10	52
	15	100 mA	3 to 6.5	25	12	49
78MXX (35)	5	0.5A	4 to 10	50	100	78
	12	0.5A	4 to 10	120	240	71
	15	0.5A	4 to 10	150	300	69

**GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.**

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**ODD TERM END EXAM NOV/DEC -2017****EXAM SEAT NO.**

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**LEVEL: FIRST****PROGRAM: EE/IE/E&TC/IT****COURSE CODE: CCF102/CCE102/R103/R104/X102/X108 COURSE NAME: ENGINEERING PHYSICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 11/12/2017**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

QN	S Q N	Question Text	R U A	Co CCF102-	Mark
<b>Q.1</b>		Attempt any <b>FOUR</b>			<b>(08)</b>
	a)	State and explain Hookes law of elasticity.	R	1	
	b)	Steel is more elastic than rubber. Explain.	U	1	
	c)	Define density and specific gravity.	R	1	
	d)	State effect of temperature and Adulteration on surface tension.	R	1	
	e)	Define free oscillations and forced oscillations.	R	2	
	f)	Define i) Nanoscale ii) Nanometer	R	3	
<b>Q.2</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Explain behavior of wire under continuously increasing load.	U	1	
	b)	A wire of diameter 4mm and length 2m extends by 2mm when a force of 10 N is applied. Find Young's modulus of the wire.	A	1	
	c)	State and explain Newton's law of viscosity. Define coefficient of viscosity and derive its S.I unit.	U	1	
	d)	Define capillary action. Give its three examples.	R	1	
	e)	Define i) Cohesive force ii) Adhesive force iii) Molecular Range iv) Sphere of influence.	R	1	
	f)	i) Write any two examples of Nano structured material. ii) Write any two characteristics of Transverse wave.	U	2	
<b>Q.3</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Derive expression for coefficient of viscosity of liquid by stokes method.	A	1	
	b)	Explain Laplace's molecular theory for surface tension.	U	1	
	c)	i) State Stokes law. ii) Define velocity gradient with S.I. Unit.	R	1	
<b>P.T.O</b>					

	d) Define i) Amplitude ii) Wave period iii) Frequency iv) Wavelength.	R	2	
	e) Define longitudinal wave and Transverse wave. Give one examples each.	R	2	
	f) State any four applications of Nanotechnology.	R	3	
<b>Q.4</b>	Attempt any <b>FOUR</b>			<b>(08)</b>
	a) Define i) dispersion ii) dispersive power.	R	4	
	b) State and explain Ohm's law.	R	4	
	c) Draw a neat sketch of a Coolidge X-ray tube.	R	5	
	d) Mention any two applications of optical fiber.	R	6	
	e) When a resistance of $262\Omega$ is connected in the right gap of a meter bridge. The balancing length is found at 48cm from the left end. Calculate the resistance in the left gap.	A	4	
	f) Draw a neat sketch showing the structure of an optical fiber.	R	6	
<b>Q.5</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
	a) Derive the prism formula.	A	4	
	b) State any four characteristics of photo-electric effect.	U	5	
	c) Mention any four applications of laser	R	5	
	d) Explain the propagation of light through an optical fiber.	U	6	
	e) State any four properties of X-rays.	R	5	
	f) When two resistances are connected in series the effective resistance is $100\Omega$ but when connected in parallel the effective resistance is $24\Omega$ . Calculate the two resistances.	A	4	
<b>Q.6</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
	a) Derive an expression for equivalent resistance, when three resistances are connected in parallel.	A	4	
	b) With the help of a neat diagram explain the construction of a photo-cell	U	5	
	c) State and explain four properties of laser.	U	5	
	d) Mention any four advantages of optical fiber over conventional metal conductors.	R	6	
	e) For an equilateral prism the angle of minimum deviation is $39^\circ$ . Calculate its refractive index.	A	4	
	f) When a light of wavelength $5400\text{\AA}$ is incident on a metal plate, electrons are emitted with zero velocity. Calculate the threshold frequency and work function. (Given : $h=6.625 \times 10^{-34}\text{Js}$ , $C=3 \times 10^8\text{m/s}$ )	A	5	

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**GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.**

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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: FIFTH**

**COURSE CODE: IEE505**

**MAX. MARKS: 80**

**PROGRAM: INDUSTRIAL ELECTRONICS.**

**COURSE NAME: OPTOELECTRONICS.**

**TIME: 3 HRS.**

**DATE: 11/12/2017**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) Draw the spectrum of light with neat labels.
- b) Give four applications of LED.
- c) State the function of optical source and give its classification.
- d) Define the terms : i) Light intensity, ii) Optical power.
- e) State the materials used for construction of LASER.
- f) Differentiate between heterojunction and homojunction LED with two points.

**Q.2 Attempt any FOUR**

**(16)**

- a) Explain the following concept with proper diagram –  
i) Spontaneous emission, ii) Stimulated emission.
- b) Draw and explain construction of surface emitter LED.
- c) Define the following terms w.r.t. light –  
i) Refractive index, ii) Reflection, iii) Refraction, iv) Polarization.
- d) Explain the operation of semiconductor injection LASER diode with proper diagram.
- e) State any four advantages and disadvantages of LED as compared with LASER.
- f) With the help of proper diagram explain the output spectrum and optical power output characteristics of LED.

**Q.3 Attempt any FOUR**

**(16)**

- a) Explain construction of incandescent lamp with neat diagram.
- b) State and explain characteristic of LASER.

**(P.T.O.)**

- c) With neat diagram, explain construction of planar LED and dome LED.
- d) Explain the concept of photon and plank's law.
- e) Draw and explain construction and working of fabry-perot resonant cavity.
- f) Compare between LED and LASER with respects to following points –
  - i) Principle of operation,    ii) Spectral width,    iii) Coupling efficiency,
  - iv) Noise.

## Section – II

**Marks**

**Q.4**      Attempt any **FOUR**

**(08)**

- a) Give any two merits & two demerits of photo resistor.
- b) Classify thermal detectors.
- c) Draw equivalent circuit for photodiode.
- d) State any four applications of optocouplers.
- e) Draw spectral response of avalanche photodiode.
- f) Define & give mathematical expression of conversion efficiency for solar cell.

**Q.5**      Attempt any **FOUR**

**(16)**

- a) Draw & explain working of avalanche photodiode.
- b) Enlist two applications of PIN photodiode & two applications of phototransistor.
- c) Explain following optocoupler specifications –
  - i) Current transfer ratio,    ii) Insulation voltage.
- d) Draw & explain super twisted nematic LCD.
- e) Draw & explain selenium photovoltaic cell.
- f) Give applications of photo resistor (any four)

**Q.6**      Attempt any **FOUR**

**(16)**

- a) Draw circuit diagram & explain switching action by LDR.
- b) Draw spectral response of PIN & explain.
- c) Compare between photodiode & photoresistor.
- d) Draw equivalent circuit for solar cell & enlist four applications of solar cell.
- e) Draw common anode & common cathode LED display & enlist four characteristics of LED display.
- f) Draw symbol & constructional diagram of photo darlington & state its four applications.

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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: FOURTH**

**COURSE CODE: IEE403**

**MAX. MARKS: 80**

**PROGRAM: INDUSTRIAL ELECTRONICS.**

**COURSE NAME: INSTRUMENTATION.**

**TIME: 3 HRS.**

**DATE: 07/12/2017**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) State any two temperature scales. Convert 77°F to degree centigrade.
- b) Enlist any four basic requirement for selection of transducer.
- c) Write any two cases where pyrometer is used.
- d) Write two transducers used for measurement of angular displacement.
- e) State any two applications of ultrasonic level measurement method.
- f) Differentiate following transducers as active and passive transducers –
  - i) Piezo-electric transducers.
  - ii) Inductive Transducers.
  - iii) Piezo-resistive transducers
  - iv) Thermo couple.

**Q.2 Attempt any FOUR**

**(16)**

- a) Define NTC and PTC. Give one example of NTC and PTC type transducer.
- b) Explain working of photo-sensitive transducer with its example, with necessary diagram.
- c) Describe the measurement of level using float type method with neat diagram.
- d) Draw & describe the construction of thermocouple. Give its two applications.
- e) Classify transducers on the basis of type of output. Give example of each.
- f) Explain with neat diagram any one the capacitive type level measurement using neat diagram List its advantages and dis-advantages.

**Q.3 Attempt any FOUR**

**(16)**

- a) Define electrical transducer. Give advantages of electrical transducers.
- b) Describe the working of radiation pyrometer with its neat diagram.

(P.T.O.)

- c) With neat constructional diagram, explain the working of LVDT.
- d) Describe use of synchros for measurement of displacement.
- e) Explain cold junction compensation technique used in thermocouple.
- f) Compare RTD and thermister for following points –
  - i) Working principle,    ii) Material used    iii) Type of temperature coefficient    iv) Range of measurement.

## Section – II

**Marks**

**Q.4**      Attempt any **FOUR**

**(08)**

- a) What are different pressure sensing elements ?
- b) Why are dummy gauges used ?
- c) Draw a neat labeled diagram of flow meter using a hot wire anemometer.
- d) Define Telemetry.
- e) Design operational amplifier as an inverter.
- f) What do you mean by Data acquisition system ?

**Q.5**      Attempt any **FOUR**

**(16)**

- a) Draw and explain C-shaped bourdon tube and Helical bourdon tube.
- b) Explain with proper diagram how flow can be measured using thermistor.
- c) Draw a block diagram of general telemetry system and explain function of each block.
- d) Explain Pulse Code Modulation (PCM) Telemetry system with neat block diagram.
- e) Explain the terms preamplification and filtering with respect to the signal conditioning.
- f) Explain multichannel data acquisition system with neat diagram.

**Q.6**      Attempt any **FOUR**

**(16)**

- a) Explain any one piezo electric transducer for pressure measurement.
- b) Draw a neat diagram of Electromagnetic flow meter. State its advantages, disadvantages & applications.
- c) State different types of telemetry system. Explain R.F. Telemetry.
- d) Explain various telemetry transmission channels and media.
- e) Explain following terms :
  - i) Ratio metric Conversion,    ii) Logarithmic compression.
- f) Draw and explain block diagram of DC signal conditioning system.

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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: FOURTH**

**PROGRAM: IE /E&TC**

**COURSE CODE: ETE/IEE402/IX/EJ302**

**COURSE NAME: 8051 MICROCONTROLLER**

**MAX. MARKS: 80**

**TIME: 3 HRS.**

**DATE: 05/12/2017**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks  
(08)**

**Q.1 Attempt any FOUR**

- a) What are the different types of buses?
- b) Describe the function of stack pointer.
- c) What do you mean by bit addressable and byte addressable memory?
- d) State the function of  $\overline{PSEN}$  and ALE pins of 8051 microcontroller.
- e) State any two byte-wise conditional jump instruction.
- f) Enlist different logical instructions of 8051 microcontroller.

**Q.2 Attempt any FOUR**

**(16)**

- a) With the help of neat diagram, explain 8 bit UART mode of 8051 microcontroller.
- b) State the difference between Harvard and Von-Neumann architecture with suitable diagram.
- c) Describe the addressing modes of 8051 microcontroller with suitable examples.
- d) Explain function of following registers
  - i) PSW Register
  - ii) DPTR
- e) Describe two instructions of 8051 microcontroller each related with external data memory and program memory access.
- f) Write a program to find how many ODD numbers are present in the array of 10 numbers stored in internal RAM memory.

**Q.3 Attempt any FOUR**

**(16)**

- a) Differentiate between microprocessor and microcontroller (any four points)
- b) With the help of neat diagram explain the operation of mode 2 of timer of 8051 microcontroller.
- c) Write the format of SCON register and explain it.
- d) Write an 8051 based ALP to transfer 10 bytes in external RAM memory starting from location 7340H to the memory location starting from 7400H.
- e) Describe the function of following instructions:
  - i) SWAP A
  - ii) XCH A, Rr
- f) Write an assembly language program to add two BCD numbers stored in register bank 1.

**Q.4 Attempt any FOUR****(08)**

- State any four applications of 8051 microcontroller.
- What value should be loaded in TMOD SFR to configure timer  $\phi$  in mode 2 & counter 1 in mode 1.
- State the significance of SMOD bit in PCON SFR.
- State any two advantages of LCD display over seven –segment display.
- What will be the step size of ADC 0804 if voltage at  $V_{ref}/2$  pin = 1.28 V?
- State the two features of temperature sensor LM35.

**Q.5 Attempt any FOUR****(16)**

- Draw a neat interfacing diagram of 8051 microcontroller with relay.
- Consider ADC 0804 is interfaced with 8051 microcontroller. Write an assembly language program to read the ADC continuously and send the data on port.
- Write an assembly language program to receive the data serially at a baud rate of 9600. Assume crystal frequency = 11.0592 MHz
- Consider LED are connected to port 1. Write an assembly language program to flash LEDs at an interval of 10 msec. continuously. Assume crystal frequency = 12 MHz.
- Write an assembly language program to measure the width of a pulse applied externally to 8051 microcontroller and send it to port 1 continuously. Assume crystal frequency = 12 MHz.
- Consider a stepper motor is interfaced with 8051 microcontroller and a switch is connected to P1. $\phi$ . Write an assembly language program to perform the following.
  - When switch = 0, rotate the stepper motor clockwise
  - When switch = 1, rotate the stepper motor anticlockwise

**Q.6 Attempt any TWO****(16)**

- Design a 8051 microcontroller based function generator that will generate various waveforms such as ramp wave, sawtooth wave, square wave, staircase wave etc. (Draw complete hardware schematic and assembly language program)
- Draw a neat labeled interfacing diagram of 8051 microcontroller with LCD display. Also Write an assembly language program to display the message "INDIA"
- Write an assembly language program to perform the following
  - To generate a square wave of frequency 1 KHz at P2. $\phi$
  - To transmit a word "ETX" at baud rate of 1200. Assume crystal frequency = 11.0592 MHz

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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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LEVEL: **THIRD**

PROGRAM: **IE/E&TC**

COURSE CODE: **EIF306/ETE306/EJ207/IEE306** COURSE NAME: **DIGITAL TECHNIQUES AND APPLICATIONS**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **06/12/2017**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	Co EIF306	Mark
Q.1		Attempt any <b>FOUR</b>			(08)
	a)	Draw pinout diagram of 7408.	R	3	
	b)	State any four Boolean laws.	R	2	
	c)	Find 2's complement of the following numbers i) 101110 ii) 101010	A	1	
	d)	List any four characteristics of logic families.	R	3	
	e)	Draw symbols and logical expressions for i) NAND ii) EX-OR	R	2	
	f)	Convert the following i) $(110101)_2 = ( )_{10}$ ii) $(420)_{10} = ( )_2$	A	1	
Q.2		Attempt any <b>FOUR</b>			(16)
	a)	Explain following characteristics of logic families i) Noise immunity ii) Power Dissipation	U	3	
	b)	State and prove De-Morgan's theorems.	U	2	
	c)	Solve $(14)_{10} - (24)_{10}$ in BCD using 9's and 10's complement.	A	1	
	d)	Explain operation of 3-input TTL NAND gate with circuit diagram.	U	3	
	e)	In the following circuits, the switches may be ON (1) or OFF (0). And will cause the bulb to be ON (1) or OFF (0). Consider all possible conditions of the switches s1 and s2, identify the logic gates and write its truth table.	A	2	
	f)	Compare COMS and ECL on the basis of i) Basic gate ii) Noise immunity iii) Power dissipation iv) propagation delay.	U	3	

**P.T.O**

<b>Q.3</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
a)	Draw the circuit diagram of 2-input COMS NAND and 2- input COMS NOR gate.	U	3	
b)	Minimize the following expression using k-map and realize using the basic gates. $Y = \sum m(1,2,9,10,11,14,15)$	A	2	
c)	Perform binary subtractions using 2' s complements of following i) $(63)_{10} - (20)_{10} = ?$ ii) $(34)_{10} - (48)_{10} = ?$	A	1	
d)	Explain working of COMS inverter with circuit inverter.	U	3	
e)	Simplify the following and realize it $Y = A + \bar{A}\bar{B}C + \bar{A}\bar{B}\bar{C} + ABC + \bar{A}\bar{B}$	A	2	
f)	Convert the following number into its equivalent $= (146.25)_{10}$ i) Binary number ii) Octal number	A	1	
<b>Q.4</b>	Attempt any <b>FOUR</b>			<b>(08)</b>
a)	State what is combinational circuit? Draw logic diagram of 2:1 mux.	R	4	
b)	Draw circuit diagram and truth table of SR flip flop.	R	5	
c)	Give the advantages of static RAM.	R	6	
d)	Draw pin diagram of IC7483.	R	4	
e)	State the applications of shift register. (any 2)	R	5	
f)	Draw block diagram of Dual slope ADC.	R	6	
<b>Q.5</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
a)	Implement full adder circuit by using half adder.	A	4	
b)	Design 3 bit synchronous counter using flip-flops.	A	5	
c)	Explain how binary data $(101)_2$ is converted into its analog form by using binary weighted register DAC.	A	6	
d)	Implement one digit BCD adder using IC 7483.	A	4	
e)	Explain J-K flip-flop with the help of circuit diagram and truth table.	U	5	
f)	Explain the working of single slope ADC.	U	6	
<b>Q.6</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
a)	Implement 16:1 Mux by using 4:1 Mux.	A	4	
b)	Explain serial in serial out mode of a shift register.	U	5	
c)	Explain memory organization with diagrams.	U	6	
d)	Explain the working of seven segments. display by using IC7447	U	4	
e)	Design 3 bit up ripple counter and explain its working.	A	5	
f)	Explain IC PCF8591, 8 bit ADC –DAC converter.	U	6	
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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: Third**

**COURSE CODE: ETE307/IEE307**

**MAX. MARKS: 80**

**PROGRAM: IE/E&TC**

**COURSE NAME: LINEAR INTEGRATED CIRCUITS**

**TIME: 3 HRS.**

**DATE: 20/11/2017**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Q.1 Attempt any FOUR**

**Marks  
(08)**

- a) Define CMRR. State its formula
- b) State any four feature of IC741.
- c) What are the advantages of Op-amp?
- d) Define i) Input offset current ii) Input bias current
- e) State the concept of virtual ground.
- f) What is the gain of non-inverting amplifier if  $R_f=5k\Omega$  and  $R_i=1k\Omega$

**Q.2 Attempt any FOUR**

**(16)**

- a) Explain output stage of op-amp with neat diagram.
- b) Draw the block diagram of op-amp. State the function of any two block.
- c) State ideal and typical value of the following parameters of IC741.
  - i) Supply voltage rejection ratio
  - ii) Common mode rejection ratio
  - iii) Slew rate
  - iv) Gain bandwidth
- d) Draw active ideal integrator circuit. State the output voltage expression.
- e) Draw circuit diagram of V-I converter of floating load. Derive expression for its output.
- f) Draw circuit diagram of antilog amplifier. State its equation for output voltage.

**Q.3 Attempt any FOUR**

**(16)**

- a) Explain with circuit diagram cascaded differential amplifier.
- b) Explain constant current source with neat diagram.
- c) Draw the equivalent circuit of op-amp. Define the terms input resistance and input capacitance.

*P.T.O.*

- d) Sketch the voltage transfer curve of op-amp and explain it.
- e) Drive the expression for output voltage of inverting summing amplifier.
- f) Explain positive peak detector with circuit diagram.

**Q.4** Attempt any **FOUR** **(08)**

- a) State the Barkhausen criteria for oscillators.
- b) What is filter? Give different types of filter.
- c) Give any four specification of IC710 comparator.
- d) Draw pin diagram for IC555.
- e) Define the terms i) Lock in range ii) Capture range.
- f) List two merits and two demerits of active filter over passive filter.

**Q.5** Attempt any **FOUR** **(16)**

- a) Explain block diagram of IC566
- b) Compare between voltage comparator and Schmitt trigger with four points.
- c) Draw circuit diagram and frequency response of first order low pass butter worth filter. Give expression of cut-off frequency and gain.
- d) Explain operation of an astable multivibrator with neat diagram using IC555.
- e) With neat circuit diagram, explain operation of frequency multiplier using IC565.
- f) Draw phase shift oscillator using IC741. State the equation for output frequency.

**Q.6** Attempt any **FOUR** **(16)**

- a) For a first order Butterworth low-pass filter. Calculate the cut off frequency if  $R=10k\Omega$  and  $C=0.001\mu f$ . Also calculate the pass band voltage gain if  $R_1=10k\Omega$  and  $R_F=100k\Omega$ .
- b) Draw and explain operation of inverting comparator with proper waveforms.
- c) Explain operation of water level controller using IC555.
- d) Draw circuit and input output waveforms for Schmitt trigger using IC555.
- e) Compare between RC phase shift oscillator and Wien bridge oscillator using op-amp with any four points.
- f) Draw circuit diagram for bistable multivibrator using op-amp and explain its operation.

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**ODD TERM END EXAM NOV. / DEC. -2017****EXAM SEAT NO.**

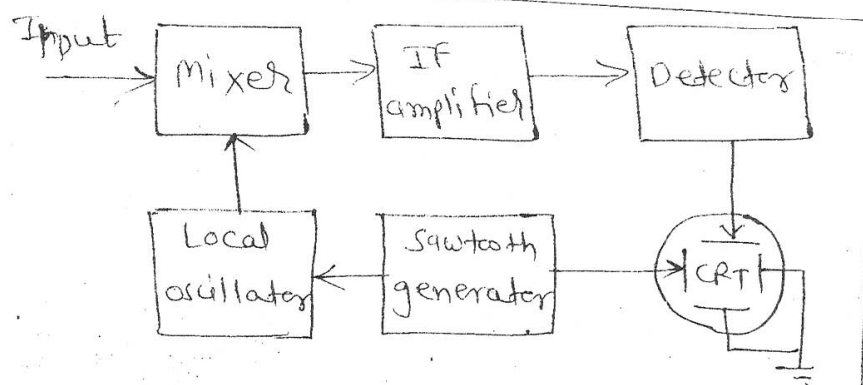
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**LEVEL :- THIRD****PROGRAM : IE & E & TC****COURSE CODE :- EIF303/IX/EJ203/IEE/ETE303****COURSE NAME :- ELECTRONICS MEASURING INSTRUMENTS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 02/12/2017****Instruction :-**

- 1) Answers must be written in the main answer book provided.( and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN > Question No., SQN> Question No. R> Remembering, U> Understanding, A> Application.

Q N	S Q N	Question Text	R/ U/ A	CO Cod e EIF303	Mark s
Q.1		Attempt any <b>FOUR</b>			<b>08</b>
	a)	State different types of errors present in electronic instruments.	R	1	
	b)	Define following terms i) Accuracy ii) Precision	R	1	
	c)	Enlist any four AC bridges.	R	2	
	d)	State any two uses of Wien's bridge	R	2	
	e)	Define the term i) Sensitivity ii) Resolution.	R	3	
	f)	State methods by which you can identify digital display is accurate.	R	3	
Q.2		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Explain the need of calibration.	U	1	
	b)	Explain the operation dual slope DVM with the help of diagram.	U	3	
	c)	Calculate unknown value of a capacitor using Schering's bridge.	A	2	
	d)	Draw and explain operation of LCR meter.	U	3	
	e)	State any four advantages of digital frequency meter.	U	3	
	f)	State any two limitations and advantages of Maxwell's Bridge	U	2	
Q.3		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Identify name of bridge which is used as modified Maxwell's bridge and drive its equation.	A	2	
	b)	Compare digital instruments and Analog instruments ( any four points)	U	3	
	c)	Explain systematic errors and Random error in detail.	U	1	
	d)	Draw and explain Hay bridge.	U	2	
	e)	Explain construction and working principle of PMMC.	A	3	
	f)	Explain capacitance comparison bridge and give any two applications of it.	U	2	

Q N	S Q N	Question Text	R/ U/ A	CO Cod e	Mark s
Q.4		Attempt any <b>FOUR</b>		<b>E1F306</b>	<b>08</b>
	a)	Draw general block diagram of CRO probe.	R	4	
	b)	Define spectrum analyzer.	R	5	
	c)	State any two applications of strip chart recorder.	R	5	
	d)	Define X-Y recorder.	R	5	
	e)	Write the function of time base generator and trigger circuit in CRO	R	4	
	f)	Define deflection sensitivity and write its formula.	R	4	
Q.5		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Draw block diagram of X-Y recorder. State any two applications of it.	A	5	
	b)	Explain how CRO can be used to test i) Diode ii) Transistor.	A	4	
	c)	Draw diagram of circular chart recorder.	U	5	
	d)	Explain with diagram input coupling selector.	U	4	
	e)	Draw a neat labeled diagram of CRT.	U	4	
	f)	Draw block diagram of pulse generator. Justify how can you vary the duty cycle of the pulse in block diagram of it.	A	5	
Q.6		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Draw and explain the type of CRO probe used to measure current in the circuit.	A	4	
	b)	Draw and explain block diagram of logic analyzer.	U	5	
	c)	Compare between single beam and dual beam CRO on basis of following points i) Number of electron beam ii) Cost iii) Number of vertical amplifiers used iv) Definition.	U	4	
	d)	Identify the given diagram shown in figure and explain its working.	A	5	
	e)	Define signal generator. Draw block diagram of RF type signal generator.	U	5	
	f)	Explain with diagram use of lissajous patterns for phase measurement.			



Q. 6. (d)

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**ODD TERM END EXAM NOV. / DEC. -2017**

**EXAM SEAT NO.**

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**LEVEL : - THIRD**

**PROGRAM : IE & E & TC**

**COURSE CODE :- EIF305 / IEE/ETE305/ EJ205**

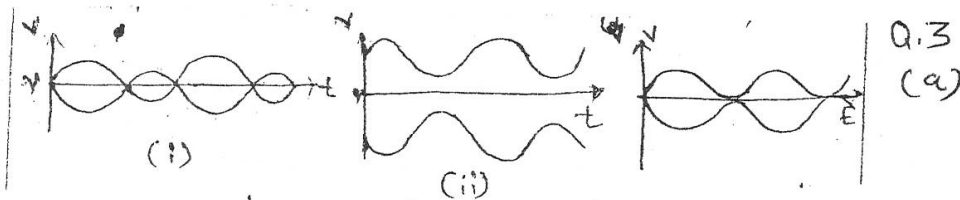
**COURSE NAME :- ANALOG COMMUNICATION**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 04/12/2017**

**Instruction :-**

- 1) Answers must be written in the main answer book provided.( and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN > Question No., SQN> Question No. R> Remembering, U> Understanding, A> Application.

QN	S Q N	Question Text	R/ U/ A	CO e Cod EIF305	Marks
Q.1		Attempt any <b>FOUR</b>			<b>08</b>
	a)	Define i) Bandwidth ii) Information capacity.	R	1	
	b)	State the significance of modulation index in AM transmission.	U	2	
	c)	Calculate the modulation index for FM if modulating frequency is 1 KHz and maximum deviation is 1.6 KHz.	A	3	
	d)	Enlist any two examples of simplex and duplex communication system.	R	1	
	e)	List any two advantages and disadvantages of single sideband (SSB) technique.	R	2	
	f)	Draw circuit diagram of varactor modulator used for FM generation.	R	3	
Q.2		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Draw and explain the electromagnetic frequency spectrum.	U	1	
	b)	In FM, if maximum deviation is 75 KHz and the maximum modulating frequency is 10 KHz, calculate the deviation ratio and bandwidth of FM.	A	3	
	c)	Derive a mathematical expression for amplitude modulated wave.	U	2	
	d)	Define modulation and explain need of modulation.	U	1	
	e)	Differentiate between AM and FM on the basis :- i) Definition ii) Bandwidth iii) Modulation index iv) Application.	U	3	
	f)	Draw and explain block diagram of high level modulated AM transmitter.	A	2	
Q.3		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Suggest suitable value of modulation index for AM waveform as shown in figure and justify it.	A	2	



P.T.O.

QN	S Q N	Question Text	R/ U/ A	CO Cod e EIF305	Mark s
	b)	Draw block diagram of Armstrong method to generate FM Wave and explain its working.	U	3	
	c)	An AM transmitter, transmits signal at 50 KW with modulation depth as 85 percent. Calculate the carrier power and total sideband power in the transmitted signal.	A	2	
	d)	Draw and explain basic electronic communication system.	U	1	
	e)	Describe vestigial sideband ( VSB) modulation technique. Compare VSB to conventional AM.	U	2	
	f)	Compare wideband FM and Narrowband FM on the basis of following points. i) Modulation index                      ii) Maximum deviation iii) Range of modulating frequency iv) Applications.	R	4	
Q.4		Attempt any <b>FOUR</b>			<b>08</b>
	a)	State the frequency ranges for ground wave and space wave propogation.	R	6	
	b)	Explain the working of PLL detector.	U	4	
	c)	Differentiate between antenna gain and directive gain for an antenna.	U	4	
	d)	Define radiation pattern of an antenna. Draw of any one antenna with proper label.	R	5	
	e)	List the functions of limiter block of an FM receiver.	R	4	
	f)	Draw the S-curve for any FM detector.	R	4	
Q.5		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Quality of FM reception is superior than the quality of AM reception. Justify.	U	5	
	b)	Define the following terms with respect to antenna i) Power gain ii) Antenna resistance.	R	6	
	c)	Draw the block diagram of FM receiver with output waveform at the output of each block.	U	4	
	d)	Interpret on charging and discharging time constants of the capacitor in a simple envelope detector.	A	4	
	e)	With the help of diagram explain multipath space wave propogation.	U	6	
	f)	Draw and explain simple slope FM detector. Mention its merits and demerits.	U	4	
Q.6		Attempt any <b>FOUR</b>			<b>16</b>
	a)	State whether true or false: Amplitude limiter is not required prior to the ratio detector.	A	4	
	b)	Explain the working of helical antenna with the help of diagram.	U	5	
	c)	Describe the strata of the ionosphere and their effect on sky wave propogation.	U	6	
	d)	With the help of radiation pattern explain the working of loop antenna.	U	6	
	e)	Explain the fading effect. List major causes and remedies to overcome fading effect.	U	6	
	f)	Explain the working of parabolic reflector antenna with its structure and radiation pattern.	A	8	



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**LEVEL: FIRST****PROGRAM: IE / E & TC****COURSE CODE: ETF/IEF-107/IEE/ETE 107****COURSE NAME: BASIC ELECTRICAL ENGINEERING****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 27/11/2017****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S. Q. N	Question Text	R U A	CO EIF107	Marks
Q.1		Attempt any <b>FOUR</b>			(08)
	a)	What is the law of resistance?	R	1	
	b)	Explain with suitable sketch voltage drop & Terminal voltage.	U	1	
	c)	State Kirchhoff's voltage law.	R	1	
	d)	State faraday's First & Second law with suitable sketch & expression for electro magnetic Induction.	U	3	
	e)	How to determine the direction of induced emf or current?	U	3	
	f)	State an expression for self inductance considering magnetic terms of the circuits.	R	3	
Q.2		Attempt any <b>FOUR</b>			(16)
	a)	Define & Explain with suitable sketch. Ohms law of Magnetic circuit.	U	2	
	b)	An iron ring has cross sectional area of $3 \text{ cm}^2$ & mean diameter of 25 cm. An air gap of 0.4 mm has been cut across the section of the ring. The ring is wound with a coil of 200 turns through which a current of 2 Amp is passed. If the total magnetic flux is 0.24 mwb, find relative permeability of iron. Neglect leakage of fringing.	A	2	
	c)	Draw labeled sketch of hysteresis loop & Explain Hysteresis loss of magnetic circuit.	U	2	

P.T.O.

	d)	The resistivity of a ferric – chromium-Aluminium alloy is $51 \times 10^{-8} \Omega\text{m}$ . A sheet of such material is 15 cm long, 6 cm wide & 0.014 cm thick. Determine resistance between – i) Opposite ends ii) Opposite side. (see fig (01) )	A	1	
	e)	Solve the given network using KCL & KVL to find the current in $8\Omega$ resistor. (See fig (02))	A	1	
	f)	Explain with suitable labeled sketch energy stored in the Magnetic field.	U	2	
<b>Q.3</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Explain the coefficient of Mutual inductance (M) using suitable sketches & their labels.	U	3	
	b)	State expressions of self inductance & Mutual Inductance using magnetic circuits terms & explain the terms with their units.	R	3	
	c)	Differentiate between DC & AC current. Draw suitable circuit diagrams & wave forms & expressions.	U	1	
	d)	Explain the procedure of calculation of A.T. for series magnetic circuits.	U	2	
	e)	Explain the details of permeability of magnetic circuit.	U	2	
	f)	State & explain various type of magnets & their applications.	U	2	
<b>Q.4</b>		Attempt any <b>FOUR</b>			<b>(08)</b>
	a)	What is meant by 'out of phase voltages?'	U	4	
	b)	Define the terms – i) Amplitude ii) Time period.	R	4	
	c)	Define admittance. State its unit.	R	5	
	d)	State types of earthing.	R	6	
	e)	Classify transformer on the basis of - i) No. of phases ii) Construction.	R	6	
	f)	Define 'phase sequence'. State its importance.	R	6	
<b>Q.5</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Find the sum of following two emfs and express the answer in similar form ; $e_1 = 100 \sin wt$ $e_2 = 100 \cos wt$	A	4	
	b)	Explain in brief how alternating voltage is generated.	U	4	
	c)	Define: i) RMS value ii) Average value iii) Cycle iv) Frequency.	R	4	
	d)	Express the instantaneous current given by $I = 20 \sin(wt - \pi/3)$ in the polar and rectangular form.	A	5	

e)	Explain purely resistive circuit with circuit diagram and phasor diagram.	U	5	
f)	Draw power triangle for R-C series circuit. Deduce the expressions for Real power, Reactive power and apparent power for R-C series circuit.	U	5	
Q.6	Attempt any <b>FOUR</b>			(16)
a)	Draw the phasor diagrams showing 'lagging' and 'leading' alternating quantities . Explain in brief.	U	5	
b)	A coil having a resistance of $4.5\Omega$ and inductance of $0.03H$ is connected across $230V$ , $50\text{ Hz}$ single phase supply mains, find current taken by coil.	A	5	
c)	$\bar{V}_1 = 3 + j6$ $\bar{V}_2 = 2 + j4$  Calculate i) $\bar{V}_1 + \bar{V}_2$ ii) $\bar{V}_1 - \bar{V}_2$ iii) $\bar{V}_1 \times \bar{V}_2$ iv) $\frac{\bar{V}_1}{\bar{V}_2}$	A	4	
d)	Explain with diagram star connected 3 phase system.	U	6	
e)	Explain advantages of poly phase system.	U	6	
f)	Explain pipe earthing with neat diagram.	U	6	

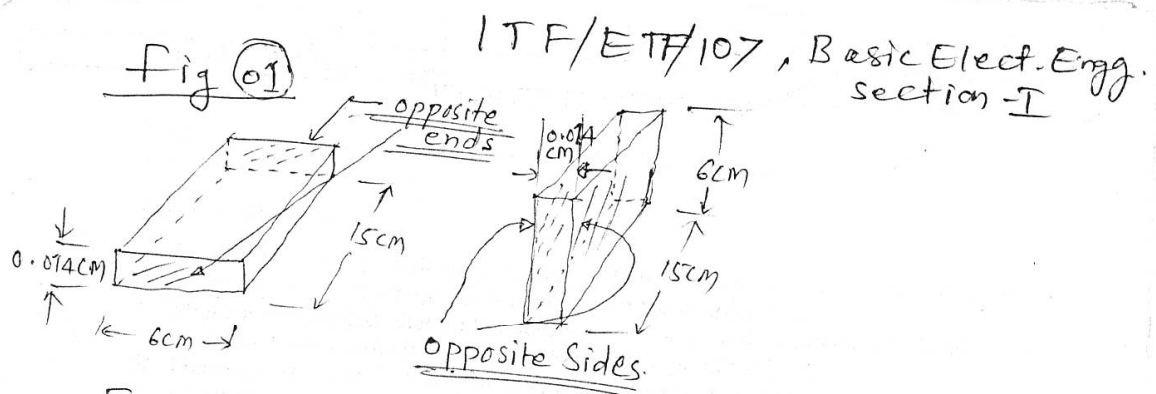
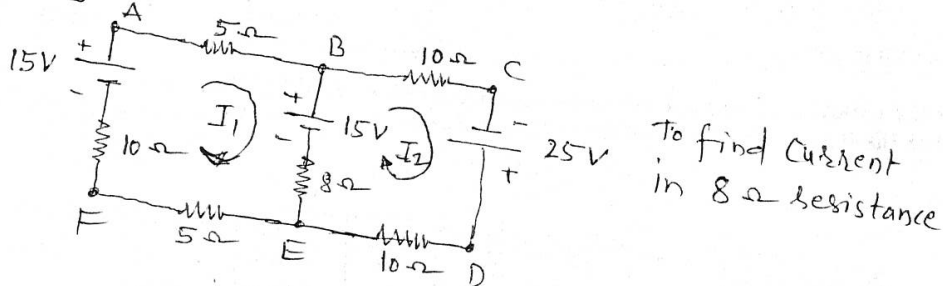


Fig 02





# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: THIRD**

**PROGRAM: IE/E&TC/IT/EE**

**COURSE CODE: EEF301/EIF301/ITF301/EE201/EEE305/IEE301/IX201/IF201/IT201/ITE301/EJ201/ETE301**

**COURSE NAME: APPLIED MATHEMATICS**

**MAX. MARKS: 80**

**TIME: 3 HRS.**

**DATE: 28/11/2017**

**Instruction:-**

- 1) Answer to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	RU A	Co EEF301	Marks
<b>Q.1</b>		Attempt any <b>FOUR</b>			<b>(08)</b>
	a)	Find the value of $\int \frac{1}{x^2-1} dx$	R	1	
	b)	Find the value of $\int \frac{1}{x^2+9} dx$	R	1	
	c)	Show that $\int e^x (\log x + \frac{1}{x}) dx = e^x \log x + c$	U	1	
	d)	Find the value of $\int_1^2 \frac{dx}{3x-2}$	R	2	
	e)	Show that, $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx = \frac{\pi}{4}$	U	2	
	f)	Evaluate $\int_0^{\pi/2} \sin 5x \cdot \cos 3x dx$	A	2	
<b>Q.2</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Show that, $\int \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx = -\sqrt{1-x^2} \cdot \sin^{-1} x + x + c$	U	1	
	b)	Evaluate : $\int \frac{1}{4x^2+3x+1} dx$	A	1	
	c)	Evaluate : $\int \cos \sqrt[3]{x} dx$	A	1	
	d)	Evaluate : $\int_0^{\pi} x \cdot \sin x \cdot \cos^2 x dx$	A	2	
	e)	Find by integration the area of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	A	3	
	f)	Find the mean value of $I = 10 \sin 100\pi t$ over a complete period	A	3	
<b>Q.3</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Evaluate : $\int \tan^{-1} \sqrt{x} dx$	A	1	
	b)	Evaluate : $\int \frac{x \tan^{-1} x}{(1+x^2)^{3/2}} dx$	A	1	

P.T. O.

c)	Sow that, $\int \frac{1}{\sqrt{1+\sin x}} dx = \sqrt{2} \log \left  \sec \left( \frac{x}{2} + \frac{\pi}{4} \right) - \cot \left( \frac{x}{2} + \frac{\pi}{4} \right) \right  + C$	U	1	
d)	Evaluate $\int_0^{\pi/2} \frac{dx}{1+\sqrt{\tan x}}$	A	2	
e)	Find the area of the region laying between the parabolas $y^2 = 4ax$ & $x^2 = 4ay$ where, $a > 0$	A	3	
f)	Calculate the R.M.S value of an alternating current $i = 10 \sin 50\pi t$ over a complete period.	A	3	
<b>Q.4</b>	Attempt any <b>FOUR</b>			<b>(08)</b>
a)	State the condition for the equation $Mdx + Ndy = C$ is exact.	R	2	
b)	Find order and degree of the following $\left(\frac{d^2y}{dx^2}\right)^3 + 3\left(\frac{dy}{dx}\right)^5 + 3y = 0$	U	2	
c)	Find modules and amplitude of $1+i\sqrt{3}$	U	3	
d)	Define order and degree of a D.E	R	2	
e)	If $\alpha = \frac{-1+i\sqrt{3}}{2}$ and $\beta = \frac{-1-\sqrt{3}i}{2}$ prove that i) $\alpha^2 = \beta$ ii) $\beta^2 = \alpha$	U	3	
f)	If $z = 2+i$ find the value of $z^2 - 2z + 1$	U	3	
<b>Q.5</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
a)	Simplify $\left[ \sin \frac{\pi}{6} + i \cos \frac{\pi}{6} \right]^7$ using De-Moivers theorem.	A	3	
b)	Solve: $\frac{dy}{dx} = e^{3x-2y} + x^2 e^{-2y}$	A	2	
c)	Solve: $(y+x^2y)\frac{dy}{dx} + (3x+xy^2) = 0$	A	2	
d)	Solve: $\frac{dy}{dx} = \frac{x^2+y^2}{xy}$	A	2	
e)	Express $\sqrt{2}(-1+i)$ into its polar form.	U	3	
f)	A particle starting with velocity has an acceleration $(1-t^2)$ m/s <sup>2</sup> . When does it first come to rest? How has it then travelled?	A	2	
<b>Q.6</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
a)	Using Euler's expression prove that $\sin \alpha + \sin \beta = 2 \sin \left( \frac{\alpha+\beta}{2} \right) \cos \left( \frac{\alpha-\beta}{2} \right)$	U	3	
b)	If $Z_1, Z_2, Z_3, Z_4$ are the value of $\left[ \cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right]^{3/4}$ . Show that $Z_1 \cdot Z_2 \cdot Z_3 \cdot Z_4 = 1$	U	3	
c)	If $\cos(A+iB) = x+iy$ prove that i) $\frac{x^2}{\cos^2 A} - \frac{y^2}{\sin^2 A} = 1$ ii) $\frac{x^2}{\cosh^2 B} + \frac{y^2}{\sinh^2 B} = 1$	U	3	
d)	Solve: $\frac{dy}{dx} + y \tan x = \cos^2 x$	A	2	
e)	Verify that $y = \sin(\log x)$ is a solution of differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 0$	U	2	
f)	Prove that $(1+i)^8 + (1-i)^8 = 32$ using De-Moiver Theorem.	A	3	

# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: FIRST**

**PROGRAM: COMMON**

**COURSE CODE: CCF106/0108/R108/X110/CCE106**

**COURSE NAME: ENGINEERING MATHEMATICS**

**MAX. MARKS: 80**

**TIME: 3 HRS.**

**DATE: 21/11/2017**

**Instruction:-**

- 1) Answer to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application

QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code	Marks
<b>Q.1</b>		Attempt any <b>FOUR</b>			(08)
	a)	Find 'k' if the points (4, k), (2, 0) and (-4, -9) are collinear.	R	CCF106-1	
	b)	Show that the roots of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3.	U	CCF106-4	
	c)	Find the distance between the two parallel lines $3x - 2y + 26 = 0$ and $3x - 2y + 11 = 0$	R	CCF106-2	
	d)	Find the perpendicular distance of the point (-1,-8) from the line $4x + 3y + 28 = 0$ . What is the conclusion?	R	CCF106-2	
	e)	Find the slope and the intercepts made by the line $\frac{3x}{5} + \frac{2y}{7} = 11$ on both axes.	U	CCF106-2	
	f)	Find out which of the following circles is bigger. $x^2 + y^2 - 4x - 2y - 35 = 0$ and $x^2 + y^2 - 4x - 14y + 28 = 0$	U	CCF106-3	
<b>Q.2</b>		Attempt any <b>FOUR</b>			(16)
	a)	Find the area of quadrilateral whose vertices are (1, 5), (8, 2), (11, 3), (4, 6)	A	CCF106-1	
	b)	Find the equation of straight line passing through (5, 4), (3, -2). Also find slope and intercepts made by that line on both axes.	A	CCF106-2	
	c)	Find the equation of the perpendicular bisector of the join AB where A(3,-4) & B(-4,3)	A	CCF106-2	
	d)	Evaluate $\sqrt[3]{60}$ using Regula Falsi method, using 2 iterations.	A	CCF106-4	
	e)	Find a positive root of $f(x) = x^3 - 2x + 0.5$ using Bisection method, upto 3 iterations	A	CCF106-4	
	f)	Use Gauss Seidel method to solve the following simultaneous equations: $8x + 4y - 2z = 3$ , $2x - 6y + z = 15$ , $4x + 5y + 15z = 37$ up to 3 iteration.	A	CCF106-5	
				<b>P.T.O</b>	



<b>Q.3</b>	Attempt any <b>FOUR</b>			(16)
a)	Show that the following circles touch each other $x^2 + y^2 + 4x - 12y + 4 = 0$ ; $x^2 + y^2 - 2x - 4y + 4 = 0$	U	CCF106-3	
b)	Find the equation of circle which has its center at (4, 3) and touches the line $5x - 12y - 10 = 0$	A	CCF106-3	
c)	Solve by Jacobi's method (3 iterations only) $25x + 6y - z = 82$ ; $6x + 15y + 5z = 75$ ; $x + 4y + 40z = 66$	A	CCF106-5	
d)	Find approximate root of the equation $x^3 + x - 1 = 0$ by using bisection method (3 iteration only).	A	CCF106-4	
e)	Find the root of the equation $2x - \log_{10} x = 7$ using Regula Falsi method (3 iterations).	A	CCF106-4	
f)	Solve by Jacobi's method (Take 3 iterations) $2x + 20y - 3z = 19$ ; $3x - 3y + 25z = 22$ ; $15x + 2y + z = 18$	A	CCF106-5	
<b>Q.4</b>	Attempt any <b>FOUR</b>			(08)
a)	If $f(x) = x^2 + x + 1$ then find $f(x-1)$ .	R	CCF106-3	
b)	Show that $f(x) = x^4 + 2x^2 + \cos x$ is an even function.	U	CCF106-3	
c)	Evaluate $\lim_{x \rightarrow 0} \frac{\sin 4x}{\tan 3x}$	R	CCF106-3	
d)	Evaluate $\lim_{x \rightarrow 5} \frac{x^3 - 125}{x^2 - 3x - 10}$	R	CCF106-3	
e)	Find $\frac{dy}{dx}$ , if $y = e^{2x} + \log_5 x + \log_7 7$	R	CCF106-4	
f)	Find $\frac{dy}{dx}$ , if $y = e^{\sin x + \cos x}$	R	CCF106-4	
<b>Q.5</b>	Attempt any <b>FOUR</b>			(16)
a)	If $f(x) = \frac{1}{1-x}$ show that, $f\{f[f(x)]\} = x$	U	CCF106-3	
b)	Evaluate $\lim_{x \rightarrow 1} \frac{\sqrt{3+x} - \sqrt{5-x}}{x^2 - 1}$	A	CCF106-3	
c)	Evaluate $\lim_{x \rightarrow \pi/4} \frac{\sin x - \cos x}{x - \pi/4}$	A	CCF106-3	
d)	If $y = \sin^{-1} \left[ \frac{1-x^2}{1+x^2} \right]$ find $\frac{dy}{dx}$	A	CCF106-4	
e)	If $y = x^x + (\cos x)^x$ find $\frac{dy}{dx}$	A	CCF106-4	
f)	Find the equation of tangent and normal to the curve $y = x(2-x)$ at point (2,0)	A	CCF106-4	
<b>Q.6</b>	Attempt any <b>FOUR</b>			(16)
a)	Find $\frac{dy}{dx}$ , if $\sin y = \log(x+y)$	A	CCF106-4	
b)	Find $\frac{dy}{dx}$ , if $x = a[\cos t + t \sin t]$ and $y = a[\sin t - t \cos t]$	A	CCF106-4	
c)	If $y = (\sin^{-1} x)^2$ prove that, $(1-x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - 2 = 0$	U	CCF106-4	
d)	If $y = \tan^{-1} \left[ \frac{5x}{1-6x^2} \right]$ find $\frac{dy}{dx}$	A	CCF106-4	
e)	If $y = \sqrt{4x^2 - 3} \cdot (7x^2 + 6)^6$ find $\frac{dy}{dx}$	A	CCF106-4	
f)	Find the maximum and minimum value of $x^3 - 18x^2 + 96x$	A	CCF106-4	
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**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**ODDTERM END EXAM NOV. / DEC. 2017**

**EXAM SEAT NO.**

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**LEVEL :- FIFTH**

**PROGRAM : IE & E & TC**

**COURSE CODE :- IEE/ETE508 / IX404**

**COURSE NAME :- INDUSTRIAL ORGANIZATION & MANAGEMENT**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 23 / 11 / 2017**

Instruction :-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) Define Organization and Business.
- b) Write meaning of Agro based Industry.
- c) Define Administration and Management.
- d) Write the meaning of planning in Management.
- e) List any four types of partners.
- f) Define authority and responsibility.

**Q.2 Attempt any FOUR**

**(16)**

- a) Write advantages and disadvantages of Globalization with reference to India.
- b) List the types of business and explain any one type of business.
- c) Explain following industrial sectors i) Engineering Industry ii) Process Industry.
- d) Explain the levels of Management.
- e) List fourteen principle of Management. ( Henry Fayol 14 principles)
- f) Describe “Scientific Management by F.W. Taylor”.

**Q.3 Attempt any FOUR**

**(16)**

- a) Explain following functions of Management. i) Organizing ii) Directing.
- b) List the types of organization and explain any one type.
- c) Explain Centralized and Decentralized departmentation.
- d) Write the meaning of partnership and explain partnership deed.
- e) Enlist any four differentiations between partnership and joint stock companies.
- f) Explain in brief how success of organization mainly depends on proper management.

**RTO**

- Q.4 Attempt any **FOUR** (08)
- a) Define the term 'Accident'.
  - b) State the importance of safety.
  - c) What is working capital?
  - d) Enlist various types of taxes.
  - e) Define the term "inventory".
  - f) State the objectives of JIT.
- Q.5 Attempt any **FOUR** (16)
- a) What is Maslow's theory of motivation?
  - b) Write provisions under factory act.
  - c) Describe the working of personnel department.
  - d) What you know about E ST act?
  - e) Describe various types of budgets.
  - f) Enlist the functions of financial management.
- Q.6 Attempt any **FOUR** (16)
- a) Describe various sources of raising capital.
  - b) Describe various steps in purchasing.
  - c) What you know about SAP?
  - d) Describe break even analysis.
  - e) Write about 5's' technique.
  - f) What is quality circle? State its advantages.

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**GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.**

(An Autonomous Institute of Govt. of Maharashtra)

**ODD TERM END EXAM NOV/DEC -2017****EXAM SEAT NO.**

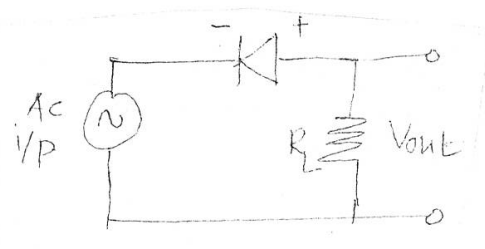
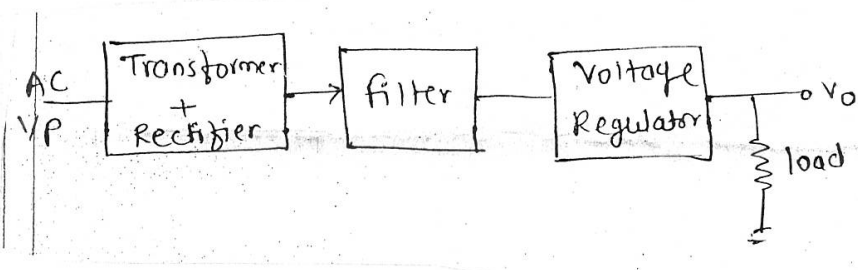
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**LEVEL: FIRST****PROGRAM: IE & TC****COURSE CODE: EIF103/ IEE/ETE103/IX/EJ111****COURSE NAME: BASIC ELECTRONICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 23/11/2017**

Instruction:-

- 1) Answer to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

QN	S Q N	Question Text	R U A	Co	Mar ks
<b>Q.1</b>		Attempt any <b>FOUR</b>			<b>(08)</b>
	a)	Give any two specifications of transistors.		3	
	b)	Define function of filter? List any two filters?		3	
	c)	Define i) PIV ii) Ripple factor	R	2	
	d)	Compare Si and Ge PN junction diode by sketching forward characteristics.	U	1	
	e)	What is doping? State any two pentavalent impurities.	R	1	
	f)	List any two application of zener diode.	R	1	
<b>Q.2</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Explain working of bridge rectifier with $\pi$ filter.	U	2	
	b)	Explain following breakdown in zener diode. i) Avalanche breakdown ii) Zener breakdown	U	1	
	c)	Explain the concept of P-type and N-type extrinsic semiconductor with example.	U	1	
	d)	Draw output characteristics of CE configuration in transistor and show all regions.	U	3	
	e)	What is $\alpha$ (alpha)? Derive relation for $\beta$ in terms of $\alpha$	U	3	
	f)	Compare full wave center tapped and bridge rectifier for following points. i) Ripple factor ii) Efficiency iii) PIV iv) DC output voltage.	U	2	
<b>Q.3</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Explain the working of full wave rectifier with input and output waveforms.	U	2	
	b)	Compare the insulators, semiconductors and conductors using energy band diagram.	U	1	
	c)	Draw practical set up for finding forward characteristics of PN junction diode and explain it.	U	1	
<b>P.T.O</b>					

	d) If $\beta$ of transistor is 100 and collector current is 50mA. Calculate the value base current.	A	3	
	e) Explain the working of transistor as a switch.	A	3	
	f) Draw the output of following circuit.	A	2	
				
<b>Q.4</b>	Attempt any <b>FOUR</b>			<b>(08)</b>
	a) State the need of biasing	R	4	
	b) Show Q point on dc load line in active region.	U	4	
	c) List two advantages of voltages divider bias circuit over the other biasing methods.	R	4	
	d) List important parameters of JFET.	R	5	
	e) Give any four specifications of FET.	R	5	
	f) Show the pinout of LM317	R	5	
<b>Q.5</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
	a) Relate stability factor with $\beta$ , $I_C$ , & $V_{BE}$ & why $\beta$ should not be less than 1.			
	b) Draw the circuit diagram of transistor as a switch. Describe its operation.	U	4	
	c) Construct P-channel JFET & explain it in detail.	A	5	
	d) Compare JFET with BJT (8 points)	U	5	
	e) Identify the following diagram & explain each block in detail.	A	6	
				
	f) Explain how zener diode can be used as a voltage regulator?	U	6	
<b>Q.6</b>	Attempt any <b>FOUR</b>			<b>(16)</b>
	a) Construct fixed bias with emitter resistor & explain it.	A	4	
	b) Draw a single stage CE amplifier with neat labeled diagram.	U	4	
	c) Develop the relation between $\mu$ , $r_d$ & $g_m$	A	5	
	d) What is mean by MOSFT? With neat diagram explain n-channel enhancement MOSFET.	U	5	
	e) Construct & explain transistor shunt voltage regulator.	A	6	
	f) Select the regulator IC for 12V regulated output voltage & draw the regulated power supply using this IC	A	6	
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**GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.**

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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: FOURTH**

**PROGRAM: IE /E&TC**

**COURSE CODE: IEE/ETE401/IX/EJ211**

**COURSE NAME: POWER ELECTRONICS -I**

**MAX. MARKS: 80**

**TIME: 3 HRS.**

**DATE: 29/11/2017**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) Draw circuit diagram of class F commutation.
- b) List different methods of commutation.
- c) State the need of high power semiconductor switches.
- d) List any two advantages of gate triggering.
- e) Draw symbol of i) DIAC ii) PUT
- f) State different methods of SCR triggering.

**Q.2 Attempt any FOUR**

**(16)**

- a) With neat circuit diagram explain operating principle of UJT relaxation oscillator.
- b) Draw & explain V-I characteristics of UJT.
- c) Compare class A & class B commutation. (any four points)
- d) Draw a neat labeled V-I characteristics of SCR. Also define i) Latching current ii) Holding current.
- e) Describe  $\frac{dv}{dt}$  triggering method.
- f) Compare UJT & PUT (any four points)

**Q.3 Attempt any FOUR**

**(16)**

- a) Draw layer diagram of TRIAC & write operating principle of it.
- b) Draw & explain characteristics of power transistor.
- c) Draw & explain class – C commutation.
- d) Explain voltage triggering method of SCR.
- e) Draw & explain characteristics of DIAC.
- f) With neat circuit diagram explain how DIAC is used to trigger TRIAC?

**P.T.O**

**Q.4 Attempt any FOUR****(08)**

- a) Give the two necessities of each:-
  - i) Series connection of SCR.
  - ii) Parallel connection of SCR.
- b) Draw vector diagram of line voltage and phase voltage.
- c) Give the use of freewheeling diode.
- d) Define derating factor. Give its equation.
- e) Draw the diagram of 3-phase delta-star type of transformer.
- f) Define controlled rectifier.

**Q.5 Attempt any FOUR****(16)**

- a) Explain the causes of unequal current sharing. (any four points)
- b) Compare three phase uncontrolled half wave rectifier and bridge rectifier. (any four points)
- c) Explain with diagram and waveform single phase half wave controlled rectifier with freewheeling diode.
- d) Derive equation for static resistance.
- e) Draw a circuit diagram and waveform of 3-phase uncontrolled bridge rectifier.
- f) Explain the concept of two quadrant operation.

**Q.6 Attempt any FOUR****(16)**

- a) Explain partial turn ON and partial turn OFF condition for SCRS.
- b) Define performance parameters of three phase full wave uncontrolled bridge rectifier.
  - a) Efficiency
  - b) Ripple factor
  - c) PIV
  - d) TUF
- c) Explain with circuit diagram and waveform of single phase half wave controlled rectifier with RL load.
- d) Derive equation for  $f_{\max}$  in dynamic equalisation network.
- e) Give the advantages of three phase uncontrolled rectifier. ( any four points)
- f) Draw and explain waveforms of single phase half wave controlled rectifier using inductive load.

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# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: FIRST**

**PROGRAM: COMMON**

**COURSE CODE: CCF105/107/CCE105/R107/X104**

**COURSE NAME: BASIC MATHEMATICS**

**MAX. MARKS: 80**

**TIME: 3 HRS.**

**DATE: 15/12/2017**

**Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

QN	S Q N	Question Text	RU A	Co CCF105-	Mar ks
<b>Q.1</b>		Attempt any <b>FOUR</b>			<b>(08)</b>
	a)	Find 'x' if $\begin{vmatrix} 1 & x & x^2 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \end{vmatrix} = 0$	R	1	
	b)	Resolve in to partial fraction : $1 + \frac{1}{x^2 - 1}$	U	1	
	c)	If $A = \begin{bmatrix} 3 & 2 \\ 1 & -1 \\ 0 & 4 \end{bmatrix}$ , $B = \begin{bmatrix} -1 & -1 \\ 3 & 2 \\ 4 & -2 \end{bmatrix}$ , verify that $A+B=B+A$	U	3	
	d)	If $\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ , $B = \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$ verify that $(A+B)' = A' + B'$	U	3	
	e)	If $\begin{bmatrix} 7 & 0 & 2 \\ 1 & 2 & 6 \\ 4 & 5 & 3 \end{bmatrix}$ , find whether matrix A is singular or non singular.	R	3	
	f)	If $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$ , $B = \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$ , find X such that $2X+3A-4B = I$	A	3	
<b>Q.2</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	The voltages in an electric circuit are related by following equation. $v_1 + v_2 + v_3 = 9$ ; $v_1 - v_2 + v_3 = 3$ ; $v_1 + v_2 - v_3 = 1$ . Find $v_1, v_2$ & $v_3$	A	1	
	b)	Solve the equations: $x + 2y + 3z = 1$ , $2x + 3y + 2z = 2$ & $3x + 2y + 4z = 1$ , by using matrix inversion method.	A	3	
	c)	Resolve into partial fractions: $\frac{x-5}{x^3 + x^2 - 6x}$	A	2	
	d)	If $\left\{ \begin{bmatrix} 3 & 1 \\ 3 & 4 & 0 \\ 3 & -3 \end{bmatrix} - 2 \begin{bmatrix} 0 & 2 \\ -2 & 3 \\ -5 & 4 \end{bmatrix} \right\} \begin{bmatrix} -1 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ , find x, y, z.	A	3	
	e)	Resolve into partial fractions : $\frac{x^2 + 23x}{(x+3)(x^2 + 1)}$	A	2	
	f)	Expand using Binomial Theorem $\left( 3a - \frac{8}{b} \right)^7$	A	4	



<b>Q.3</b>	Attempt any <b>FOUR</b>			(16)
a)	Solve by Cramer's Rule : $x + y = 3, y + z = 5, z + x = 4$	A	1	
b)	Find inverse of matrix , $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$	A	3	
c)	Resolve into partial fractions : $\frac{2x+1}{x^2.(x+1)}$	A	2	
d)	If $A = \begin{bmatrix} 0 & 1 & -1 \\ 3 & -2 & 3 \\ 2 & -2 & 3 \end{bmatrix}$ , show that $A^2 = I$	U	3	
e)	Resolve into partial fractions: $\frac{x^3}{x^2-1}$	A	2	
f)	Show that $(\sqrt{3}+1)^5 - (\sqrt{3}-1)^5 = 152$	U	4	
<b>Q.4</b>	Attempt any <b>FOUR</b>			(08)
a)	Express the following angles in radian measures. i) $75^\circ$ ii) $-270^\circ$	R/ U	5	
b)	Evaluate without using calculator $\frac{\tan 85^\circ - \tan 40^\circ}{1 + \tan 85^\circ \tan 40^\circ}$	R/ U	5	
c)	Prove that $\sin\left(\theta + \frac{\pi}{6}\right) - \sin\left(\theta - \frac{\pi}{6}\right) = \cos \theta$	U	5	
d)	If $\sin A = 0.4$ find $\cos 2A$ using multiple angle formula.	R/ U	5	
e)	Prove that $\cos^2 \theta - \cos^2 \theta \cdot \sec^2 \theta = 1$	R/ U	5	
f)	Find the value of $\sin\left[\cos^{-1}\left(-\frac{1}{2}\right)\right]$	R/ U	5	
<b>Q.5</b>	Attempt any <b>FOUR</b>			(16)
a)	The difference between two acute angles of a right angled triangle is $\frac{2\pi^c}{5}$ . find the angles in degrees	U/ A	5	
b)	Prove that $\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 60^\circ \cdot \sin 80^\circ = \frac{3}{16}$	U/ A	5	
c)	Prove that $\frac{\sin 4\theta + \sin 2\theta}{1 + \cos 2\theta + \cos 4\theta} = \tan 2\theta$	U	5	
d)	Prove that $\cos(A+B) = \cos A \cos B - \sin A \sin B$	U/ A	5	
e)	Show that $\frac{\sin 7x + \sin x}{\cos 5x - \cos 3x} = \sin 2x - \cos 2x \cdot \cot x$	U/ A	5	
f)	Show that $\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{27}{11}\right)$	A	5	
<b>Q.6</b>	Attempt any <b>FOUR</b>			(16)
a)	If $\tan(x+y) = \frac{3}{4}$ and $\tan(x-y) = \frac{8}{15}$ Then show that $\tan(2x) = \frac{77}{36}$	U/ A	5	
b)	Prove that $\cos A \cos(60-A) \cdot \cos(60+A) = \frac{1}{4} \cos 3A$	U/ A	5	
c)	Prove that $\frac{\sin A - \sin 3A}{\sin^2 A - \cos^2 A} = 2 \sin A$	U/ A	5	
d)	Prove that $\frac{\sin A + \sin 2A + \sin 3A + \sin 4A}{\cos A + \cos 2A + \cos 3A + \cos 4A} = \tan\left(\frac{5A}{2}\right)$	U/ A	5	
e)	Prove that $2 \tan^{-1} x = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$	U/ A	5	
f)	Show that $\tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{13}\right) = \tan^{-1}\left(\frac{2}{9}\right) = \cot^{-1}\left(\frac{9}{2}\right)$	A	5	



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**ODD TERM END EXAM NOV. / DEC. -2017****EXAM SEAT NO.**

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**LEVEL :- FIRST****PROGRAM : COMMON****COURSE CODE :- CCF110/X111/CEE110/R112****COURSE NAME :- APPLIED MECHANICS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 12/ 12 / 2017****Instruction :-**

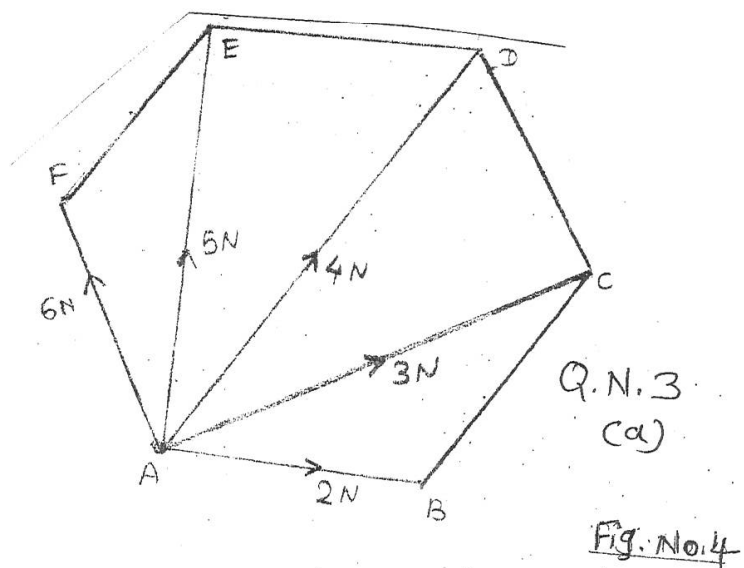
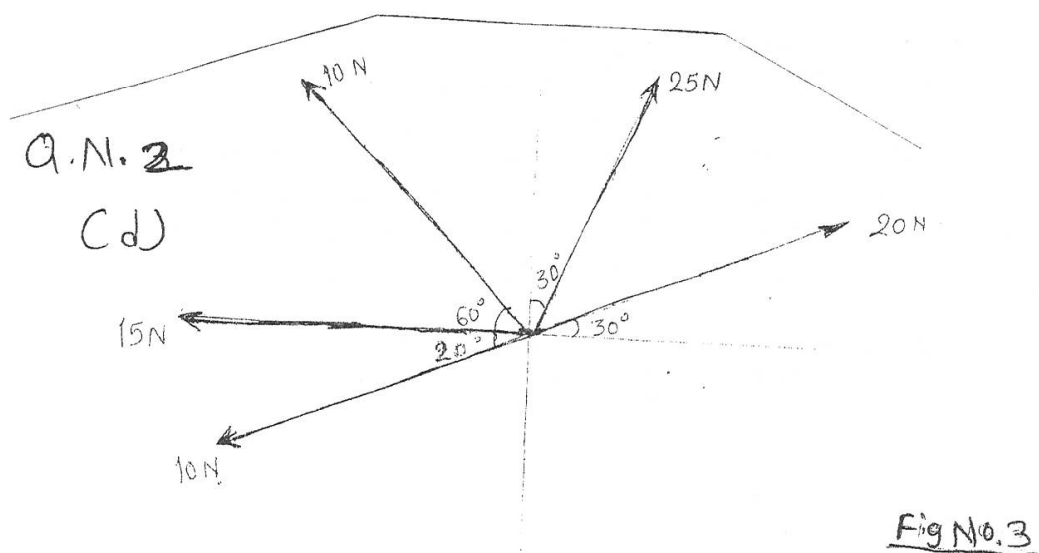
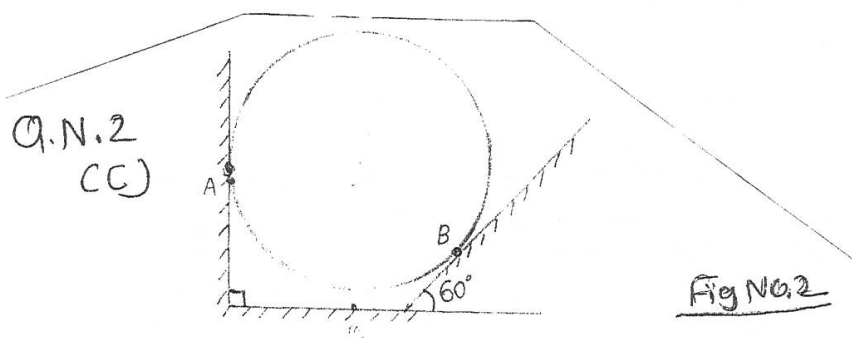
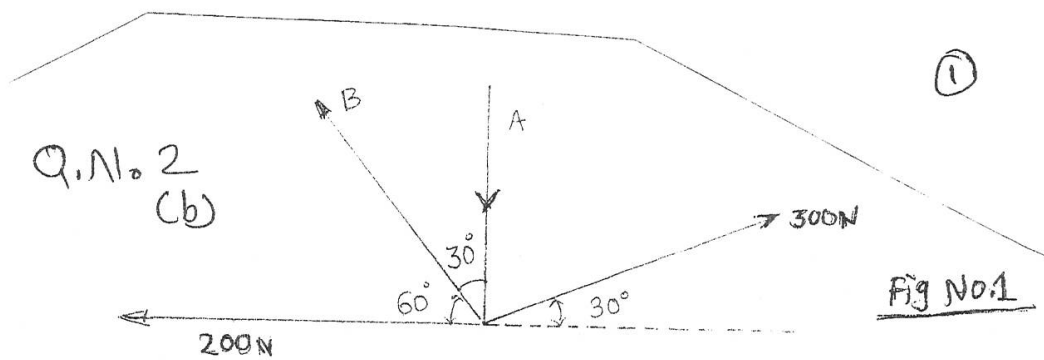
- 1) Answers must be written in the main answer book provided.( and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN > Question No.. SQN> Question No. R> Remembering, U> Understanding, A> Application.

QN	S Q N	Question Text	R/ U/ A	Cod e CCF110	Marks
Q.1		Attempt any <b>FOUR</b>			<b>08</b>
	a)	Differentiate between weight and mass.	U	1	
	b)	Define force system and enlist any four types of force systems.	R	1	
	c)	Define composition of forces.	R	1	
	d)	State Lami's theorem.	R	2	
	e)	State any two advantages and any two limitations of graphical methods.	R	3	
	f)	Define friction.	R	3	
Q.2		Attempt any <b>FOUR</b>			<b>16</b>
	a)	Two forces 6 KN and 8 KN acting on a particle and their lines of action are inclined to each other at an angle of $70^{\circ}$ . Determine the resultant force & its inclination.	A	1	
	b)	Determine the forces A & B. Shown in Figure No.1. If resultant of this concurrent force system is zero.	A	2	
	c)	A smooth sphere weighing 500 N is resting in a trough as shown in Figure No.2. Determine the reactions at points of contact A & B.	A	2	
	d)	Determine graphically the resultant of concurrent force system shown in figure No.3.	U	3	
	e)	A block weighing 500 N is resting on a plane inclined at $30^{\circ}$ with the horizontal. Determine the force P that can be applied on the block at an angle of $10^{\circ}$ to the inclined plane so that the block is just on the point of moving up the plane. Take coefficient of friction between body and inclined plane is 0.22.	A	2	

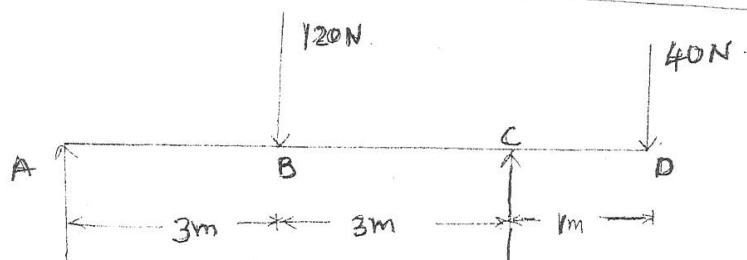
QN	S Q N	Question Text	R/ U/ A	Code CCF110	Marks
	f)	A wooden block is resting on a rough inclined plane whose inclination to the horizontal is $10^\circ$ . The smallest force acting parallel to the inclined plane is 2 N due to which block moves down the plane. If the coefficient of friction between block and plane is 0.32. Determine the weight of the block.	A	2	
Q.3		Attempt any <b>TWO</b>			16
	a)	Forces 2N, 3N, 4N, 5N & 6N acts at one of the angular point of a regular hexagon towards the other five angular points taken in order. Find the resultant of the system. Refer Figure No.4	A	2	
	b)	i) A beam of 6m in span is simply supported at the ends. It carries a point load of 8 kN at the distance 2 m from the left hand support and a concentrated clockwise moment of intensity 10kN.m. at a distance 2 m from right hand support and u.d.l. of intensity 5 kN/m over the distance 4 m from the left hand support. Calculate reactions at the end supports analytically. ii) One end of a uniform ladder weighing 30 N rests against a smooth wall and the other end on a rough horizontal floor, coefficient of friction being 0.24. Find the inclination of ladder to the horizontal when it is on the point of slipping.	A	2	
	c)	A beam is as shown in Figure No. 5. Find support reaction graphically.	U	3	
Q.4		Attempt any <b>FOUR</b>			08
	a)	State the position of $\bar{X}$ & $\bar{Y}$ for a triangle having 'B' as base and 'H' as height.	R	4	
	b)	Locate the centroid of semi circle of radius 'R'.	A	4	
	c)	State any two equations of motion under gravity with meaning of them.	R	5	
	d)	Differentiate between distance and displacement.	U	5	
	e)	Define angular motion and give 5.1 unit of angular velocity.	R	5	
	f)	Define Ideal Machine.	R	6	
Q.5		Attempt any <b>FOUR</b>			16
	a)	Locate the position of centroid for T-beam as shown in figure.	A	4	
	b)	From a solid cylinder 300mm diameter and 600mm height a co-axial cylinder of 100mm diameter is 200mm height is cut off from the top locate the center of gravity ( C.G ) with respect to bottom .	A	4	
	c)	A body is projected vertically upward from a height of 25m above the ground calculate the time required for the body to reach the ground take initial velocity $\mu = 20\text{m/s}$ .	A	5	

	d)	A stone is released from a height of 15m. Determine its velocity when it strikes the ground.	A	5	
	e)	A fly wheel is rotating at 400rpm. If the radius of rotation is 1.5m. Calculate the i) Angular velocity ii) Linear velocity.	A	5	
	f)	A turbine runs at 3000rpm. It is brought to rest in i) 30 min and ii) 300 revolutions. Calculate the retardation in $\text{rad} / \text{s}^2$ in each Phase.	A	5	
Q.6		Attempt any <b>FOUR</b>			<b>16</b>
	a)	For a lifting M/C VR=50.00. An effort of 100 N lifts load of 1800N and effort of 150N lifts a load of 3200N. Determine law of M/C and maximum efficiency of machine.	R	5	
	b)	In a differential axle & wheel machine which has velocity ratio is 10 & a load of 12 KN is lifted by an effort of 2KN then determine efficiency of machine and state type of machine reversible or non-reversible.	A	6	
	c)	Draw the nature of graph for a lifting machine i) Load Vs effort ii) Load Vs ideal effort iii) Load Vs MA iv) Load Vs effort cost in friction.	U	6	
	d)	An body of mass of 10kg is moving with velocity of 100 m/s at height of 150m from ground find the total energy possessed by the body.	A	5	
	e)	How many litres of water can be raised in 10 minutes to a height of 20m by means of pump of 3.0 KW power and efficiency is 75%?	A	5	
	f)	An oil tank of 10m diameter and height 5m has its bottom 6m above the ground. Determine the work done in lifting this tank.	A	5	

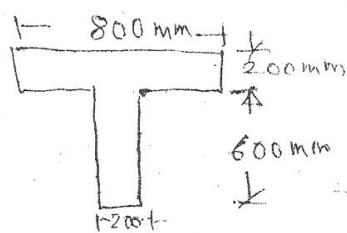
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Q.N. 3 (c) Fig. No. 5



Q.N. 5 (a)

\* \* \* \* \*



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**ODD TERM END EXAM NOV/DEC -2017**

**EXAM SEAT NO.**

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**LEVEL: THIRD**

**PROGRAM: IE / E&TC**

**COURSE CODE: ETE308/IEE308/EJ112**

**COURSE NAME: CIRCUITS & NETWORK**

**MAX. MARKS: 80**

**TIME: 3 HRS.**

**DATE: 12/12/2017**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Q.1 Attempt any FOUR**

**Marks  
(08)**

- a) Define the terms - i) Electric Current, ii) Resistance.
- b) State the voltage divider rule.
- c) Define Power & state ohm's law.
- d) Convert practical current source of 4A current and  $45\Omega$  resistance into practical voltage source. Draw its diagram
- e) State the Norton's theorem.
- f) State the condition for maximum power to be transferred to the load and write formula for maximum power.

**Q.2 Attempt any FOUR**

**(16)**

- a) State and explain Kirchhoff's laws.
- b) Find the voltage across each resistances for the circuit shown in **fig. 1**.
- c) How practical voltage source can be transformed into practical current source ? explain.
- d) Find the current through  $7\Omega$  resistor as shown in **fig. 2** using mesh analysis.
- e) State and explain Thevenin's theorem.
- f) Find the current  $I_L$  through terminals A-B for the circuit shown in **fig.3** using Norton's theorem.

**Q.3 Attempt any FOUR**

**(16)**

- a) Find current in  $9\Omega$  resistor shown in **fig.4**.
- b) State and explain concept of open circuit and short circuit.
- c) Find current in different branches using Nodal Analysis. (**Fig.5**)

(P.T.O.)

- d) If three resistances  $5\Omega$ ,  $12\Omega$ ,  $19\Omega$  find the equivalent resistance if they are connected in series and if they are connected in parallel, also draw the diagrams.
- e) Find current in  $1\Omega$  resistor in the circuit shown in **fig.6** using superposition theorem.
- f) Find the equivalent circuit for the circuit shown in **fig.7**.

**Q.4** Attempt any **FOUR**

**(08)**

- a) Define time constant. Write equation of time constant for capacitor.
- b) Determine reactance of capacitor in given **fig.8**.
- c) Draw a circuit diagram of series resonant.
- d) Define quality factor & write its formula of resonant circuit.
- e) Draw a circuit diagram & frequency response of R-L low pass filter.
- f) Define concept of decibel.

**Q.5** Attempt any **FOUR**

**(16)**

- a) For each of the following input frequencies, find the impedance in rectangle & polar form for the **fig.9**. - i)  $F = 4 \text{ KHz}$ , ii)  $F = 2 \text{ KHz}$ .
- b) Compare R-L & R-C circuits. (any four)
- c) Derive formula for series resonant frequency.
- d) Calculate resonant frequency, quality factor & bandwidth in **Fig.10**.
- e) Draw & explain circuit diagram & frequency response of parallel resonant band stop filter.
- f) Explain with diagram 3 dB frequency & roll off rate.

**Q.6** Attempt any **FOUR**

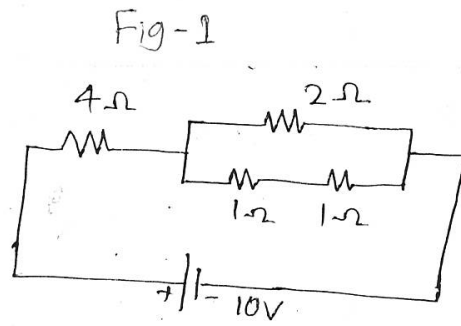
**(16)**

- a) Derive the formula for inductive reactance.
- b) Determine the admittance in **Fig.11**.
- c) Find the current & voltage across each element in **fig.12**, express each quantity in polar form & draw a complete voltage phasor diagram.
- d) Draw & explain circuit diagram & frequency response series resonant band pass filter.
- e) Explain RC low pass & RC high pass filter with diagram & frequency response.
- f) Explain with diagram parallel resonant band pass filter, also draw its frequency response.

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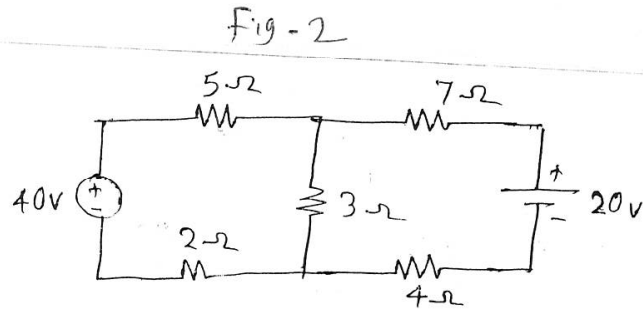


Q-2 (b)

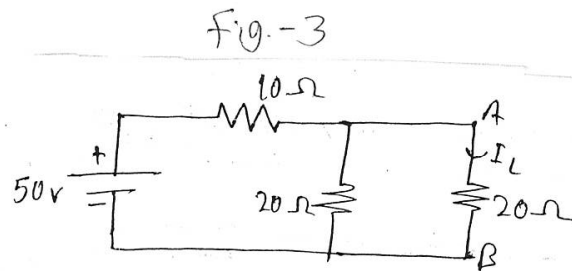


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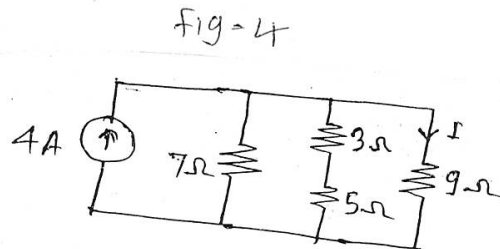
Q-2 (d)



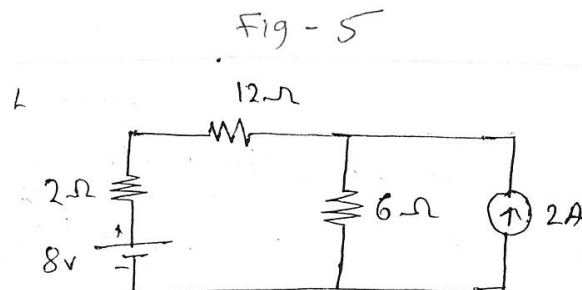
Q-2 (f)



Q-3 (a)



Q-3 (c)

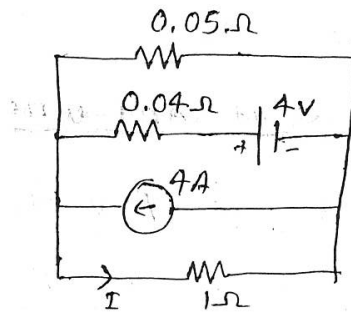


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Q-3 (e)

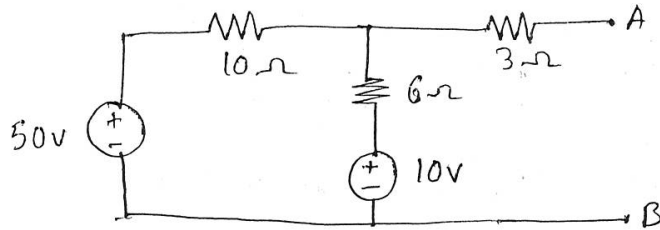
Fig-6

(2)



Q-3 (f)

Fig.-7



Q.4b) Fig.8

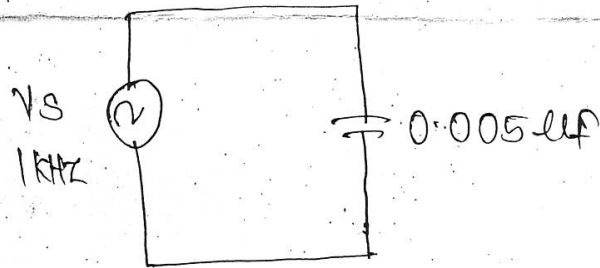
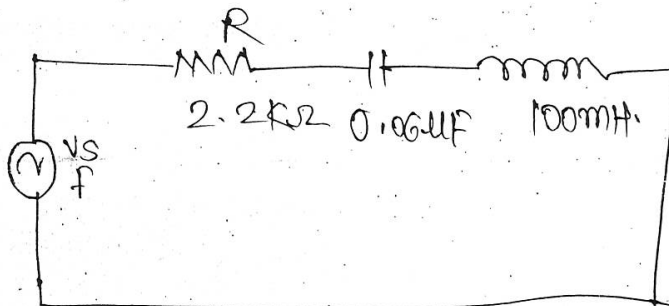
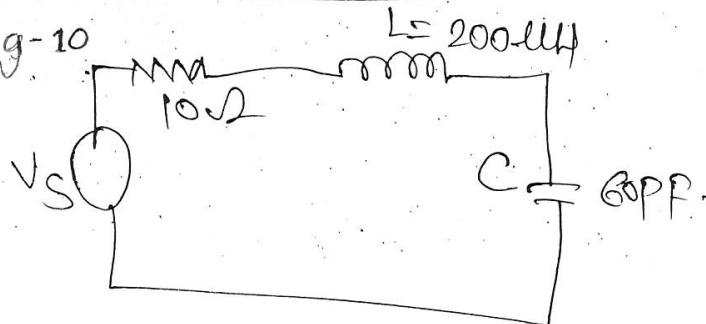


Fig.9

Q.5 a)

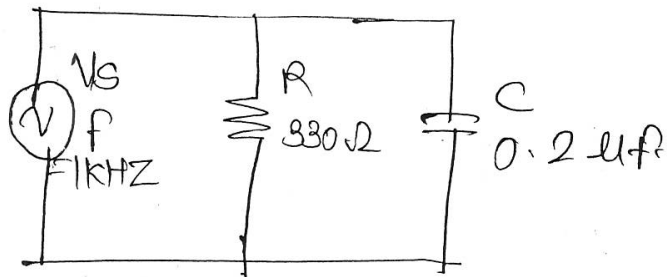


Q.5 d) Fig-10

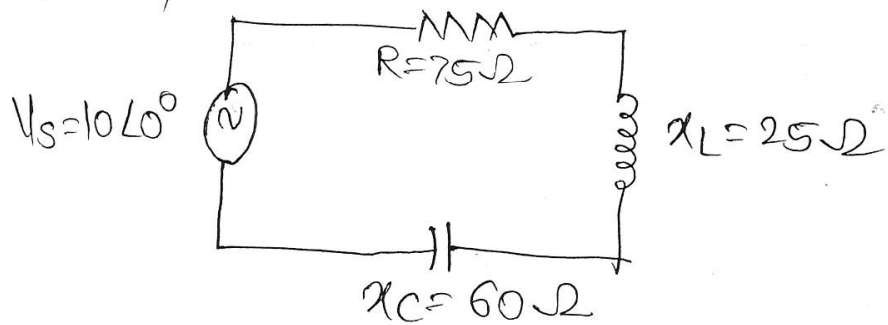


Q-6b) Fig 11

③



Q-6c) Fig-12





**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM NOV. / DEC. 2017**

**EXAM SEAT NO.**

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**LEVEL :- FOURTH**

**PROGRAM : INDUSTRIAL ELECTRONICS**

**COURSE CODE :- IEE501 / IX301**

**COURSE NAME :- POWER ELECTRONICS -II**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 13 / 12/ 2017**

**Instruction :-**

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I		Marks
Q.1	Attempt any <b>FOUR</b>	(08)
	a) Draw symbols of i) GTO ii) IGBT.	
	b) Give classification of chopper.	
	c) State need of ac voltage regulator.	
	d) List any two applications of IGBT.	
	e) What is function of cyclo-converters?	
	f) Draw block diagram of SMPS & label it.	
Q.2	Attempt any <b>FOUR</b>	(16)
	a) Draw labeled layer diagram of n-channel IGBT. Draw its output characteristics.	
	b) With the help neat circuit diagram and necessary waveforms explain class C chopper.	
	c) Explain servo type regulator with neat circuit diagram.	
	d) Draw and explain working of 1- $\phi$ to 1 $\phi$ cycloconverter.	
	e) Explain power supply requirements.	
	f) Describe Jone's chopper with waveforms.	
Q.3	Attempt any <b>TWO</b>	(16)
	a) Draw and explain operation of 3- $\phi$ to 1 $\phi$ cycloconverter and 3- $\phi$ to 3- $\phi$ cycloconverter.	
	b) i) Draw constructional diagram of GTO. Describe its operating principle.	
	ii) List four applications of power MOSFET. Why thermal run away does not takes place in power MOSFET?	
	c) i) Explain solid state type regulator with neat circuit diagram.	
	ii) Explain operating principle of resonant type regulator with neat circuit diagram.	

P.T.O

Q.4 Attempt any **FOUR**

(08)

- a) Classify Inverter.
- b) Give two functions of snubber circuit.
- c) What is need of UPS? Explain in short.
- d) Draw simple bridge inverter with R load.
- e) Define annealing.
- f) Give two specifications of inverter.

Q.5 Attempt any **FOUR**

(16)

- a) Explain bridge inverter with McMurray commutator.
- b) Give any four specifications of UPS.
- c) How we can protect our circuit from i) Over current ii) Over voltage?
- d) Classify Inverter on the basis of commutation. Explain any one of them.
- e) Explain isolation circuit using pulse transformer.
- f) Draw and explain waveforms of parallel inverter with RL load.

Q.6 Attempt any **FOUR**

(16)

- a) What is resonant inverter? Explain the concept of zero voltage switching.
- b) Draw block diagram of UPS & explain each block.
- c) With the help of neat diagram, explain the operation principle of snubber circuit.
- d) How harmonics are controlled using PWM inverter?
- e) Compare line interactive UPS and Online UPS. ( four points)
- f) Explain in brief i) Circuit breaker ii) Spike suppresser.

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**EXAM SEAT NO.**

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**LEVEL :- FOURTH**

**PROGRAM : IE & E& TC**

**COURSE CODE :- IEE/ ETE 404/IX/EJ303**

**COURSE NAME :- PRINCIPLES OF CONTROL SYSTEMS**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 13 / 12/ 2017**

**Instruction :-**

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

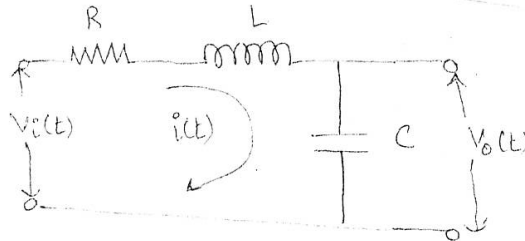
**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) Define the term order and type of system.
- b) What do you mean by poles and zeros of transfer function?
- c) State the need for standard test inputs.
- d) What is bode plot? Give its advantages.
- e) Define the terms :- Damping and damping ratio.
- f) Find the transfer function for given RLC circuit below.



**Q.2 Attempt any FOUR**

**(16)**

- a) Draw and explain block diagram of open loop system.
- b) Derive equation for transfer function of generalized closed loop system.
- c) Draw the standard test signals used in time domain analysis and state the mathematical statement for each.
- d) State any four advantages and disadvantages of frequency domain analysis.
- e) Draw the Bode magnitude plot of the following system. ( Use semilog paper for plotting)

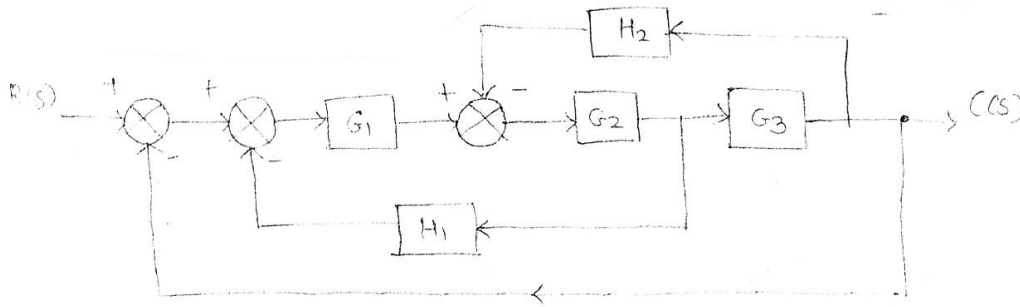
$$G(s) = \frac{100}{s(s+5)(s+20)}$$

- f) Derive the equation for unit step response of 2<sup>nd</sup> order critically damped system. Draw the output response curve.

**P.T.O.**



- a) Find the single block equivalent by block diagram reduction technique.



- b) The response of a control system after applying unit step input is  $C(t) = 1 + e^{-40t} - 2e^{-20t}$ . Determine  
 i) Natural frequency of oscillation  $\omega_n$ . ii) Damping Ratio  
 iii) Settling time iv) closed loop transfer function.
- c) Explain the procedure to draw bode plot.
- d) What is meant by linear time varying and time invaring system? Give examples of each.
- e) The open loop transfer function of unity feedback control system is given by  $G(s) = \frac{25}{s(s+5)}$  obtain maximum overshoot, peak time, rise time and settling time.
- f) Define the following frequency domain specifications  
 i) Resonant Peak. ii) Resonant Frequency. iii) Bandwidth. iv) cut-off rate.

## Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

- a) Define servo system.
- b) State Routh stability criterion.
- c) List the modes of control actions.
- d) Draw the characteristics of DC servo motors.
- e) What is mean by conditionally stable system?
- f) List two applications of ON-OFF controller.

Q.5 Attempt any **FOUR**

(16)

- a) Compare AC and DC servo systems ( any four points)
- b) A unity feedback system is characterized by the open loop transfer function  $G(s) = \frac{K(s+13)}{s(s+3)(s+7)}$  using Routh's criterion. Calculate the range of values of K for the system to be stable.
- c) State the expression for proportional controller and define  
 i) Proportional band ii) Offset.
- d) Compare DC servo motor and stepper motor. ( any four points)
- e) Explain rules for the construction of the root locus.
- f) Explain process control system with neat diagram.

- a) Explain PID controller with electronic PID controller diagram.  
Give two application of it.
- b) i) Explain block diagram of servo system with neat diagram.  
ii) Derive the transfer function of armature controlled DC servo motor.
- c) i) Explain the concept of marginal stability. Draw neat sketch to represent it on S-plane.  
ii) Explain stable system and unstable system.

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**LEVEL :- SECOND**

**PROGRAM : INDUSTRIAL ELECTRONICS**

**COURSE CODE :- IE205**

**COURSE NAME :- ELECTRICAL ENGINEERING**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 30/11/2017**

**Instruction :-**

- 1) Answers must be written in the main answer book provided.( and supplements if required)
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) Define Resistance and state its unit.
- b) State Kirchhoff's current law.
- c) Define mmf.
- d) State Faraday's First Law of electromagnetic induction.
- e) Define node.
- f) State maximum power transfer theorem.

**Q.2 Attempt any FOUR**

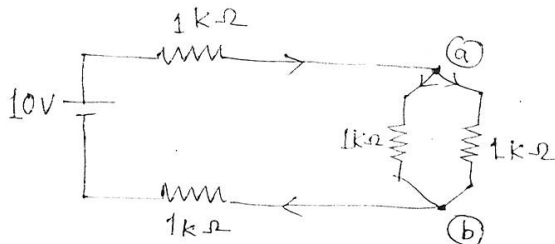
**(16)**

- a) Explain superposition theorem for the solution of electrical circuits.
- b) What is dynamically induced emf? Derive expression for the magnitude of dynamically induced emf.
- c) Find equivalent star for a delta network of resistance.
- d) State and explain Norton's theorem.
- e) Explain ideal constant voltage source and ideal constant current source.
- f) Compare series circuit with parallel circuit ( any four point)

**Q.3 Attempt any TWO**

**(16)**

- a) i) State and explain Faraday's law of electromagnetic induction.  
ii) Explain Lenz's Law.
- b) Verify Kirchhoff's current law ( KCL) for the node points ( a ) and ( b ).



- c) Explain in brief series RL circuit with step input voltage.

*P.T.O.*

Q.4 Attempt any **FOUR**

- a) Classify DC Motors.
- b) State any two applications of single phase Motors.
- c) Name any four parts of transformer.
- d) Define voltage Regulation related to transformers.
- e) Define i) Cycle ii) Frequency.
- f) State voltage and current Relation in star connection.

(16)

Q.5 Attempt any **FOUR**

- a) State any four industrial applications of induction motors.
- b) Draw the neat diagram of three point starter. Explain in brief.
- c) Describe how a pulse transformer works in brief.
- d) Draw and explain three phase three wire system.
- e) Draw a sinusoidal quantity and label on it the cycle, periodic time & peak value and explain it.
- f) Define Reactance and impedance of R-L series circuit and state their units.

(16)

Q.6 Attempt any **FOUR**

- a) Describe the need for starters for a.c. motors.
- b) A 230/115 volt single phase transformer supply a load of 900 watt at its output. Determine the efficiency if the iron losses are 15 watt and the total copper losses are 40 watt.
- c) Describe losses and efficiency in transformer.
- d) Derive the expression for average power in purely resistive circuit.
- e) Describe briefly the working of the purely capacitive circuit connected across A.C. supply. Draw related phasor diagram and circuit diagram.
- f) Draw a labeled R-L-C series circuit and draw the phasor diagram showing the voltages across R, L and C the current and the total voltage applied.

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**LEVEL :- THIRD PROGRAM : INDUSTRIAL ELECTRONICS**

**COURSE CODE :- IX307**

**COURSE NAME :- INDUSTRIAL DRIVES**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 30 / 11 / 2017**

Instruction :-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) State any two limitations of dc drives.
- b) List any two advantages of electrical drives.
- c) Enlist factors considered for drive selection.
- d) Draw speed Torque characteristics of DC shunt motor & label it.
- e) State different methods of speed control for induction motor.
- f) Give any two advantages of convertor fed induction motor.

**Q.2 Attempt any FOUR**

**(16)**

- a) Draw and explain construction and working of synchronous motor.
- b) Explain working of squirrel cage rotor Induction motor in detail.
- c) Explain how stator current can be controlled to control the speed?
- d) Explain start mode and run mode of stator in detail.
- e) Give advantages and disadvantages of stator voltage control technique.
- f) How the frequency can be controlled of stator for speed control?

**Q.3 Attempt any TWO**

**(16)**

- a) Explain in detail the speed control methods with necessary diagram
  - i) Stator voltage control method.
  - ii) Frequency control method.
- b) Explain speed torque characteristics of i) DC series motor. ii) DC compound motor.
- c) Explain four quadrant operation of hoist with neat diagram.

- Q.4 Attempt any **FOUR** (08)
- a) What do you understand by motor coasting?
  - b) Draw neat circuit diagram of three phases half wave converter drive.
  - c) Write any two disadvantages of discrete drives.
  - d) What are types of steel rolling mills? Define any one of them.
  - e) Write any two requirements of motor used in drive for cement mills.
  - f) What are different protections provided by the microprocessor based drive?
- Q.5 Attempt any **FOUR** (16)
- a) What do you mean by class A chopper drive? Draw its circuit diagram and explain its working.
  - b) With necessary diagram explain control strategies used in chopper.
  - c) Differentiate between single phase semiconverter drive and single phase full converter drive.
  - d) Explain in brief DC drive performance.
  - e) Explain different stages in sugar mills.
  - f) With neat diagram explain phase locked loop control in DC drives.
- Q.6 Attempt any **TWO** (16)
- a) With neat diagram explain multiphase chopper drive working. Also draw necessary waveforms.
  - b) What do you mean by circulating current mode and non circulating current mode of dual converter? Also explain with neat diagram speed reversal using dual converter
  - c) List various stages in cement drive. Also explain various stages in paper mills.

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**LEVEL: THIRD****PROGRAM: IE /E&TC****COURSE CODE: EIF302/ETE/IEE302/EJ202****COURSE NAME: APPLIED ELECTRONICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 30/11/2017****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	Co EIF 302-	Mar ks
Q.1		Attempt any <b>FOUR</b>			(08)
	a)	List effect of negative feedback on amplifier characteristics(any four)	U	1	
	b)	State two applications of sinusoidal oscillators.	R	1	
	c)	Define feedback. State types of feedback.	R	2	
	d)	State the need of power amplifier.	R	3	
	e)	Draw a neat diagram of crystal oscillator.	R	2	
	f)	Why heat sinks are used for power transistors in power amplifier circuits.	U	3	
Q.2		Attempt any <b>FOUR</b>			(16)
	a)	Compare positive & negative feedback.	U	1	
	b)	The overall gain of multistage amplifier is 140, when negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input.	A	1	
	c)	Compare Hartley & colpitt's oscillator.	U	2	
	d)	With neat diagram explain frequency response of single tuned amplifier.	U	3	
	e)	Describe with neat circuit diagram complementry symmetry class B push pull amplifier	U	3	
	f)	Explain with neat circuit diagram working of class A transformer coupled power amplifier.	U	3	
Q.3		Attempt any <b>FOUR</b>			(16)
	a)	Compare class A & class B power amplifiers (any four points)	U	3	
	b)	Explain with neat diagram frequency response curve of double tuned circuit.	U	3	
	c)	Draw block diagram of current series & voltage series feedback.	R	1	

**P.T.O**

	d)	Explain any four advantages of negative feedback.	U	2	
	e)	Draw & explain working of colpitts oscillator.	U	3	
	f)	In Hartley oscillator, $L_1=2\text{ mH}$ , $L_2= 20\text{ mH}$ , $C=1\text{pf}$ , Determine required gain for oscillator & frequency of oscillation.	A	2	
<b>Q.4</b>		Attempt any <b>FOUR</b>			<b>(08)</b>
	a)	Draw switching waveforms of Astable multivibrator.	R	4	
	b)	Define multivibrator.	R	4	
	c)	Enlist the method of generating a time base signal.	R	5	
	d)	Define term sweep-error.	R	5	
	e)	Define – i) Positive clipper ii) Negative clipper	R	6	
	f)	Draw response of high pass RC network to a square wave.	R	6	
<b>Q.5</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	Differentiate astable multivibrator and monostable multivibrator (any four points)	U	4	
	b)	Determine the period and frequency of oscillation for an astable multivibrator with component values $R_1=2\text{ k}\Omega$ ; $R_2= 20\text{ k}\Omega$ and $C_1=0.01\text{ }\mu\text{f}$ ; $C_2= 0.05\text{ }\mu\text{f}$	A	4	
	c)	Explain how sweep circuit can be built using transistor switch.	U	5	
	d)	Construct and explain sweep circuit using unijunction transistor switch.	A	5	
	e)	Explain positive clamper using diode with waveforms.	U	6	
	f)	Sinusoidal waveform of 10 V peak-to-peak is applied to the circuit shown in fig (a) sketch the waveform at the circuit output.	A	6	
<b>Q.6</b>		Attempt any <b>FOUR</b>			<b>(16)</b>
	a)	The input signal with waveform shown in fig (b) is applied to the clamper circuit shown in fig. (c). sketch the waveform of the output voltage.	A	6	
	b)	A Sinusoidal waveforms of 10 V peak-to-peak is applied to the circuit shown in fig. (d) Sketch the waveforms at the circuit output.	A	6	
	c)	Explain with diagram Bootstrap sweep generator.	U	5	
	d)	Explain with circuit diagram transistorized constant current sweep generator.	U	5	
	e)	A monostable multivibrator is required to convert a 100 KHz, 30% duty cycle square wave to a 100 KHz, 50% duty cycle square wave. Find the values of $R_3$ if $C_1=1\text{ nf}$	A	4	
	f)	Determine the value of capacitors to be used in an astable multivibrator to provide a train of pulse 1 $\mu\text{sec}$ wide at a repetition rate of 100 KHz. Given $R_1=R_2=10\text{ k}\Omega$	A	4	
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**LEVEL: THIRD**

**COURSE CODE: IEE310**

**MAX. MARKS: 80**

**PROGRAM: INDUSTRIAL ELECTRONICS**

**COURSE NAME: ELECTRIC MACHINES**

**TIME: 3 HRS.**

**DATE: 23/11/2017**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
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- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Q.1 Attempt any FOUR**

**Marks  
(08)**

- a) What is meant by % voltage regulation of a 1 phase transformer?
- b) State classification of dc generator give any two typical applications of dc shunt generator.
- c) Which are the losses taking place in 1 phase transformer?
- d) What is meant by slip frequency emf induced in rotor of a 3 phase induction motor?
- e) State various type of spare parts used for HV distribution 3 $\phi$  transformer.
- f) Draw suitable circuit diagram how to reverse the direction of dc shunt motor.

**Q.2 Attempt any FOUR**

**(16)**

- a) Draw speed torque characteristics for dc shunt, series & compound motor & comment on it.
- b) Give reason why single phase transformer's core losses remain constant during loading up to full load condition.
- c) Explain the need of starter for 3 phase induction motor. Also state various starters used.
- d) Give applications two application of each for two types of d.c shunt and d.c series motor.
- e) Draw constructional diagram label each spare part of 3 phase induction motor.
- f) Draw 3 phase ring induction motor construction diagram, label each parts & explain its working operation briefly.

**Q.3 Attempt any FOUR**

**(16)**

- a) Draw various types of circuit connection diagram for 3 phase transformer & their various types.
- b) Draw star delta starter & name their spare parts used for 3 phase induction motor.

**P.T.O.**

- c) Explain in brief the production of rotating magnetic field by 3 phase supply in 3 phase winding.
- d) A dc shunt motor takes 72A at 230V & runs at 755rpm. The resistance of the armature is  $0.5\Omega$  & shunt field winding is  $115\Omega$ , if iron & frictional losses are 968W find i) Electrical power developed (Driving power) ii) copper losses iii) Break horse power iv) Armature torque.
- e) A 3 phase 4 pole, 400V, star connected induction motor draws a line current of 20 Amp at 0.866 lag. P.f. the stator resistance/ phase  $=0.5\Omega$ . The rotor exerts a torque of 120NW-M making 16 revolution/ sec. The useful mechanical Output is 12000W calculate i) Efficiency ii) slip iii) stator iron loss.
- f) Explain back emf for dc motor & state its equation with details & the effect of back emf on speed of dc motor.

**Q.4** Attempt any **FOUR** (08)

- a) Write down any two applications of shaded pole induction motor.
- b) Define pitch factor related to alternator.
- c) What is meant by synchronous impedance of an alternator?
- d) State the working principle of permanent magnet stepper motor.
- e) Write down any two application of A.C servo motor.
- f) How alternators are classified according to the construction of rotors?

**Q.5** Attempt any **FOUR** (16)

- a) With neat diagram explain the working of capacitor start capacitor run single phase induction motor
- b) Explain how torque is produced in a shaded pole induction motor?
- c) Derive emf equation of 3 phase alternator.
- d) State the advantages of stationary armature in an alternator.
- e) Why terminal voltage in an alternator is not equal to the voltage generated in armature, explain?
- f) Explain the working of variable reluctance stepper motor with neat diagram.

**Q.6** Attempt any **FOUR** (16)

- a) Explain how A.C series motor works?
- b) Explain how torque is produced in repulsion motor?
- c) Find the no load line voltage of a star connected 4 pole alternator from the following.
  - i) Flux per pole  $=0.12\text{wb}$
  - ii) Conductors per slot  $=4$
  - iii) Slots per pole per phase  $=4$
  - iv) Two layer winding with coil span  $=150^\circ$
 Assume  $K_d = 0.958$
- d) Explain how regulation of an alternator can be obtained with the help of synchronous impedance method?
- e) Explain working of permanent magnet stepper motor with two windings.
- f) Explain with neat diagram the working of drag cup servo motor.

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**LEVEL :- THIRD PROGRAM : ALLIED**

**COURSE CODE :- MEE312/IEE/ETE311/MTE311/MG227/R227**

**COURSE NAME :- NON CONVENTIONAL ENERGY SOURCES**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 24 / 11 / 2017**

Instruction :-

- 1) Answers must be written in the main answer book provided.( and supplements if required)
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Marks

**Q.1 Attempt any FOUR**

(08)

- a) What do you meant by fossiel fuels?
- b) Define solar constant.
- c) State the merits of solar energy. ( any four)
- d) What are the causes of wind?
- e) State the advantages of wind energy. ( any four)
- f) What is biomass energy?

**Q.2 Attempt any FOUR**

(16)

- a) Briefly explain the challenges to explore non conventional energy sources.
- b) Explain briefly flat plate collector.
- c) What are the various solar energy utilization methods?
- d) Draw block diagram of control panel of wind energy system and explain it.
- e) State the classifications of wind turbine? Explain any one in brief.
- f) Explain various biomass types.

**Q.3 Attempt any TWO**

(16)

- a) With neat sketch explain the working of sunshine recorder.
- b) What is the future of wind energy in India? Explain the environmental effects of wind energy.
- c) Explain with neat sketch the working of floating drum type biogas plant.

P.T.O.

Q.4 Attempt any **FOUR**

(08)

- a) State the four advantages of ocean energy.
- b) Enlist the basic components of a tidal power plant.
- c) State four limitations of geothermal energy.
- d) State four applications of fuel cell.
- e) State the objectives of energy conservation.
- f) Define i) ROI ii) Life cycle cost.

Q.5 Attempt any **FOUR**

(16)

- a) State the requirement for site selection of ocean thermal power plant.
- b) Draw a neat sketch of Dry steam system geothermal power plant and explain its working.
- c) Enlist the components of small mini hydroelectric plant and state the function of each component.
- d) Define energy management. Write four objectives of it.
- e) What is energy audit? Explain detailed energy audit methodology.
- f) State the ways of improving boiler efficiency.

Q.6 Attempt any **FOUR**

(16)

- a) Describe single basin tidal power plant.
- b) State the main components of fuel cell and the function of each component.
- c) State the principle of Magneto-hydro dynamic power generation. State its advantages.
- d) State the factors affecting site selection for geothermal power plant.
- e) Draw a neat sketch of gas turbine co-generation plant and explain its working.
- f) State four waste heat recovery devices. State advantages of waste heat utilization.

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**ODD TERM END EXAM NOV/DEC -2017****EXAM SEAT NO.**

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**LEVEL: THIRD****PROGRAM: IE / E&TC / IT****COURSE CODE: ETE/IEE312/IX/EJ210/ITE312 COURSE NAME: HIGHER MATHEMATICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 24/11/2017****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Q.1 Attempt any FOUR****Marks  
(08)**

- a) Find  $\frac{\partial u}{\partial y}$  if  $u = x^2 \sin\left(\frac{x}{y}\right)$
- b) If  $u = xy f\left(\frac{y}{x}\right)$  show that  $x \frac{du}{dx} + y \frac{du}{dy} = 2u$
- c) If  $u = \log(x^2 + y^2)$  prove that  $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$
- d) Prove that  $\Delta \nabla = \Delta - \nabla$
- e) Evaluate  $\Delta^2(x^2 + x)$
- f) If  $f(x) = x^2 - 2x + 1$  construct Newton's forward difference table for  $x=1,2,3$

**Q.2 Attempt any FOUR****(16)**

- a) Using Lagrange's interpolation formula find  $f(2.5)$  for

x	1	2	3
y	7	18	35

- b) Find the missing term in the following table

x	0	1	2	3	4
y	1	3	9	---	8

- c) The population of a town in decimal census is given below. Estimate the population for the year 1955

Year (x)	1921	1931	1941	1951	1961
Population(in thousands )	46	66	81	93	101

- d) If  $u = x^3 \sin^{-1}\left(\frac{y}{x}\right) + x^4 \tan^{-1}\left(\frac{y}{x}\right)$  find the value of  $x^2 \frac{\partial^2 y}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$
- e) If  $u = x^2 - y^2$ ,  $v = xy$  find  $\frac{\partial(u,v)}{\partial(x,y)}$
- f) If  $x = r \cos \theta$ ,  $y = r \sin \theta$  prove that  $J.J' = 1$

**Q.3 Attempt any FOUR****(16)**

- a) Express  $f(x) = x^4 - 2x^2 + 1$  in factorial form & hence find  $\Delta^2 f(x)$  at  $x = 0.5$
- b) Using Newton's suitable interpolation formula, estimate  $f(42)$  from the following table

x	20	25	30	35	40	45
f(x)	354	332	291	260	231	204

**P.T.O**



- c) Prove that  $\left(\frac{\Delta^2}{E}\right)e^x \cdot \frac{Ee^x}{\Delta^2 e^x} = e^x$
- d) If  $z = f(x+ay) + \phi(x-ay)$  show that  $\frac{\partial^2 z}{\partial y^2} = a^2 \frac{\partial^2 z}{\partial x^2}$
- e) If  $u = \tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$  prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$
- f) If  $u = (1-2xy+y^2)^{-1/2}$  prove that  $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = y^2 u^3$

**Q.4 Attempt any FOUR**

**(08)**

- a) Evaluate  $L(\sin^2 3t)$
- b) Evaluate  $L(2 + e^{-3t} + \cos 2t)$
- c) Evaluate  $L^{-1}\left(\frac{2}{s^3} - \frac{1}{s+2}\right)$
- d) Evaluate  $L^{-1}\left[\frac{6}{(s+3)^4}\right]$
- e) Find the Fourier constant  $a_0$  for the function  $f(x) = \sqrt{1-\cos x}$  in  $(0, 2\pi)$
- f) Find the value of an (Fourier constant) for  $f(x) = \sin ax, -\pi < x < \pi$

**Q.5 Attempt any FOUR**

**(16)**

- a) Evaluate  $L^{-1}\left[\frac{1}{(s+2)^3} + \frac{s+7}{s^2+6s+13}\right]$
- b) Evaluate  $L^{-1}\left[\frac{2s^2-1}{(s^2+1)(s^2+4)}\right]$
- c) Evaluate  $L[t^3 \cdot e^{-3t}]$
- d) Using convolution theorem, find  $L^{-1}\left[\frac{1}{s(s+1)^2}\right]$
- e) Find Laplace transform of  $te^{2t} \sin 3t$
- f) Solve using Laplace transform :  $\frac{dy}{dt} + 3y = 2 + e^{-t}$  given that  $y = 1$  when  $t = 0$

**Q.6 Attempt any TWO**

**(16)**

Find Fourier expansion of following function.

- a)  $f(x) = \begin{cases} x, & 0 < x < 1 \\ 1-x, & 1 < x < 2 \end{cases}$
- b)  $f(x) = x - x^2, -\pi < x < \pi$  Hence deduce that  $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$
- c)  $f(x) = \sin x, 0 \leq x \leq \pi$   
 $= 0, \pi \leq x \leq 2\pi$  Hence deduce that  $\frac{1}{2} = \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots$

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**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

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**ODD TERM END EXAM NOV. / DEC. -2017****EXAM SEAT NO.**

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**LEVEL :- FIRST PROGRAM : COMMON****COURSE CODE :- CCF202 / CCE202****COURSE NAME :- COMMUNICATION SKILLS****MAX. MARKS : 40 TIME : 2 HRS. DATE :- 24 / 11 / 2017**

Instruction :-

- 1) Answers to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN > Question No., SQN> Question No. R> Remembering, U> Understanding, A> Application.  
CO > Course Outcome

Q.N.	S Q N	Question Text	U R A	CO CCF202	Ma rks
Q.1		Answer the following questions in 3-5 sentences ( attempt any FOUR)			08
	a)	Define communication. Give an example of communication event.	R	1	
	b)	Explain any two principles of written communication.	R	3	
	c)	Define encoding and decoding.	R	1	
	d)	Enlist any four advantages of over Head projector ( OHP)	U	5	
	e)	Enlist any four tips of prepared speech.	U	2	
	f)	Write any four examples in which oral communication is used.	A	2	
Q.2		Answer the following questions in 12-14 sentences (attempt any FOUR)			16
	a)	Explain any four principles of effective communication.	U	1	
	b)	Distinguish between oral and written communication.	A	2/3	
	c)	State any four precautions one should take while making presentation.	A	5	
	d)	Explain any four interview techniques.	U	6	
	e)	State the importance of communication for the development of an engineer.	A	1	
	f)	Explain the various aspects of body language.	U	4	
Q.3		Attempt any TWO			16
	a)	Write an application letter along with your resume to 'Infosys' software Bangalore -05 for the post of engineer.	A	3	
	b)	Explain the types of communication.	U	1	
	c)	The following is the age wise readership of 'The Times of India' a daily newspaper.			
		Age                  Group                  Readership (%)			
		16                  25                  10			
		26                  35                  27			
		36                  45                  17			
		46                  55                  22			
		56                  65                  24			
		Present the above data in the form of pie graph.	A	4	

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**ODD TERM END EXAM NOV. / DEC. 2017**

**EXAM SEAT NO.**

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**LEVEL :- FIFTH**

**PROGRAM : INDUSTRIAL ELECTRONICS**

**COURSE CODE :- IEE511**

**COURSE NAME :- PLC & DRIVES**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 24 / 11 / 2017**

Instruction :-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) State Basic elements of drive system.
- b) List the different methods of speed control of induction motor.
- c) State any two drive requirements for steel rolling mills.
- d) List the various stages involved in textile mill.
- e) Draw the circuit diagram Rotor voltage control.
- f) State any two advantages of converter fed induction motor.

**Q.2 Attempt any FOUR**

**(16)**

- a) Give comparison between AC Drives and DC drives ( any four points)
- b) Describe the speed-Torque characteristics of induction motor.
- c) Draw and explain slip energy Recovery system.
- d) Which type of motors are used at different stages of cement mill and why?
- e) Describe the role of microprocessor for speed control of DC motor with neat Block diagram.
- f) Write different stages and drives required for sugar mill.

**Q.3 Attempt any FOUR**

**(16)**

- a) Illustrate drives stability with the help of Torque-speed characteristics.
- b) Explain the stator voltage scheme for induction motor control.
- c) Describe the role of micro processor in controlling a stepper motor drive with suitable schematic.
- d) List the different requirements of motor used for paper mill application.
- e) With the help of Block diagram, explain V/F control using square wave inverter.
- f) With the help of circuit diagram, explain how the speed of induction motor is controlled by chopper control

**P.T.O.**

Q.4 Attempt any **FOUR** (08)

- a) Draw the block diagram of PLC and label it.
- b) Give the advantages of PLC over conventional relay logic.
- c) List different relay type instructions of PLC with symbols ( any four)
- d) State four logical instructions.
- e) Draw the ladder diagram for following Boolean equation  $Y = (A+B) \cdot (C+D)$
- f) Draw the ladder diagram for EX-OR gate.

Q.5 Attempt any **FOUR** (16)

- a) Describe the role of PLC in automation.
- b) Explain the function of memory in PLC system.
- c) Explain high speed encoder with neat diagram.
- d) List and explain arithmetic instructions used in PLC programming.
- e) Draw and explain format of ON delay timer (  $T_{ON}$  ) with waveform.
- f) Develop ladder diagram for 4:1 multiplexer.

Q.6 Attempt any **FOUR** (16)

- a) Explain the following characteristics of PLC: speed of execution.
- b) Explain in detail RTD input module.
- c) Explain functional blocks of count up CTU and also give the format of counter data file.
- d) Explain any two PLC sequencer instructions and give the parameters in PLC sequencer instructions.
- e) Explain the following data handling instructions i) Move ii) Masked move.
- f) Develop a ladder diagram that will cause output Q to be ON when push button A is ON, or either B or C are ON.

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**ODD TERM END EXAM NOV. / DEC. 2017**

**EXAM SEAT NO.**

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**LEVEL :- FIFTH**

**PROGRAM : IE & E&TC**

**COURSE CODE :- IEE/ETE512**

**COURSE NAME :- PIC MICROCONTROLLER**

**MAX. MARKS : 80 TIME : 3 HRS. DATE :- 24 / 11 / 2017**

**Instruction :-**

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicate marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

**Section – I**

**Marks**

**Q.1 Attempt any FOUR**

**(08)**

- a) State any two features of RISC architecture.
- b) What is the address range for the scratch pad section of the access bank?
- c) What is the status of C and Z flags after the execution of following code?  
MOVLW FFH  
ADDLW 1
- d) What is the difference between MOVWF and MOVF instruction?
- e) Indicate when the TMRΦIF flag is raised for each of the following mode  
i) 16 bit ii) 8 bit.
- f) Find the TICON value for 16 bit mode, no prescalar, timer oscillator OFF, with the clock coming from the PIC 18's crystal.

**Q.2 Attempt any FOUR**

**(16)**

- a) Assume that a 1 Hz frequency pulse is connected to input pin TICK1. Write an assembly language program to display counter values of TMR1H and TMR1L on port B & D respectively.
- b) Write an assembly language program for PIC /18F 458 to generate a square wave of frequency 5 KHz at pin PORT B.Φ. Assume crystal frequency = 10MHz.
- c) Consider two switches are connected to lower two bits of PORT C. Write an assembly language program to send the following ASCII to Port D based on the status of switch.

RC1	RC Φ	Function
0	0	Send ASCII of '0'
0	1	Send ASCII of '1'
1	0	Send ASCII of '2'
1	1	Send ASCII of '3'

- d) Explain following instructions with example i) LFSR f,k ii) BTFSC f,b,a
- e) Write an assembly language program to copy the value 55H into RAM memory locations 340H to 345H using i) Direct addressing mode ii) A loop.
- f) Write an assembly language program for PIC to transfer the contents of RAM location 20H-2FH to RAM location 2D Φh- 2DFH.

*P.T.O*

Q.3 Attempt any **TWO**

(16)

- With the help of neat labelled diagram explain the architecture of PIC 18F microcontroller.
- With the help of neat diagram explain the 16 bit mode and 8 bit mode of timer  $\Phi$  of PIC 18F microcontroller.
- Explain any four table processing instructions of PIC 18F microcontroller with example.

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Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

- Draw the interrupt vector table for PIC 18.
- Give importance of RS and  $R/\overline{W}$  pins of LCD.
- Enlist any four applications of Relays.
- Give the importance of step angle of stepper motor.
- Enlist various sources present for interrupt in PIC 18.
- Explain WP Bit of DS 1306 RTC control register.

Q.5 Attempt any **FOUR**

(16)

- Write an assembly language program to transmit message "BYE" serially at Baud rate of 9600, 8 Bit data, 1 start and stop Bit continuously ( XTAL = 12 MHz)
- Write an assembly language program to display "GPKP" on LCD serially.
- Write an assembly language program for PIC 18 to transfer letter 'y' serially at Baud rate of 57,600 continuously with ( XTAL = 10MHz) Use BRGH=1
- Draw a neat interfacing diagram for PIC 18 to stepper motor using opto isolator.
- Write an assembly language program to rotate stepper motor in clockwise direction for PIC 18 ( Use 4 normal step sequence)
- Explain all pins of DS 1306 RTC chip in detail.

Q.6 Attempt any **FOUR**

(16)

- Draw and explain format of INT CON register.
- Write an assembly language program to turn ON and turn OFF the lamp using relay connected to PIC 18.
- Write a program to rotate DC motor for following condition  
i) if SW=0, DC motor rotates clockwise. ii) if SW = 1, DC motor rotates anticlockwise.
- Draw and explain the format of ADCON 1 register in detail.
- Write a note on compare mode programming and capture mode programming.
- Draw an interfacing of diagram of PIC 18 to DAC 0808 and write a program to generate a sine wave continuously.

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**ODD TERM END EXAM NOV/DEC -2017****EXAM SEAT NO.**

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**LEVEL: FIRST****PROGRAM: COMMON****COURSE CODE:CCF108 /R110/X107/110/CCE108****COURSE NAME: ENGINEERING DRAWING -II****MAX. MARKS: 80****TIME: 4 HRS.****DATE: 22/11/2017****Instruction:-**

- 1) Answer to each section must be written in separate answer book.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>course outcome

QN	S Q N	Question Text	R U A	CO CCF108-	Marks
<b>Q.1</b>		Attempt any <b>TWO</b>			(08)
	a)	Illustrate following joints with their symbols i) Spot weld ii) Single- J butt weld	U	3	
	b)	Draw free hand sketch for 'V' thread.	U	3	
	c)	Draw free hand sketch for wing nut.	U	3	
<b>Q.2</b>		Attempt any <b>TWO</b>			(16)
	a)	Draw the following orthographic views of the object as shown in fig.1. i) Sectional F.V (03 marks) ii) Side view from left (03 marks) iii) Top view (02 marks)	U	1	
	b)	Fig.2 shows pictorial view of an object using first angle projection method, draw i) Front view (03 marks) ii) Top view (02 marks) iii) Sectional left hand side view(03 marks) iv) Give important dimensions.	U	2	
	c)	Fig 3.Shows pictorial view of an object, Draw i) Sectional F.V(03 marks) ii) Top view (02 marks) iii) Right hand side view (03 marks)	U	2	
<b>Q.3</b>		Attempt any <b>TWO</b>			(16)
	a)	Fig.4 shows pictorial view of an object. Draw following views of an object by using first angle method. i) F.V. in the direction X (03 marks) ii) Top view (02 marks) iii) Right hand side view (03 marks)	U	2	

**P.T.O**

	b)	By using first angle method, draw i) F.V. in the direction X (03 marks) ii) Top view (02 marks) iii) Left hand side view (03 marks) Refer Fig.5	U	2	
	c)	Fig 6 show pictorial view of an object using first angle method of projection , draw i) Front view (03 marks) ii) Top view (02 marks) iii) Right hand side view(03 marks)	U	2	
<b>Q.4</b>		Attempt any <b>ONE</b>			(08)
	a)	Figure no.4 (a) shows two views of an object. Draw by using first angle projection method the following views. i) Sectional elevation (section A-A) (04 marks) ii) Left hand side view (missing view) (04 marks)	U	4	
	b)	Fig.4 (b). Shows elevation and plan of a machine part. Draw the following views, by using first angle method of projection. i) Sectional elevation (section A-A) (04 marks) ii) Left hand side view (missing view) (04 marks)	U	4	
<b>Q.5</b>		Attempt any <b>ONE</b>			(16)
	a)	Fig. no 5 (a). Shows two views of an object. Draw its isometric view, taking 'O' as an origin. Use natural scale.	U	5	
	b)	i) Construct isometric scale upto 150mm (02 marks) ii) Fig. no 5 (b) (ii) shows two views of an object. Draw its isometric projection taking 'O' as an origin by isometric scale. (14 marks)	U	5	
<b>Q.6</b>		Attempt any <b>TWO</b>			(16)
	a)	Figure no. 6 (a) shows front view and top view of an a square prism, having a circular hole in the center. Draw its development of the surface.	U	6	
	b)	Figure no 6 (b) shows front view of cone, resting in H.P in first quadrant, cut by three different planes I, II, III. Draw the development of the lateral surface of this cut cone.	U	6	
	c)	Figure no 6 (c) shows front view of a right square pyramid with the sides of base equally inclined to V.P, resting on its base H.P. It is cut by two sectional planes A&B at $60^0$ to each other as shown in fig. no 6(c). Draw the development of the lateral surface of the pyramid.	U	6	
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