EnTC

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**
COURSE CODE :- **ETE502/EJ307**
COURSE NAME :- **OPTICAL FIBER COMMUNICATION**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 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 o 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 critical angle. Give its importance in optical fiber communication.

b) What is fiber bend loss? State its two types.

c) Write down any two requirements of optical fiber.

d) Define refractive index. What is it's unit?

e) Which fiber coupler is used for distributing a single i/p signal to multiple outputs? Draw it's structure.

f) Give two ways to reduce Mie Scattering loss.

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

a) Draw electromagnetic spectrum which shows region used for optical fiber communication.

b) Explain process of light wave propagation in multimode graded index fiber.

c) Draw setup for eye-pattern measurement and eye pattern showing performance parameters.

d) Compare single mode fiber and multimode fiber on following parameters.

i) Core diameter ii) Type of optical source useful
iii) Effect of intermodal dispersion. iv) Application.

e) Explain absorption mechanism and it's effect on fiber optics.

f) Explain any four advantages of optical fibers over coaxial cable.

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

a) Why fiber splicing is required? Explain any two mechanical splicing techniques.

b) Explain any one method for numerical aperture measurement.

c) Explain intermodal dispersion in optical fiber.

d) Explain following optical laws. i) Reflection ii) Refraction.

e) Compare plastic fiber and glass fiber. (any four points)

f) Explain cut-back technique used for attenuation measurement.

P.T.O.

Section – II	Marks

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

a) What do you mean by internal efficiency of an LED?

b) Why do we prefer laser diodes over LEDs for communication applications?

c) Define quantum efficiency of photodetector.

d) Draw construction of Avalanche photo diode.

e) What are the requirements for a preamplifier?

f) What do you mean by WDM? What is its function?

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

a) What do you mean by direct and indirect bandgap semiconductors? Explain why direct bandgap semiconductors are suitable for optoelectronic devices?

b) Differentiate between spontaneous emission and stimulated emission. (any four)

c) Which materials are used for construction of Laser? Also explain characteristics of Laser.

d) Describe the working principle of phototransistor using suitable diagram.

e) Explain characteristics of Avalanche photo diode.

f) Explain any four applications of optical fiber communication system.

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

a) What is use of OTDR? Explain it with neat diagram. Also write limitation of OTDR testing.

b) What are different types of semiconductor injection laser? Explain any two of them

c) With neat diagram, explain working and spectral response of p-i-n photo diode. Also write its two application.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD.** PROGRAM: **IE & E&TC ENGINEERING.**

COURSE CODE: **IEE/ETE302.** COURSE NAME: **APPLIED ELECTRONICS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/04/2017.**

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 if necessary.
7) Use of Mobile is strictly prohibited.

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

a) State types of negative feedback.

b) An amplifier has a voltage gain of 1000 without feedback. What will be gain if a negative feedback path with a feedback factor of 0.009 is connected?

c) State classification of oscillator.

d) Draw circuit diagram of Colpitt's oscillator.

e) Define 1) Overall efficiency 2)collator efficiency

f) State characteristics of class A power amplifier (any four.)

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

a) Draw transistor circuit for voltage series feedback & explain its working.

b) Distinguish between voltage series & current shunt feedback (any four points)

c) Draw circuit diagram of Hartley oscillator & explain its working.

d) Explain working of class B push-pull amplifier with neat circuit diagram.

e) Explain working of Double tuned amplifier with its circuit diagram & frequency response.

f) Explain working of complementary symmetry class B power amplifier.

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

a) Explain advantages of negative feedback.(any four)

b) An amplifier has a gain of 100 & 5% distortion with an input signal of one volt. When an input signal of 1V is applied to amplifier, calculate 1) Output signal voltage. 2) Distortion voltage 3) Output voltage.

c) In a Hartley oscillator if L_1=0.1 MH, L_2=10μH & mutual inductance is 20μH. Calculate value of capacitor 'C' of oscillatory circuit to obtain frequency of 4110kHz & also find condition for sustained oscillation.

d) Explain working of wein bridge oscillator with the neat circuit diagram.

e) Explain characteristics of class B power amplifier.

f) Draw neat circuit diagram of class-AB power amplifier & explain its working.

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

a) Mention the specific four applications of bistable multivibrator.

b) Draw a circuit diagram of Astable multivibrator.

c) State the working principal of Miller sweep generator.

d) Draw the symbol and equivalent circuit diagram of UJT..

e) List the applications of voltage time base generators.

f) State conditions of RC integrator and differentiator.

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

a) Find the value of resistor, if capacitor C=100μf for monostable multivibrator to give output pulse width of 400 ns. What will be the resistor, if 'C' is changed to 40 pf, keeping pulse width constant?

b) With neat circuit diagram and waveforms, explain the operation of Schmitt trigger.

c) Draw and explain the operation of bootstrap ramp generator.

d) With neat diagram, explain operation of exponential sweep generator.

e) Compare clipper and clamper.(any four points)

f) Draw and explain positive clamper using diode.(any four)

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

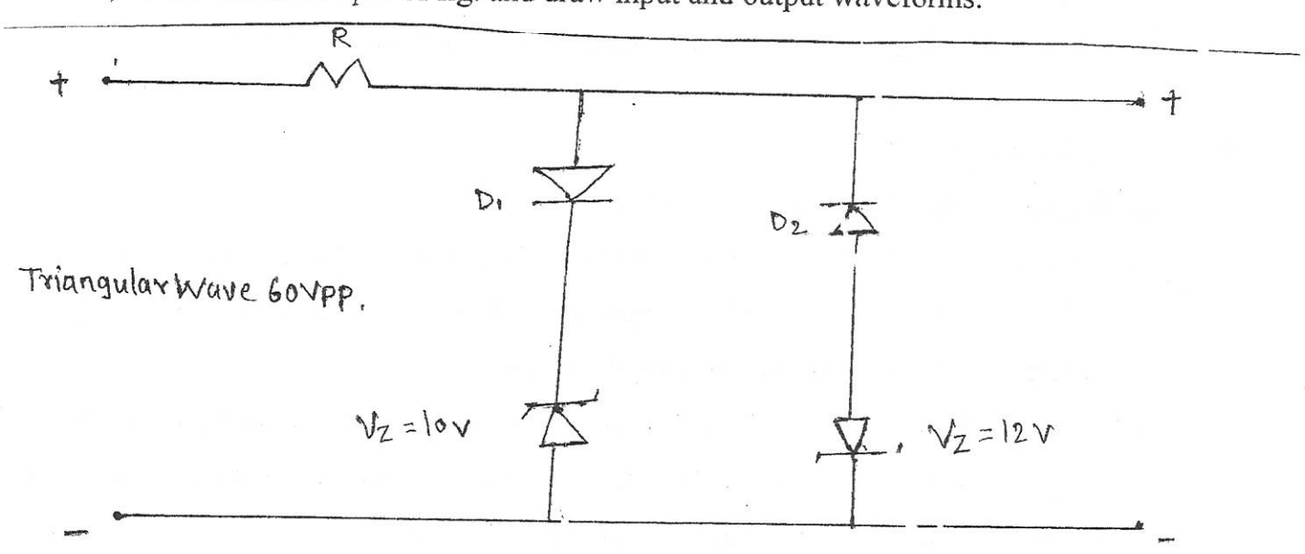
a) Describe the operation of transistor as a switch with neat diagram.

b) With neat circuit diagram explain the working of bistable multivibrator.

c) Draw the circuit of UJT switch sweep generator. State its operating principle.

d) Draw and explain the working of current time base generator.

e) Find out the output of fig. and draw input and output waveforms.



f) Draw a circuit diagram of RC integrator. Sketch the output waveform for square wave input. Describe the working of the circuit.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E & TC**

COURSE CODE :- **IEF/ETF103/IEE/ETE103/IX/EJ111/IE202**

COURSE NAME :- **BASIC ELECTRONICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **28 / 04 / 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) State any four specifications of Zener diode.

b) Draw the symbol of p-n junction diode and Zener diode.

c) What is the need of filter?

d) State the types of transistor and draw the symbol of it.

e) In a common base connection, a certain transistor has an emitter current of 10mA and a collector current of 9.8mA. Calculate the value of base current.

f) State the types of configuration of transistors.

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

a) With neat diagram, explain the formation of P-type extrinsic semiconductor.

b) Explain the formation of P-N junction diode.

c) Define the following terms with respect to rectifiers,
i) Ripple factor ii) Rectifier efficiency iii) PIV iv) TUF.

d) Draw and explain fullwave center tap transformer rectifier.

e) Draw and explain the input characteristics of NPN transistor in CE configuration.

f) A transistor has β=150. Calculate the approximate collector and base currents, if the emitter current is 10mA.

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

a) Give the comparison between conductors and semiconductors. (any 4 points)

b) With neat diagram, explain the operation of reverse biasing of Zener diode.

c) Draw and explain halfwave rectifier with capacitor filter.

d) Give the comparison between fullwave center tap rectifier and bridge wave rectifier. (any 4 points)

e) With neat diagram, explain the operation of NPN transistor.

f) Derive the relation between α and β of transistor.

P.T.O.

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

a) What is meant by dc biasing of a transistor?

b) What is operating point Q of the transistor?

c) Give the classification of FET.

d) State the need of regulator.

e) Give the limitations of Zener regulators.

f) State the function of 78 XX and 79 XX IC.

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

a) Explain the voltage divider method with the help of circuit diagram.

b) Explain the concept of DC load line and operating point for biasing circuit.

c) Draw and explain the construction of N-channel JFET.

d) Give the interrelationship between μ, g_m and r_d with respect to FET.

e) Explain regulating action of Zener diode with varying input voltage.

f) Draw the basic block diagram of dc power supply. Explain the function of each block.

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

a) List biasing methods of transistor. Draw the fixed bias circuit.

b) State the need for stabilization of operating point.

c) What is pinch-off voltage of FET? And also describe drain resistance of FET.

d) Compare BJT and FET (any 4 points)

e) What is MOSFET? Draw constructional diagram of n-channel Enhancement MOSFET.

f) Draw pin diagram of IC 723. Write the functions of IC 723 (any two)

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **IE/E&TC**

COURSE CODE: **ETE310/IX/EJ208** COURSE NAME: **DIGITAL COMMUNICATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **03/05/2017**

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) Define entropy and its unit.

b) State various continuous wave modulation systems.

c) Why QPSK is superior than BPSK?

d) What is Nyquist rate, Nyquist interval?

e) Draw the block diagram of basic digital communication system.

f) What is the bandwidth requirement of QAM?

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

a) Explain with neat block diagram delta modulation transmitter.

b) Explain FSK generation with neat waveforms.

c) Draw and explain DPCM transmitter and receiver.

d) Compare PCM and DPCM (any 4 points)

e) Draw block diagram of quadrature amplitude modulation and explain its working

f) What are the advantages and disadvantages of digital communication (any two each)

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

a) Draw m-ary PSK transmitter and explain its operation.

b) What are the effect of inter symbol interference (ISI)?

c) State and explain the Shannon Hartley theorem.

d) Compare FSK and PSK (Any 4 points)

e) Explain the meaning of slope overload error and granular noise in delta modulation.

f) Draw and explain amplitude shift keying (ASK) transmitter.

P.T.O

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

a) What is the need of multiplexing? State the types of it.

b) Define i) Bit rate ii) Baud rate

c) Write any two advantages of FDM.

d) Define TDMA.

e) How to detect and correct errors?

f) Write any two applications of DS-SS system.

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

a) A bit word 1011 is to be transmitted construct the even parity seven bit hamming code for this data.

b) Define the following terms,

i) Code word

ii) Code rate

iii) Hamming weight

iv) Hamming distance

c) Explain NRZ line coding.

d) With neat block diagram explain FDM receiver.

e) Give the comparison between slow frequency hopping and fast frequency hopping.(any four points)

f) With neat block diagram explain the model of spread spectrum digital communication system.

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

a) Explain frequency hop spread spectrum (FH-SS)system

b) A receiver received the following hamming code 0011100101101 with odd parity. Find the error in the received code and give the corrected data.

c) Explain processing gain performance parameter of DS-SS system.

d) With neat diagram explain WDM system.

e) Explain time division multiplexing system.

f) Explain how error detection takes place in parity checking method.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **IE/E&TC**

COURSE CODE: **IEE/ETE307/EJ206** COURSE NAME: **LINEAR INTEGRATED CIRCUIT**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **19/04/2017**

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

a) State the features of differential Amplifier (Any 2 features)

b) List the characteristics of an ideal op-amp.

c) Define CMRR.

d) Sketch equivalent circuit of op-amp.

e) Why instrumentation amplifier are used?

f) State the application of an antilog amplifier (any 2 application)

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

a) Draw the circuit diagram of log amplifier and explain.

b) Draw & explain dual input balanced output [DIBO] differential amplifier.

c) Explain concept of offset null adjustment.

d) Explain block diagram of OP-AMP

e) Write neat circuit diagram, explain the instrumentation amplifier using three OP-AMP.

f) Draw & explain voltage to current covertor with floating load.

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

a) Explain Antilog Amplifier using OP-AMP with the use of diode.

b) Draw & explain the ideal integrator circuit.

c) Explain cascaded differential amplifier with neat diagram.

d) Draw & explain dual input unbalanced output differential amplifier.

e) Define the following parameters

i) Input offset voltage

ii) Input offset current

iii) SVRR

iv) Slew Rate

f) Draw the 8 pin configuration of Op-AMP IC741 and state the main features of IC741

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

a) Draw the pin diagram of IC-566

b) Define the terms w.r.t PLL a) Lock in range b) Capture range.

c) Give any two advantages and disadvantages of wien bridge oscillator.

d) List two applications of Schmitt trigger.

e) Draw an ideal and practical frequency responses with correct labelling for first order high pass Butterworth filter.

f) State the functions of following pins of IC555

i) Control

ii) Trigger

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

a) Explain block diagram of phase lock loop.

b) Draw the circuit diagram of a monostable multivibrator using IC555 and explain it operation.

c) Compare between voltage comparator and Schmitt trigger with any four points.

d) Draw the circuit of astable multivibrator using IC741. Sketch the waveforms across the capacitor and the output on the same time scale.

e) Explain operation of triangular waveform generator using op-amp

f) Draw the circuit of second order high pass Butterworth filter with labelled frequency response. Give expression for cut-off frequency and gain.

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

a) For a first order Butterworth law pass filter, calculate the cut off frequency if R=10kΩ and c=0.001 μf . Also calculate the passband voltage gain if R_1=10kΩ and R_f=100kΩ.

b) Draw the circuit of first order wide bandpass filter. Draw the labelled frequency response of a filter. Give the expression for cut off frequency.

c) Explain operation of IC555 as water level controller with neat diagram.

d) Draw block diagram if IC555 and explain functions of each pin.

e) Compare between RC-phase shift oscillator and wien bridge oscillator with four points

f) Draw phase shift oscillator using IC741. Explain the function of each component in it.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **IE & E&TC**
COURSE CODE :- **IEE/ETE401/EJ211**
COURSE NAME :- **POWER ELECTRONICS - I**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **19 / 04 / 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.
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7) Use of Mobile is strictly prohibited.

Section – I

Marks

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

a) What is forward blocking state in SCR?

b) Draw ideal switch characteristics.

c) State any two advantages of gate triggering.

d) Draw a neat circuit diagram of class E commutation.

e) What is the need of high power semiconductor switch?

f) Define i) Natural commutation. ii) Forced commutation.

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

a) Describe any four specifications of SCR.

b) Draw and explain UJT characteristics.

c) Explain with diagram, construction of SCR.

d) Describe PUT relaxation oscillator.

e) Draw and explain class D commutation.

f) Explain voltage-triggering method of SCR.

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

a) Draw UJT relaxation oscillator and waveforms. Explain it. Also write expression for its time-period.

b) Describe four modes of operation of Triac.

c) i) Compare voltage commutation and current commutation. (any four points)
ii) Draw and explain class B commutation.

P.T.O

Section – II

Marks

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

a) Give the need of series connection of SCR (any two points)

b) Give the meaning of phase controlled rectifier.

c) Draw circuit diagram of single phase half wave controlled rectifier.

d) Define load and source.

e) Draw the diagram of 3-phase delta star type of transformer.

f) Draw vector diagram of line voltage and phase voltage.

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

a) Explain with circuit diagram and waveform of single-phase half wave controlled rectifier with RL load.

b) Derive the equation for capacitor in dynamic equalization network.

c) Define performance parameters of three phase full wave uncontrolled bridge rectifier.
i) Efficiency ii) Ripple factor iii) PIV iv) TUF

d) Describe the working of free wheeling diode in controlled rectifier, with the help of diagram.

e) List the advantages of three phase uncontrolled rectifier. (any four points)

f) Explain the concept of two-quadrant operation.

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

a) Draw a circuit diagram and explain the principle of three phase half wave uncontrolled rectifier.

b) List the causes for unequal distribution of current. (any four points)

c) Draw and explain waveforms of single phase half wave controlled rectifier using inductive load.

d) Derive value of dynamic equalizing resistor. Give the equation of Tmin.

e) Draw static equalization circuit for series connected SCR and write the function of each element.

f) Draw and explain 3-phase uncontrolled bridge rectifier.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**
COURSE CODE :- **CCF/CCE202/X106**
COURSE NAME :- **COMMUNICATION SKILLS**
MAX. MARKS : **40** TIME : **2HRS.** DATE: - **20 / 04 / 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.
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7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR (Answer the following questions in 3-5 sentences).** (08)

a) Write importance of oral communication for engineers.

b) Write four examples of oral communication.

c) State the advantages of written communication.

d) Define the term artefacts.

e) Write two advantages of LCD projector.

f) Explain panel interview.

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

a) Explain communication process with suitable diagram.

b) Explain mechanical and physical barriers.

c) Write strengths of media aided presentation.

d) Explain 'Media plays an important role in the communication processes'.

e) Write four advantages and disadvantages of oral communication.

f) Write short note on mock interview.

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

a) Write any four principles of effective communication.

b) Write an application for the post of Design Engineer in Tata Motors, Pune. Give your resume.

P.T.O

c) Prepare a pie-chart which shows the distribution of sales of the car industry among six car companies :

General Motors	: 37%
Maruti	: 22%
Ford	: 04%
Tata	: 12%
Hyundai	: 13%
Fiat	: 12%

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH** PROGRAM: **IE /E&TC**

COURSE CODE: **IEE/ETE404** COURSE NAME: **PRINCIPLES OF CONTROL SYSTEM**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **20/04/2017**

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.
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7) Use of Mobile is strictly prohibited.

Section – I

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

a) What is order of system? Give example of 1st order system.

b) Write the expression of unit step response of first order system and draw it.

c) List any four examples of open loop system.

d) Write down two limitations of time domain analysis.

e) What is frequency response of the system? State two methods for frequency response analysis.

f) Define characteristics equation of system.

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

a) State any four block diagram reduction rules.

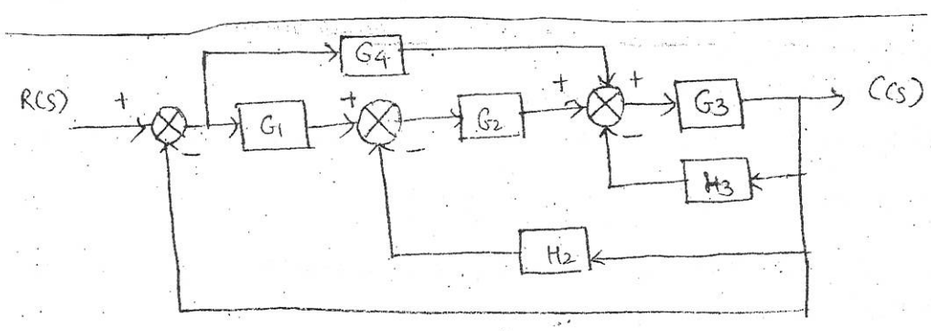
b) Drive equation for step response of second order critically damped system.

c) Write down the procedure for constructing Bode plot.

d) State the significance of Laplace transform in control system.

e) Find out the poles, zeros, order and characteristics equation of system with transfer function $T.F = \dfrac{s^2 - 4}{s(s^2 + 5s + 6)}$

f) Obtain C(s)/R(s) using block diagram reduction technique.



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

a) Explain time- in varying and time varying system with example.

b) Why standard test signals are required in time domain analysis? State Laplace representation of all standard test signals.

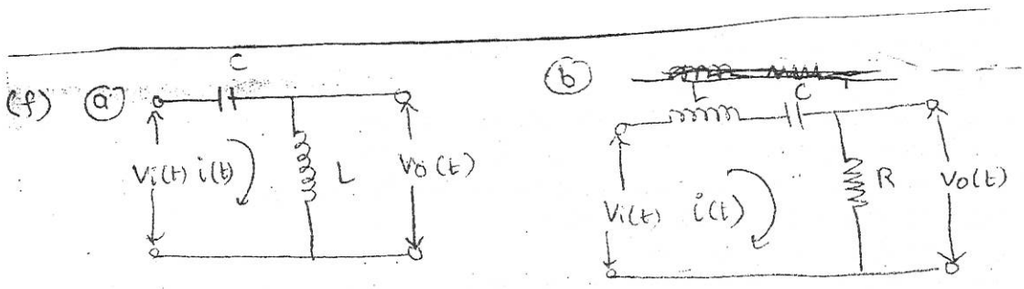
c) State any four advantages and disadvantages of frequency domain analysis.

d) Define the terms Gain Margin, phase margin, gain crossover frequency and phase crossover frequency used in frequency domain analysis.

e) For a second order system, transfer function is given by $\frac{C(s)}{R(s)} = \frac{2s}{s^2 + 6s + 2s}$. Find out

i) Risetime (tr)
ii) Peak time (tp)
iii) Delay time
iv) Peak overshoot

f) Derive the transfer function of given network (Refer fig.Q3(f))



Section – II

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

a) What is synchro? Give its two applications.
b) Give classification of controllers used in process control system.
c) State the necessary conditions for system to be unstable.
d) What is servo system? Give its types.
e) State any four advantages of proportional controller.
f) What is meant by absolute and conditional stability of system?

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

a) Explain any one special case of Routh's criteria with example.
b) With neat diagram explain potentiometer as an error detector.
c) Find out the stability of the system by Routh's criterion if the characteristics equation is given by $s^4 + s^3 + 2s^2 + 2s + 3 = 0$
d) Draw and explain block diagram of process control system.
e) Compare between armature controlled DC servomotor and field controlled DC servomotor(any four points)
f) State the principle of derivative control action. Write its standard equation. Give its advantages.

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

a) Explain rules for drawing root locus.
b) Find the range of k for stability of a unity feedback system whose open loop transfer function is $G(S) = \frac{k}{s(s+2)(s+4)(s+6)}$
c) Draw electronic PID controller and give its mathematical equation, advantages and disadvantage.
d) Compare AC and DC servomotors (any four points)
e) Draw neat diagram of AC position control system. State function of each component.
f) State the expression for proportional controller and define the terms: proportional band and offset.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **IE & E & TC**

COURSE CODE :- **IEE/ETE402/EJ302**

COURSE NAME :- **8051 MICROCONTROLLER**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **21 / 04 / 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 o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

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

a) What is the size of internal RAM and ROM in 8051?

b) State the function of PSW Register.

c) Draw functional pin diagram of 8051 microcontroller.

d) State any four features of 8051 microcontroller.

e) Enlist the assembler directives of 8051 family.

f) Describe the following instruction: XCH A, R1.

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

a) Compare between microprocessor and microcontroller. (any 4 points)

b) Explain organization of RAM in 8051

c) Describe the function of Boolean processor with two suitable examples.

d) Describe the function of following pins : *i) ALE* *ii) $\overline{PSEN}$* *iii) $\overline{EA}$* *iv) XTAL1.*

e) Write a program to add two BCD numbers stored in register bank1.

f) Describe two instructions each related with external data memory and program memory of 8051 microcontroller.

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

a) Explain power saving operations of 8051 microcontroller.

b) State alternate function of port 3 pins of 8051 microcontroller.

c) Draw the architecture of 8051 microcontroller.

d) Write an assembly language program to count number of 0's and 1's in 8 bit number.

e) State any four addressing modes in 8051 with one example of each.

f) Write a program to find smallest number from the array of ten numbers stored in external RAM memory.

P.T.O.

Section – II Marks

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

a) What value should be loaded in IESFR to enable serial port and timer Φ overflow interrupt?

b) Write various baud rates supported by 8051.

c) If the step angle of a stepper motor is 2^0, how many steps will be required for rotation of 180^0.

d) How many memory chips of following sizes will be required to interface a memory of 8k X 8 with 8051 microcontroller? i) 4k X 8 ii) 8k X 4.

e) State any four applications of 8051 microcontroller.

f) Write the function of following pins of ADC 0808 i) SC ii) EOC.

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

a) Draw a neat interfacing diagram of ADC 0804 with 8051 microcontroller.

b) Consider DAC 0808 is interfaced with 8051 microcontroller. Write an assembly language program to a triangular wave.

c) Write an assembly language program to measure the frequency of a square wave applied externally to 8051 microcontroller. Assume crystal frequency =12MHz.

d) Draw a neat labeled hardware schematic diagram of stepper motor controller.

e) A square wave is applied to TΦ pin of 8051 microcontroller. Write an assembly language program to count the pulses and send the count to port 1 continuously.

f) Write an assembly language program to transmit the message "GPKP" serially at a baud rate of 4800. Assume crystal frequency = 11.0592 MHz.

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

a) Design a 8051 microcontroller based temperature ON-OFF controller that will measure the temperature of a liquid and control it within 60^0-80^0C (Use LM35 as a temperature sensor).

b) Interface an external RAM of size 8k X 8 with 8051 microcontroller with starting address of 8000H.

c) Write an assembly language program to perform the following i) Flash the LEDS connected to port 1 at an interval of 1 msec continuously. ii) Read the data from port Φ and send it to port 2 continuously. Assume crystal frequency = 12MHz.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH** PROGRAM: **ELECTRONICS AND TELECOMMUNICATION**

COURSE CODE: **ETE512** COURSE NAME: **PIC MICROCONTROLLER**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2017**

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

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

a) Write all features of PIC 18F.

b) What are the various addressing nodes in PIC microcontroller? Explain in brief.

c) Write a PIC program to initialize the I/O port. Set PORT B as an output port and B as an input port with A IN 3 as an analog input and other input line of PORT A as simple digital inputs.

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

a) i) Show the status of C, DC and Z flags after the addition of 88H and 93H in the following instructions

MOV LW 88H

ADD LW 93H

ii) Give the value in WREG for the for the following instruction after execution

MYCOUNT EQU OX95

MOV LW MYCOUNT

b) Explain RISC architectural features of PIC

c) Disect the BRA instruction indicating how many bit are used for the operand and opcode and indicate how far it can branch.

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

a) An LED is connected to each pin of port D. Write a program to turn on each LED from pin D_0 to pin D_7. Call a delay module before turning on next LED.

b) Write steps to program Timer 0 in 16 bit mode.

c) Write short note on Bank switching in PIC18.

P.T.O

Section – II

Marks

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

a) Write the function of following bits of INTCON register i) RBIE ii) INTOIE

b) Calculate the baud rate error, for baud rate of 57600, use BRGH=0 & assume XTAL=10MHz.

c) Write the function of following pins of DS 1306 RTC i) SCRMODE ii) INT1

d) Draw the format of SSP CON1 register.

e) Define step angle of steeper motor calculate the number of steps per revolution if step angle is 2.5.

f) Write the difference between stepper motor & DC motor(any 2 points)

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

a) Assume 1 H_Z pulse is connected to timer 1, LED is connected to CCP1 pin, the timer 1 is used as a counter. Write a program to toggle the LED after every 10 pulses by using compare mode.

b) Draw the format of ECCPICON register. Also write significance of each bit.

c) Write an assembly language program to display massage "WELCOME" on LCD display. Also draw the interfacing of LCD with PIC18.

d) Write an ALP for PIC 18 to initialise the date at 12-04-2004. Use single byte operation for writing into control register of DS1306 & use multibyte burst mode for writing date, month, year.

e) Write a program for PIC18 to turn ON & OFF the relay and draw the interfacing of relay with PIC18 F485.

f) Write an ALP for PIC 18 to rotate stepper motor in counter clockwise direction.

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

a) Draw the interfacing diagram of keyboard with PIC18F. Also write the necessary program to detect the key pressed.

b) Write a program for PIC 18 to rotate the dc motor in clockwise direction or in counter clockwise direction depending on status of switch which is connected to the PORT D-7 & perform the following.

1) If SW=0: DC motor moves in clockwise direction.

2) If SW=1: DC motor moves in counter clockwise direction. Also draw the interfacing diagram of dc motor with PIC 18 using 1293IC.

c) i) Explain Interrupt priority of PIC 18.

ii) Assume door sensor is connected to RB4 & Buzzer is connected to RC7. Write an assembly language program that every time when door is open, sound the buzzer by sending high to low pulse with some delay.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IE/IT/E & TC**

COURSE CODE :- **CCF104/CCE104/X109/X103**

COURSE NAME :- **CHEMISTRY OF ENGINEERING MATERIALS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **24 / 04 / 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) Write any two differences between atomic number and atomic mass number.
b) State Pauli's exclusion principle.
c) Define i) Electrolyte ii) Electroplating.
d) State Faraday's first law of electrolysis.
e) State any two factors affecting rate of atmospheric corrosion.
f) Draw diagram of galvanizing method of protection of metal from corrosion.

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

a) Write orbital electronic configuration of following elements

$20^{Ca^{40}}$ $17^{Cl^{35}}$ $24^{Cr^{52}}$ $11^{Na^{23}}$

b) Explain formation of CO_2 molecule.

c) Explain the types of oxide film in atmospheric corrosion.

d) Write any four differences between Temporary hardness and permanent hardness.

e) Explain with reaction bleaching powder method of chlorination used for sterilization of water.

f) i) State any two applications of p^H. ii) Draw p^H scale.

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

a) Define degree of ionization. Explain any three factors affecting degree of ionization.

b) Explain mechanism of electrolysis of $CuSO_4$ solution by using copper electrode.

c) What is metal cladding process? Draw diagram of metal cladding process and write two limitations of it.

d) State and explain any four disadvantages of scale formation in boiler.

e) State any two disadvantages each of hard water in i) paper industry and ii) Sugar industry.

f) Write principle of ion exchange method used for removal of hardness from water. How exhausted Cation exchangers are regenerated?

P.T.O.

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

a) With example write classification of batteries.

b) Write with formula four ores of copper.

c) Define i) Flux ii) Mineral.

d) Define Alloy & write its classification.

e) Write two applications of silicon carbide.

f) Write two properties of Teflon.

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

a) With labelled diagram write construction and working of lead acid storage cell.

b) With the labelled diagram explain froth floatation process.

c) Explain calcination method with chemical reactions.

d) Write with example four purposes of making alloy.

e) Write four properties and two applications of Germanium

f) With example explain addition polymerization.

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

a) Define i) Battery ii) Separator iii) Electrochemical couple iv) Charge.

b) With diagram explain smelting process of extraction of copper.

c) Write occurrence of metals in nature. Draw flow chart of metallurgical process.

d) Write composition and two applications of Rose metal.

e) Define polymer and insulators. Write preparation of glass wool.

f) Write four characteristics of good adhesives. Write two uses of Thermocole.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E & TC**

COURSE CODE :- **IEE/ETE308/EJ112**

COURSE NAME :- **CIRCUIT AND NETWORK**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **21 / 04 / 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) State Ohm's law.

b) Find equivalent resistance across AB as shown in fig..

c) Define electric charge.

d) State Norton's Theorem.

e) Find load resistance when maximum power is transferred to the load. Also find max. power as shown in fig.

f) State Kirchoff's current law.

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

a) State and prove superposition theorem with any one example.

b) Determine the currents in each branch using nodal analysis as shown in fig.

c) Determine the current through each resistor in the circuit

d) Derive an equation for voltage division rule with suitable diagram.

e) For the circuit shown, find I_1, I_2, & I_3 using mesh analysis.

f) Determine the voltage across the terminals AB in the circuit shown.

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

a) Explain voltage and current source.

b) Determine current in the 10Ω resistance and find Vs in the circuit.

c) Write a short note on open and short circuits.

d) Determine maximum power delivered to the load in the circuit as shown in fig..

e) Derive formulae for equivalent series and parallel resistances.

f) Use Thevenin's theorem to find current in the 3Ω resistances.

P.T.O 01

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

a) What do you mean by RC time constant?

b) Write the equation and draw the curve for energizing current in inductor circuit.

c) Define i) Admittance ii) Impedance.

d) State the quality factor related to series resonance circuit.

e) Draw the frequency response for R-L and R-C Low pass filter.

f) State decibel measurement.

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

a) A resistor of 10Ω and an inductance of 0.1H are connected in series across 230V, 50Hz, supply. Find i) Reactance ii) Impedance iii) Current iv) Phase angle.

b) Draw the waveforms for voltage and current in R-C series circuit with circuit diagram. Also draw the vector diagram for voltage and current.

c) Compare series and parallel resonance circuit (any four points)

d) What is meant by resonance in RLC series circuit? Derive the equation for resonant frequency of series circuit.

e) Explain the parallel resonant band pass filter with its frequency response.

f) Describe working with the neat diagram series resonant band stop filter.

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

a) Derive the equation for charging of capacitor with its curves.

b) Draw the circuit diagram of series R-L circuit. Also draw the waveforms for voltage, current and power.

c) Explain the Q factor of series Resonant circuit and prove how it affects voltage across inductors & capacitor.

d) Describe the parallel resonant band stop filter.

e) Explain the series resonant band pass filter with its frequency response.

f) Draw and explain frequency response for R-L High pass filter.

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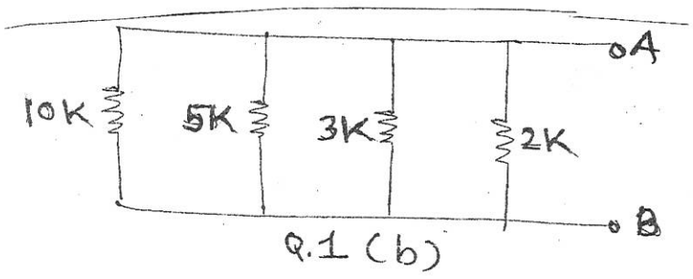
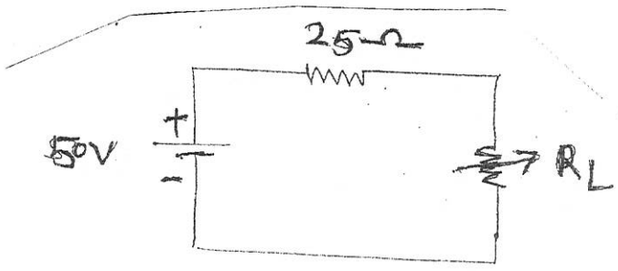


Q.1 (b)



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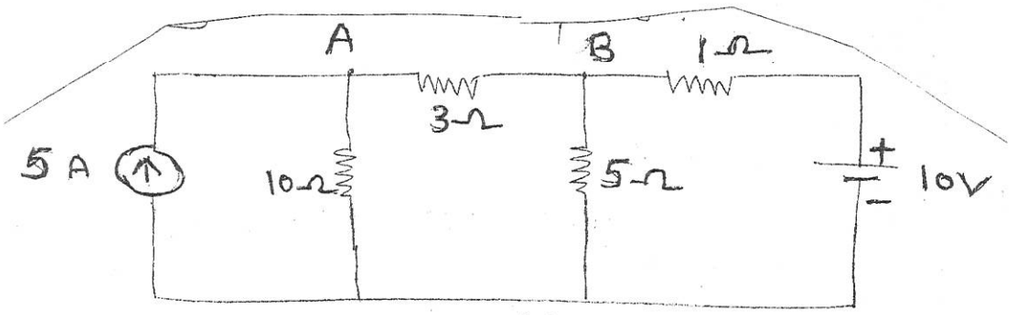
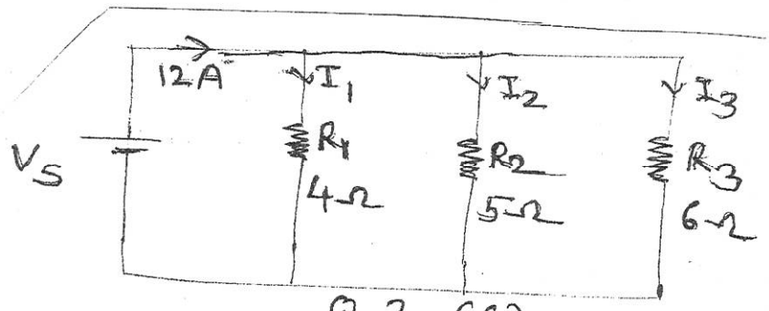
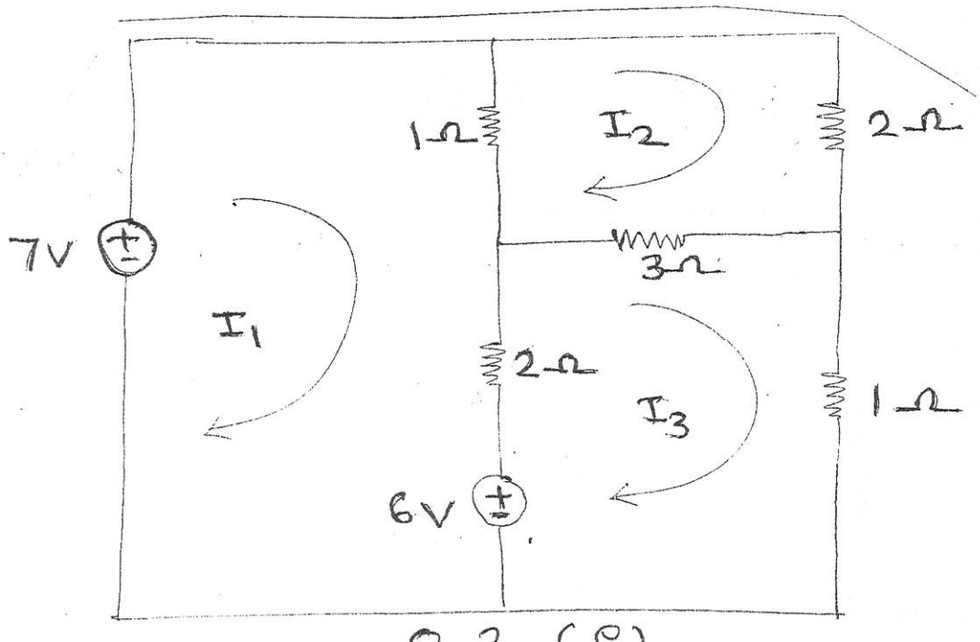


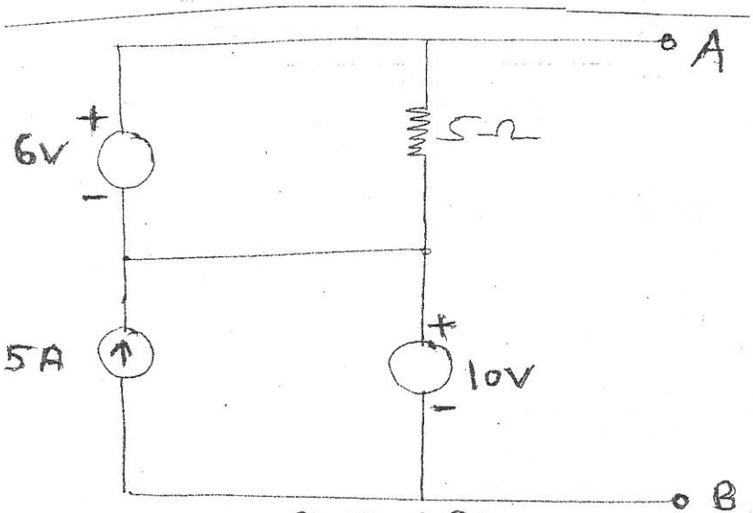
Q.2 (b)



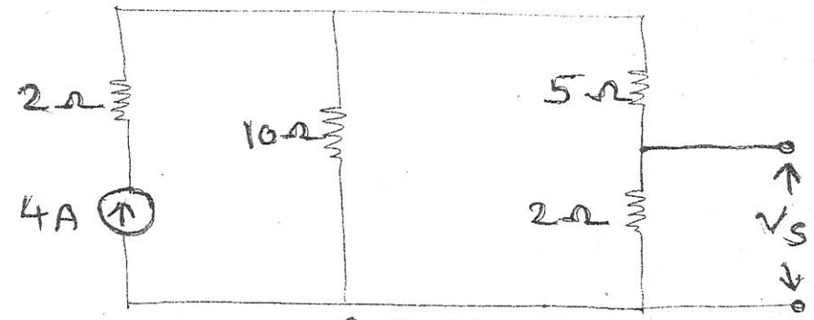
Q.2 (c)



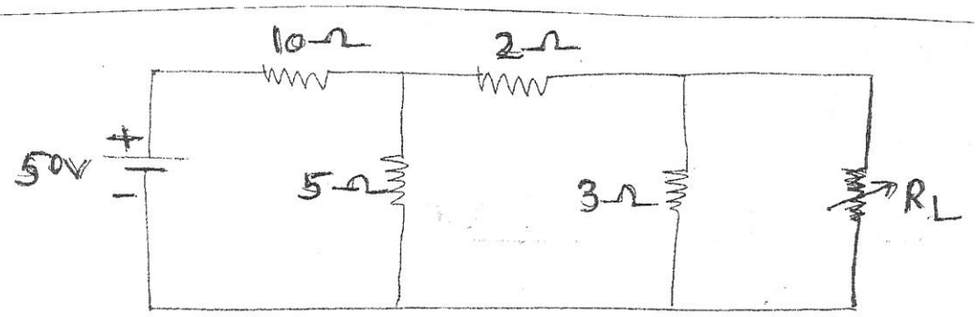
Q.2 (e)



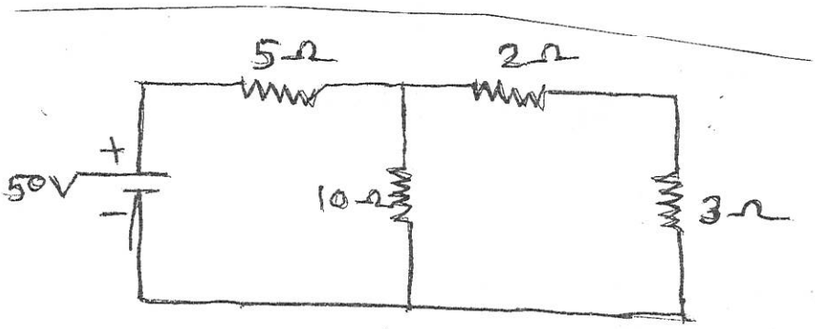
Q.2 (f)



Q.3 (b)



Q.3 (d)



Q.3 (f)

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE :- **ETE501**

COURSE NAME :- **MOBILE COMMUNICATION AND NETWORKING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **24 / 04 / 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 o 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 forward channel and reverse channel.

b) What is a function of mobile switching center (MSC)?

c) State the necessity of wireless communication.

d) Write function of logic unit of mobile handset.

e) State the advantages of sectoring in cellular system.

f) What do you mean by hand-off in cellular system?

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

a) Explain how cellular telephone call is made?

b) Draw the block diagram of mobile unit. Explain its operation.

c) Describe how repeaters used for range extension of cellular system.

d) Draw the block diagram of logic unit of mobile handset and explain its working.

e) Explain the concept of frequency reuse. State the expression used to calculate distance between two same cells.

f) Explain closed loop and open loop power control for reducing interference.

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

a) List various mobile radio systems around the world. Explain any one in brief.

b) Write a short note on the evolution of mobile radio communication.

c) Draw the block diagram of transmitter unit of mobile handset and describe it,

d) Describe the following terms : i) Sectoring ii) Microcell zone concept.

e) Describe the effect of adjacent channel interference in communication. How it affect system capacity?

f) Explain following terms :- i) Hard hand off ii) Soft hand off

iii) Delayed hand off iv) Queued hand off.

P.T.O

Section – II	Marks

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

a) State important features of GSM.

b) State different types of G.S.M. channel.

c) What are different features of IS-95? (any four)

d) Define authentication center (AC).

e) State applications of 3G wireless systems.

f) Draw Bluetooth architecture (ESS)

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

a) Explain call processing in GSM.

b) Differentiate GSM and IS 95. (any four)

c) Draw the IS-95 system architecture and explain VLR & HLR.

d) How the security and identification is maintained in IS-95 CDMA?

e) Explain SS-7 performance services.

f) State features of 3G CDMA.

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

a) Draw GSM architecture. State function of NSS.

b) What is WLL? Describe with suitable diagram.

c) List specification of IMT-2000.

d) Explain GSM radio subsystem and list GSM air interface specification.

e) Describe frequency and channel specification of IS-95.

f) Describe the call processing in IS-95 CDMA.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF110/CCE110/X111/R112** COURSE NAME: **APPLIED MECHANICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2017**

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 concurrent force system with any one of field example.

b) State polygon law of forces.

c) Explain funicular polygon with its use.

d) State any two laws of friction.

e) Explain the relationship between angle of friction & angle of Repose.

f) Draw free body diagram of body resting on rough inclined surface.

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

a) Resolve the 200N force along 30^0 & 20^0 on either side with neat sketch.

b) Find resultant in magnitude & direction of forces 1kN, 2kN, 3kN, 4kN, 5kN and 6kN acting from center of hexagon towards its angular points respectively. (solve by analytical method)

c) Solve Q.No.2 (b) by graphical method.

d) An electric bulb of 5N weight is hanging from ceiling. Its wire is pulled by a force acting horizontally such that the wire makes an angle of 60^0 with ceiling. Find the magnitude of pulled force & tension in the wire.

e) Find the support reaction of beam ABCD supported at 'A' & 'C' & portion CD is overhang. The given span is AB=BC=2m & CD=1.5m. The UDL of 20kN/m is acting on 'B' to 'D' with downward point load of 50kN acting at point D free end.

f) The body of weight 100N will begin to slide when horizontal plane is raised gradually upto 22^0. What is horizontals force required to drag the same body.

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

a) The forces 50N, 30N, 20N & 15N are acting on four sides of 10cm square box respectively on clockwise direction. Find resultant from force & locate from 50N side.

b) Three forces are acting along three side of an equilateral triangle of side 2m with forces 15N, 20N & 10N respectively. Find resultant from force of side 10N.

c) A solid sphere of radius 10cm weighing 1.2KN is hung with steel cable 50cm from vertical smooth wall to its center. Find the contact force between wall & solid sphere & tension in cable.

P.T.O

d) Beam AB of span 6m is hinged at A & roller support at B carrying vertically downward point load of 12kN at 2m from support A & inclined point load of 10kN inclined at 30^0 anticlockwise from horizontal at 4m from support A, Also udl of 5kN/m is acting over entire span. Calculate support reaction by analytical method.

e) Solve Q.No.3 (d) by graphical method.

f) A ladder of 3.5m with weight 150N is rested on smooth vertical wall & rough horizontal surface with 18^0 inclination to horizontal. What is force (pull) required at horizontal contact surface to keep ladder in equilibrium when man weighing 750N stands on its mid length. Take coefficient of friction between rough horizontal surface is 0.25.

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

a) Define Rectilinear motion.

b) Differentiate displacement & distance.

c) Define angular velocity.

d) Define energy.

e) Define work done by torque.

f) State law of machine with meaning of each notation.

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

a) A composite section as shown in figure in which a equilateral triangle is rested on a square. Determine centroidal position of the section from reference axes X& Y

b) A circular disc of 500mm diameter is cut off from a sheet of radius 500mm find the centroid of the remainder portion from reference axes X&Y as shown in figure.

c) A car staring from rest & increases speed from 0 to 10m/s with constant acceleration 0.5 m/sec^2 runs at this speed for a time of 30 seconds & finally comes to rest, with deceleration of 0.3m/sec^2. Find the total distance travelled by car.

d) A wheel moves from 200rpm to 150 rpm in 10 seconds find the retardation & time required to come to stop.

e) A bullet weighing 1N is fired with velocity 400m/sec. into a wooden block weighing 100N. If the bullet remains embedded in the block, calculate the velocity of the block after impact.

f) In a simple lifting machine 100N is lifted by an effort of 8N at an efficiency 62.5%. Find the effort lost in friction & the load lost in friction.

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

a) Determine center of gravity of a solid composite body as shown in figure from the base of body.

b) A stone is dropped into well. Its sound is heard after 3 seconds. The velocity of sound is 320 m/sec. find the depth of well.

c) A wheel starts from the rest & accelerates at 15 red/sec^2 until it reaches a speed of 300 rpm. With this speed it rotates for 3 minutes & then retards uniformly for 150 seconds & stops. Find total number of revaluations made.

d) In a simple lifting machine the effort required to lift a certain load is 150N. When efficiency is 65%. Find ideal effort of machine.

e) A simple lifting machine lifts a load of 400N & 600N by efforts of 60N & 80N respectively. Find law of machine & efficiency at a load of 800N if velocity ratio of machine is 22.

f) 300 cubic meters of water is to be raised to a tank of height 10 meters in 10 minutes. Calculate the power of the pump required in kilowatt.

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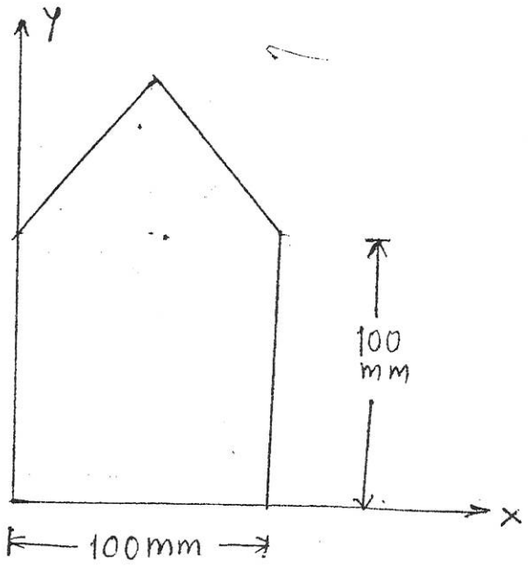
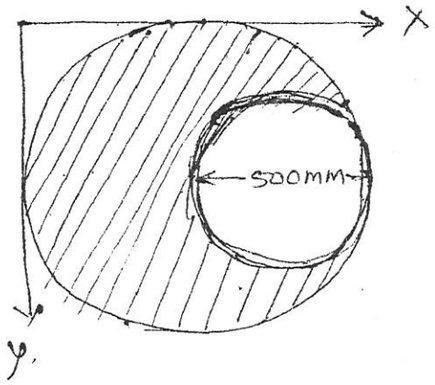
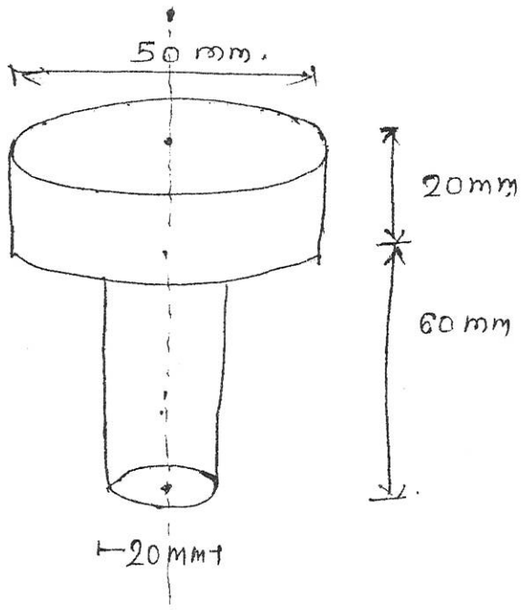
Q.5)
a)



Q.5)
b)



Q.6) a.)



GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E & TC**

COURSE CODE :- **IEF/ETF101/IEE/ETE101**

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

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **02 / 05 / 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) Give colour code for the following resistors. i) 100Ω, 10% ii) 47K Ω, 5%.

b) State any four dielectric materials used in manufacturing the capacitor.

c) Define the reactance of an inductor.

d) List four non-linear resistors.

e) Name any four specifications of capacitor.

f) Give types of an inductor

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

a) Define the following terms with respect to inductor.
i) Self inductance ii) Mutual inductance iii) Co-efficient of coupling
iv) Leakage inductance.

b) Draw and explain the construction of an aluminium electrolytic capacitor.

c) Explain NTC and PTC resistors with temperature resistance characteristics.

d) Draw the constructional details of air core inductor and explain.

e) Compare paper and ceramic capacitors on the basis of range of values, voltage rating, power factor and temperature coefficient.

f) Draw labelled constructional diagram of rheostat.

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

a) Draw and explain, constructional details of carbon film resistor, and write its two applications.

b) Explain air ganged capacitors with its constructional diagram.

c) Compare iron core inductor and ferrite core inductor on the basis of eddy current loss, frequency, application, and symbol.

d) Draw and explain constructional diagram of standard wire wound resistor, and write its two applications.

e) Draw constructional diagram of slug-tuned inductor.

f) Draw and explain constructional details of Trimmer capacitor with two applications.

P.T.O.

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

a) Draw constructional diagram of cable.

b) List types of connector.

c) Define Electrical and mechanical life of Relay.

d) What is switch? State different types of switches.

e) List any two applications of light emitting diode.

f) List types of PCB.

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

a) Draw and explain a neat sketch of general purpose relay and label the different parts.

b) Draw and explain PUSH ON and PUSH OFF switch.

c) Explain screen printing technique used in PCB manufacturing.

d) Draw and explain a neat sketch of dip soldering technique used in PCB's.

e) List any eight applications of optical fibre cable.

f) Explain the construction of video connector and write its two applications.

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

a) Draw construction of co-axial cable. State its any three applications.

b) Draw and explain flat ribbon cable.

c) Draw and explain working of dry reed relay.

d) Draw and explain constructional details of LCD.

e) Draw and explain rocker switch. Write its two applications.

f) Explain safety, Health and Medical Aspects of soldering.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF105/CCE105/X104/R107/107** COURSE NAME: **BASIC MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **09/05/2017**

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) Resolve into partial fraction $\frac{1}{x^2 - x}$

b) If $A = \begin{bmatrix} 2 & -1 & 1 \\ 3 & -4 & 0 \end{bmatrix}$ & $B = \begin{bmatrix} 0 & 2 \\ -3 & 1 \\ 4 & -1 \end{bmatrix}$ is the matrix AB is non singular.

c) Evaluate i) ${}^{7}P_{3}$ ii) ${}^{4}C_{3}$

d) Solve the equations by matrix method

$3x + y = 1$

$5x + 2y = 3$

e) Expand the following binomial upto 4th term of the expansion $(1+2x)^{1/2}$

f) Expand $(x+y)^5$ by using binomial theorem.

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

a) Find k if $\begin{vmatrix} 2-k & 7 \\ 3 & -4 & 13 \\ 8 & -11 & 33 \end{vmatrix} = 0$

b) Resolve into partial fraction $\frac{x^3 + x}{x - 9}$

c) If $A = \begin{bmatrix} 2 & 4 & 4 \\ 4 & 2 & 4 \\ 4 & 4 & 2 \end{bmatrix}$ show that A^2-8A is a scaler matrix.

d) Resolve into partial fraction $\frac{x^2 + x + 1}{(x-1)^3}$

e) If $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 3 & -2 \end{bmatrix}$, $c = \begin{bmatrix} 3 & -1 \\ 0 & 6 \end{bmatrix}$ Find 3A+4B-2C

f) Find x and y if $\left\{4\begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 3 \end{bmatrix} - 2\begin{bmatrix} 1 & 3 & 1 \\ 2 & -3 & 4 \end{bmatrix}\right\}\begin{bmatrix} 2 \\ 0 \\ -1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

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

a) Solve the equations by Cramer's rule

$x + y + z = 3$

$x - y + z = 1$

$x + y - 2z = 0$

P.T.O

b) Resolve into partial fraction $\frac{2x+1}{x^2(x+1)}$

c) If $A=\begin{bmatrix}1 & -3\\ 2 & -1\end{bmatrix}$ & $B=\begin{bmatrix}1 & 0 & 1\\ 2 & -1 & 3\end{bmatrix}$ *verify that* $(AB)^T = B^T A^T$

d) Resolve into partial fraction $\frac{2x+3}{x^2-2x-3}$

e) Show that $\left(\sqrt{3}+1\right)^5 - \left(\sqrt{3}-1\right)^5 = 152$

f) Solve the equation using matrix method

$x+y+x=2$

$y+z=1$

$x+z=3$

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

a) Prove that $\cos ec^2\theta - \cos^2\theta.\cos ec^2\theta = 1$

b) Without using calculator find $\sin 15^0$

c) If $\sin A = \frac{1}{2}$, *find* $\sin 3A$

d) Prove that $\cos 2\theta = 1-2\sin^2\theta$

e) Prove that $\sin\left(\theta+\frac{\pi}{6}\right) - \sin\left(\theta-\frac{\pi}{6}\right) = \cos\theta$

f) Find the principal value of $\cos^{-1}\left(\frac{-1}{2}\right) - \sin^{-1}\left(\frac{1}{2}\right)$

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

a) Prove that $\frac{\cos ecA}{\cos ecA-1} + \frac{\cos ecA}{\cos ecA+1} = 2\sec^2 A$

b) Prove that $\sin(A+B) = \sin A\cos B + \cos A\sin B$

c) Simplify $\frac{\cos^2(180^0-\theta)}{\sin(-\theta)} + \frac{\cos^2(270^0+\theta)}{\sin(180^0+\theta)}$

d) Prove that $\frac{\cos 3\theta}{\cos\theta} + \frac{\sin 3\theta}{\sin\theta} = 4\cos 2\theta$

e) Prove that $\frac{\sin 4A+\sin 5A+\sin 6A}{\cos 4A+\cos 5A+\cos 6A} = \tan 5A$

f) Prove that $\cos^{-1}\left(\frac{4}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$

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

a) If A & B are obtuse angles such that $\sin A = \frac{5}{13}$ & $\cos B = \frac{-4}{5}$. Find tan(A+B)

b) prove that $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

c) Prove that $\frac{1-\tan 2\theta.\tan\theta}{1+\tan 2\theta.\tan\theta} = \frac{\cos 3\theta}{\cos\theta}$

d) Prove that $\frac{\sin 8x-\sin 5x}{\cos 7x+\cos 6x} = \sin x + \cos x.\tan\frac{x}{2}$

e) Prove that $\tan^{-1}(x)+\tan^{-1}(y) = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$ *if* $xy<1$

f) Prove that $\tan^{-1}(1)+\tan^{-1}(2)+\tan^{-1}(3) = \pi$

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E & TC**

COURSE CODE :- **IEE/ETE306/IX/EJ207/IE208**

COURSE NAME :- **DIGITAL TECHNIQUES & APPLICATIONS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **09 / 05 / 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) Convert the following Boolean equation in POS form into standard POS form

$Y = (A+B)\,(A+C)\left(B+\overline{C}\right)$

b) Convert: i) $(2486)_{10}$ to hexadecimal ii) $(7204)_8$ to decimal.

c) Write the steps to perform subtraction using 9's complement method.

d) Define:- i) Noise Margin ii) Fan-out.

e) Perform $(1101)_2 - (1010)_2$ using 2's complement method.

f) Draw symbol of EX-OR gate with its truth table.

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

a) Simplify the following function using K-map

$F(A,B,C,D) = \Sigma\, m\,(1,5,6,12,13,14) + d\,(2,4)$

b) Explain with circuit diagram TTL NAND gate.

c) Perform BCD subtraction using 9's complement method. $(628)_{10} - (735)_{10}$

d) Define Interfacing. Explain TTL to CMOS interfacing.

e) Reduce the following expressions.

i) $F = A + B\left[AC + \left(B+\overline{C}\right)D\right]$ ii) $F = (B+BC)\left(B+\overline{B}C\right)(B+D)$

f) Compare between BCD code and gray code (any four points)

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

a) Convert the following Boolean equations from standard SOP to standard POS form

i) $Y = ABC + \overline{A}BC + \overline{A}\,\overline{B}C + A\overline{B}C + A\overline{B}C + A\,\overline{B}\,\overline{C}$ ii) $Y = \overline{A}BC + A\,\overline{B}\,C + AB\overline{C} + ABC$

b) Draw the logical diagrams of NOT, AND, OR and NOR gates using only a universal NAND gate.

P.T.O.

c) Perform BCD subtraction using 10's complement method $(206.4)_{10} - (507.6)_{10}$.

d) Explain the circuit diagram of CMOS NAND gate.

e) State De-Morgan's second theorem. Write its logical equation and truth table for 3 variables.

f) Define the following characteristics of logic families.

i) Propagation delay ii) figure of merit iii) Fan-in iv) power dissipation.

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

a) Give classification of memory.

b) Draw Pin diagram of IC 6116.

c) What is race around condition in JK FF?

d) Define i) Level triggering ii) Edge triggering.

e) Draw truth table for Full adder.

f) Draw logic diagram for half substractor.

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

a) Design 4- bit binary adder using IC 7483 & explain its working.

b) With neat diagram and truth table, explain working of 4-bit SISO register.

c) Draw a neat circuit diagram of dual slope ADC and explain it.

d) Draw block diagram of one digit BCD adder using IC 7483 & explain it.

e) With neat diagram and truth table, explain working of RS-Flip Flop.

f) Compare Demultiplex and Decoder (any 4 points)

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

a) Draw pin diagram of IC 74147. Explain with the help of truth table.

b) i) Compare ROM & RAM (any four points)

ii) With neat circuit diagram, explain working of weighted resister DAC.

c) Draw 4-bit down counter explain its working with timing diagram and truth table.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E & TC**

COURSE CODE :- **IEF/ETF 107/IEE/ETE107**

COURSE NAME :- **BASIC ELECTRICAL ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **04 / 05 / 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 Electric current.

b) State any two points for classification of electric current.

c) State ohms law with its application.

d) Which are the expressions for statically induced emf & dynamically induced emf?

e) State Lenze's Law for direction of current.

f) Explain mutual induction with suitable sketch.

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

a) What is resistance? Derive an expression for resultant of two resistances in series combination.

b) If three resistances of 4Ω, 6Ω & 8Ω are connected in parallel across 20 volt supply. Find out the power dissipated in the equivalent resistance of parallel combination.

c) Define i) Magneto motive force.
ii) Reluctance with sketch of simple magnetic series circuit.

d) Explain with labelled sketch of magnetic series circuit leakage flux, Useful flux, fringing.

e) What is a hysteresis in Magnetism? Draw labelled sketch of Hysteresis loop.

f) Derive an expression for dynamically induced emf use suitable labelled sketches.

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

a) On which factors does the resistance value depends explain in brief with expressions.

b) Explain Faraday's Law of electromagnetic induction with suitable labelled diagrams.

c) Two coils A & B, A = 12500 turns & B = 16000 turns lie in parallel planes so that 60% of flux produced in A links with coil B. It is found that a current of 5A in coil A produces a flux of 0.6 mwb while the same current in B produces 0.8 mwb. Determine mutual inductance and coefficient of coupling.

P.T.O.

d) Explain i) Magnetization curve for magnetic material.
ii) State coercive force & Remainent flux terms of Hysteresis loop.

e) Compare electric circuit and magnetic circuit.

f) Give four applications of each:- permanent magnet and electromagnet.

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

a) State the applications of transformer in electric circuit.

b) State the types of earthing.

c) Define phase sequence in three phase supply system.

d) Which type of circuit shows lagging power factor?

e) Define Peak factor and form factor.

f) Determine the time period of a waveform having frequency 50Hz.

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

a) Draw a sinusoidal quantity and label on it the cycle, periodic time and peak value.

b) Explain Active and Reactive Power in single phase A.C. circuit.

c) Draw and explain circuit with Resistance and Inductance in series with concept of power factor.

d) Two sine waves are represented by the expressions $i_1=20 \sin (wt + \Pi/3)$ & $i_2= 12 \sin (wt - \Pi/6)$ find $i_1 + i_2$.

e) State any four advantages of 3-phase supply system over single phase system.

f) State and explain types of transformer according to
i) Construction ii) Function iii) No. of phases.

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

a) Define Earthing. Explain necessity of Earthing.

b) Draw and explain three phase three wire system.

c) Draw and explain circuit with resistance inductance and capacitance in series with concept of power factor.

d) State the meaning of the term lag and lead in relation to alternating quantity with necessary waveforms.

e) Explain the generation of alternating em^f.

f) Explain the terms i) Phase ii) Phase difference.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF107/X105/R109/CCE107**

COURSE NAME: **ENGINEERING DRAWING -I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **04/05/2017**

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 **TWO** **Marks (08)**

a) On a plan of a field, a line of 1m long is represented on a drawing by a line of 5cm. construct a diagonal scale to read upto 2m and mark the length of 1m, 6 decimetres & 4cm on it.

b) Illustrate & write down application of following lines
   i) Ruled line with zigzag.
   ii) Short dashed medium.

c) Construct a scale of 1cm=0.4m to show metres & decimetres and large enough to measure upto 5m. Show a distance of 4m & 6 decimetres on it.

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

a) Construct an ellipse when the distance of focus from directrix is equal to 60mm & eccentricity=2/3.

b) The length of a top view of a straight line AB parallel to V.P & inclined at 40^0 to HP is 60mm. Its end A is 10mm above H.P is and 25mm infront of V.P. Draw front & Top views & determine the true length of the line AB.

c) Draw the projections F.V & T.V of a 75mm long straight line, inclined at 60^0 to V.P and its one end 15mm in front of it, parallel to and 25mm above H.P.

d) The top view of a 75mm long line measures 55mm. The line is in V.P, its one end being 25mm above the H.P. Draw its projections (F.V. and T.V)

e) End A & B of a line AB is 15mm & 55mm respectively infront of the V.P Elevation length of line is 60mm. it is parallel to XY line & 15mm above it. Draw Two views of the line & find its true length & inclination with V.P

f) The distance between the projectors through the ends of a line 75mm long is 60mm. Its end M is 15mm above HP & 20mm infront of V.P. Draw its two views when it is parallel to V.P. Determine its inclination with H.P.

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

a) Draw an Archemedian spiral of one convolution, the maximum & minimum radii being 80mm & 20mm respectively.

b) Draw a Helix on a cylinder of 50mm diameter of two turns, given pitch equal to 40mm.

c) A disc of diameter 50mm rolls without slip on a plane inclined at an angle of 15^0 to the horizontal. Trace & name the locus of point P on the circumference of the disc.

d) Draw in involute of a hexagon of side 20mm for one complete turn.

P.T.O

e) Draw a hyperbola with asymptotes OB=140 & OA=130 intersecting at an angle of 70^0 and passing trough point P on the curve 36mm from OB & 20mm from OA.

f) A stone is thrown upwards from a building 6m high & in its highest point of flight, it just crosses palm tree 12m high. Trace the path of the projectile, if the distance between the building and the palm tree be 3m. Take suitable scale.

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

a) A circular plate 50mm diameter has its center 30mm above HP & 35mm infront of VP. Draw the three views of the plate when the surface is perpendicular to VP & inclined at 45^0 to HP.

b) A rhombus having diagonals 60mm & 30mm respectively is resting on a corner in VP. The longer diagonal is parallel to HP & inclined to VP such that front view appears as a square. Determine the angle made by the rhombus with VP.

c) A pentagonal plane of side 30mm is resting on HP on one of its side with the corner opposite to that side, 25mm above HP side on HP is perpendicular to VP. Draw three views of the pentagonal plane & find its inclination with HP.

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

a) A cone of 50mm diameter & axis 70mm long is resting on HP on a point of its circumference of base such that its axis is parallel to VP & apex is 50mm above HP. Draw its projections.

b) A pentagonal prism base 20mm side & axis 55mm long, is standing on a corner of its base on HP with its axis inclined at 45^0 to HP & parallel to VP. Draw its projections.

c) A hexagonal pyramid base 25mm sides & axis 60mm long has a corner of base in the HP. Its axis makes an angle of 30^0 with HP & parallel to VP. Draw its projections.

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

a) A hexagonal pyramid base 30mm side & axis 70mm long has its base on HP with an edge of base parallel to VP. A section plane perpendicular to VP & inclined at 45^0 to HP cuts the axis of pyramid 30mm from the apex.
Draw-
   i) Front view (02 marks)
   ii) Sectional top view (03 marks)
   iii) True shape of section. (03 marks)

b) A cylinder of 50mm diameter & axis 70mm long has its axis perpendicular to HP. It is cut by a section plane perpendicular to VP & inclined at 45^0 to HP & intersecting the axis 40mm above the base.
Draw-
   i) Front view (02 marks)
   ii) Sectional top view (03 marks)
   iii) True shape of section (03 marks)

c) A square prism base 40mm side & axis 80mm long, stands vertically on HP with the edges of the base equally inclined to VP. A section plane perpendicular to VP & inclined at 60^0 to HP cuts the axis of prism 15mm from its top end.
Draw-
   i) Front view (02 marks)
   ii) Sectional Top view (03 marks)
   iii) True shape of section. (03 marks)

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **IE/E&TC ENGINEERING.**

COURSE CODE:**IEE/ETE309/IX/EJ/209/ET210.**

COURSE NAME: **MICROPROCESSOR & INTERFACING.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/04/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

Marks

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

a) Enlist microprocessor initiated operations.

b) Draw the symbol and write function of the following interfacing devices
   1) Tristate Buffer. 2) Latch.

c) Draw instruction format of 8085 processor and describe each field.

d) What will be contents of Accumulator after execution of following instruction?
   XRA A
   DCR A

e) Describe RST 1 instruction and write its vector location.

f) State the function of the following pins.
   (1)SID (2) SOD

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

a) 1) Draw architectural diagram of 8085 microprocessor(05marks)
   2) Describe following registers of 8085 with reference to their function and size in bits.1) PC 2)SP 3)A (03 marks)

b) Draw labeled timing diagram of CALL instruction for following details:

Addr	opcode	oprand
1020H	CALL	4060H

   (Machine code of CALL is CBH)

c) 1) Draw overall interrupt structure of 8085 processor and label it.(06marks)
   2) Describe EI & DI instructions.(02marks)

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

a) With the help of diagram, describe demultiplexing of low order address/data bus.

b) Identify the addressing mode and the effect on flags, of the following instructions:1) ADI 2) ORA 3) LXI 4) STA

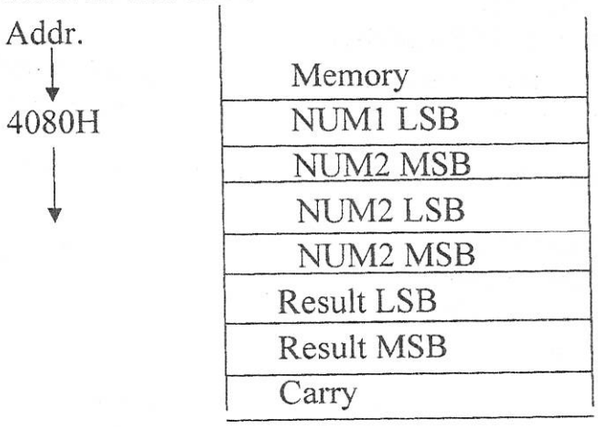
c) Draw and describe the format of SIM instruction.

d) Write ALP to multiply two 8 bit numbers stored in memory. Also store the result in memory.

e) Describe any four logical instructions with respect to their functions.

P.T.O.

f) Write ALP to perform 16 bit addition of the numbers stored in memory as follows. Use ADC instruction



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

a) Give the number of address required to interface the memory chip (i) 2k*8 (ii) 4k*4

b) Draw the format for BSR mode in 8255.

c) With respect to CWR of 8255 write the set of instructions to perform the following

1) Initialise port A as input & port B as output.
2) Intialise upper port C as output & lower as input.
3) Use mode 0 for group A & mode 1for group B.

d) Enlist any four features of 8259.

e) Draw the format for ICW_1 with respect to 8259

f) How many memory chips of 4k*8 are required to interface following memory chips with 8085 (i)8k*4 (ii)16*8.

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

a) Sketch & explain in brief block diagram of 8255.

b) With necessary waveforms explain mode 0 operation of 8255.

c) Compare between I/O mapped I/O and memory mapped I/O. (any four points)

d) Interface 8 switches & 8 LED's to 8085 using buffer & latch in I/O mapped I/O.

e) Interface 2764 EPROM memory with the 8085

f) With the respect to 8259 give the function of following pins (1)IR_0-IR_7 (2) A_0 (3)CAS_0-CAS_2 (4)$\overline{SP}/\overline{EN}$

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

a) Draw & explain format of ICW_4 w.r.t. 8259.

b) Sketch block diagram of 8259 & explain its major blocks.

c) Interface 8255 with 8085 in memory mapped I/O.

d) Explain mode 1 input mode with timing diagram.

e) Interface 8085 with 2k*8 memory using 1k*4 chips. Give the address range.

f) Compare RAM & ROM memories(any four points)

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E &TC**

COURSE CODE :- **IX/EJ307** COURSE NAME :- **INDUSTRIAL DRIVES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 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 o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

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

a) Enlist various elements of drives.

b) Give requirements of adjustable speed drive.

c) What is mean by stability of drive?

d) Enlist factors considered for drive selection.

e) Give specifications of DC motors. (any four)

f) Give advantages of converter fed induction motor.

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

a) Draw and explain star-delta connections.

b) Explain four quadrant operations of hoist with diagram.

c) Explain speed-torque characteristics of induction motor.

d) Draw and explain slip energy recovery system.

e) Explain starting of electric motors.

f) Explain stator voltage control technique with its working principle.

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

a) Draw and explain different braking methods of electric motors.

b) Give comparison of AC & DC drive. (any four points)

c) Explain rotor voltage control technique with its working principle.

d) Draw and explain 3-phase inverter for 3-phase induction motor.

e) Ex plain working principle of DC motor with its characteristics.

f) Draw and explain chopper controlled resistance in rotor circuit.

P.T.O.

Section – II

Marks

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

a) Write the names of single quadrant chopper drives.

b) Draw basic chopper circuit.

c) What do you understand by motor coasting?

d) Why is the motor current almost continuous over wide operating range in DC series motors?

e) Write any two advantages of PLL control of DC drives.

f) Write the requirements of mill motors in cement mills.

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

a) With neat circuit diagram and waveforms, explain the working of two quadrant chopper, also write any four advantages of microprocessor based drives.

b) Draw a neat circuit diagram of single phase dual convertor drive and explain its operation in four quadrants.

c) With neat diagram explain operation of microprocessor based DC motor control.

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

a) Draw neat circuit diagram and waveforms of multiphase chopper drive and explain its operation for its two operating modes.

b) With neat circuit diagram and necessary waveforms explain operation of three phase half wave convertor drive, Also write the DC drive performance parameter and explain their significance.

c) Explain various stages in cement production in cement mill.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH** PROGRAM: **IE/E&TC**

COURSE CODE: **IEE/ETE 508/EJ404**

COURSE NAME: **INDUSTRIAL ORGANIZATION MANAGEMENT**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **28/04/2017**

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) Define manufacturing.

b) What is globalisation?

c) Define the term 'Scientific management'.

d) Enlist levels of management.

e) Enlist different types of organization. Which one you will prefer?

f) State two advantages of sole proprietorship.

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

a) Enlist advantages and limitation of globalisation.

b) Write about 'Role of Agro industry in India'.

c) Describe 'service' and 'Trade' as types of business.

d) Describe various steps in planning.

e) Describe the procedure of controlling.

f) 'Directing is effective management function' comment.

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

a) Enlist five principles of management.

b) Define authority and responsibility.

c) What is departmentation? Describe its types.

P.T.O

d) State various steps in organization.

e) How a partnership firm is formed?

f) Write about cooperative societies.

Section – II **Marks**

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

a) What is personnel management?

b) List four types of training required for new employee.

c) What are objectives of financial management?

d) List different types of budgets.

e) What are objectives of Inventory management?

f) List function of purchase department.

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

a) What is role of training and development in H.R.M Department?

b) Explain Marlow's Theory of motivation.

c) What are steps taken by H.R.M department to reduce accidents?

d) What is workmen compensation act? Explain.

e) Why service tax introduced? Explain in brief.

f) Write short note on custom duty.

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

a) What is balance sheet? Explain in brief.

b) Explain E.O.Q in brief with graph.

c) List steps involved in purchase.

d) Compare CPM and PERT.

e) Why break Evan analysis used to decide make or buy decision?

f) Explain what is 6 sigma?

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH.** PROGRAM: **INDUSTRIAL ELECTRONICS & E&TC ENGINEERING.**

COURSE CODE: **IEE403/IX307/EJ304.** COURSE NAME: **INSTRUMENTATION.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/04/2017**

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 the classification of transducer.

b) What do you mean by PT 100?

c) State any two advantages of pyrometer.

d) Enlist various types of thermister.

e) Draw the diagram of liquid level measurement using float.

f) Give the names of transducer used for linear and angular displacement measurement.

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

a) Explain in detail characteristics of transducer.

b) What are the basic requirements of transducer? Explain any one in detail?

c) Draw constructional diagram of thermocouple. How emf can be measured using thermocouple?

d) Explain infrared radiation pyrometer with neat circuit diagram.

e) Explain capacitive level detector with neat diagram.

f) Explain working of RVDT with diagram.

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

a) State different types of errors occurred due to inefficient input-output relationship in transducer and explain them.

b) State difference between primary and secondary transducer.

c) Describe construction and working of resistive thermometer.

d) What do you mean by cold junction compensation? Explain in detail.

e) How potentiometer can be used as a transducer?

f) Draw and explain liquid level measurement with gamma rays.

P.T.O.

Section – II

Marks

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

a) What is the laminar flow?

b) Define the term pressure and its unit.

c) What is the signal conditioning in DAS? Why it is necessary?

d) What is telemetry?

e) List methods of modulation.

f) Write the function of data aquisition system.

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

a) What is strain gauge? With neat diagram explain wire strain gauges.

b) Draw and explain working of Piezoelectric transducer.

c) Write different communication channels used for telemetry and explain any two of them in detail.

d) With necessary diagram explain Frequency modulation telemetry system.

e) Explain with diagram pre-amplification and filtering in DAS.

f) Explain Logarithmic conversion with necessary diagram.

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

a) Draw and explain electromagnetic flow meter. Also write its advantages, limitations and applications.

b) Why multiplexing is necessary in telemetry? Also describe the various stages of TDM system by using its block diagram.

c) With neat diagram explain multichannel DAS.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD.** PROGRAM:**IE & E&TC ENGINEERING.**

COURSE CODE: **IEE/ETE303/IX203/EJ203/IE204.**COURSE NAME: **ELECTRONICS MEASURING INSTRUMENTS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/04/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

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

a) Give the comparison between accuracy and precision (any two points)

b) State any four types of AC bridges.

c) Draw the constructional diagram of PMMC.

d) What is the need of calibration?

e) Define 1)ADC 2) DAC

f) Write any two applications of Wheatstone's bridge.

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

a) Draw and explain digital frequency meter.

b) Explain any four static characteristics of instruments.

c) Derive the equation for bridge balance condition for Wheatstone's bridge.

d) With neat diagram explain Wagner ground connection

e) Explain with neat diagram integrating type DVM.

f) Explain unknown capacitance measurement by Schering's bridge.

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

a) Draw and explain bridge balance condition of Maxwell's bridge.

b) With neat block diagram explain successive approximation type DVM.

c) Write a note on time period measurements.

d) Draw the diagram and derive the equation for Hay's bridge.

e) Give the comparison between average value and RMS value. (any four points.)

f) Define standards and give the classification of it.

P.T.O.

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

a) What is the role of Schmitt trigger in block diagram of pulse generator?

b) State the applications of recorder.

c) How voltage probe operates?

d) State the function of accelerating anode.

e) Classify recorders in details.

f) State the advantage of active probe.

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

a) Explain the operation of strip chart recorder.

b) State the role of Trigger circuit and Time base generator in oscilloscope.

c) Explain in detail RF type signal generator.

d) Draw the block diagram of Dual beam CRO.

e) With block diagram explain pulse generator.

f) Write the advantages of DSO.

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

a) Explain how a CRO can be used to test 1) Diode 2) Transistor.

b) Differentiate between tine domain and frequency domain instrument.

c) Explain with the help of block diagram X-Y recorder.

d) Differentiate single beam CRO with dual beam CRO.

e) Explain in detail Spectrum analyzer.

f) Draw neat labeled diagram of CRT.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**
COURSE CODE :- **ETE506/EJ410**
COURSE NAME :- **AUDIO VEDIO ENGG.**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **26 / 04 / 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 o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I Marks

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

a) List important characteristics of Hi-Fi amplifier.

b) Give various controls available on stereo equipment.

c) What is a need of compression?

d) Define the term persistance of vision.

e) State Grassman's Law.

f) Name the Primary Colours and complementary colours chosen for colour TV system.

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

a) Compare stereo amplifier with mono amplifier (any 4 points)

b) List and state the function of different types of speakers.

c) Explain Joint Photograph Experts Group (JPEG). State its disadvantages and applications (any two)

d) Why 'Colour Burst' is added in picture signal of colour TV transmitter?

e) Compare additive and subtractive mixing of colours.

f) Explain why 'equilizing pulses' are required to be transmitted? Give the number of equalizing pulses added in our transmission standard.

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

a) State and explain the necessity of cross-over network in Hi-Fi amplifier.

b) Explain the need of standardization for compression technique.

c) What are the different video compression techniques? Explain any one.

d) List all the constituents of composite video signal (CVS). Give purpose of each.

e) Draw and explain interlace scanning.

f) Define following terms : i) Luminance ii) Hue iii) Saturation iv) Contrast.

P.T.O.

Section – II	Marks

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

a) Write any two drawbacks of delta gun picture tube.

b) What is the use of colour killer circuit?

c) Define TV signal.

d) Draw diagram for separation of U & V signals.

e) Give any two merits of negative modulation.

f) What is CCTV?

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

a) Explain in detail CATV.

b) Write a short note on EHT generation.

c) Explain attenuators in detail used in cable TV.

d) Explain with diagram, PIL picture tube.

e) With neat diagram, explain working of LCD TV.

f) Draw circuit of ACC amplifier and explain it.

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

a) Draw and explain burst pulse blanking circuit.

b) Explain different types of amplifiers used in cable TV distribution system.

c) Draw block diagram of colour TV receiver (PAL-D type)

d) Write a short note on HDTV.

e) Compare positive and negative modulation (any 4 points)

f) With neat circuit diagram, explain colour signal matrixing.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E & TC**

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

COURSE NAME :- **ANALOG COMMUNICATION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **26 / 04 / 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 with example: simplex and duplex.

b) Represent AM wave in time domain and frequency domain.

c) State the power relation in AM wave.

d) Represent the FM in time domain.

e) Define i) Modulation index. ii) Deviation ratio.

f) List the methods of FM generation.

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

a) Draw the block diagram of communication system and state function of each block.

b) A 10 KW carrier is amplitude modulated by two sine waves to a depth of modulation 0.5 and 0.6 respectively. Calculate total power content of the modulated carrier.

c) Draw the block diagram of low level AM transmitter and explain.

d) Write any four advantages and disadvantages of SSB.

e) Differentiate between FM & PM.

f) Draw and explain the block diagram of Armstrong method to generate FM wave.

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

a) State and explain the types of noise in communication system.

b) Define i) Bandwidth ii) Information capacity iii) Modulation iv) Demodulation.

c) Derive the expression for an AM wave.

d) Explain the effect of modulation index on AM wave with waveform for following values of M: i) $m<1$ ii) $m=1$.

e) A frequency modulated signal is represented by voltage equation as
$e_{FM} = 10 \sin (6 \times 10^8 t + 5 \sin 1250t)$
i) Carrier frequency ii) Modulating frequency
iii) Modulation index iv) Maximum deviation.

P.T.O.

f) Compare the AM and angle modulation.

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

a) List two applications of loop antenna.

b) Draw block diagram of superheterodyne receiver.

c) Define following performance characteristics of radio receiver.

i) Sensitivity ii) Fidelity

d) Write functions of receiver.

e) Define critical frequency and skip distance.

f) Draw radiation pattern of X/2 dipole resonant antenna and non-resonant antenna.

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

a) Draw block diagram of FM receiver and explain each block.

b) Explain with sketch sky wave propagation.

c) What is the need of AGC? Explain how it can be provided.

d) Draw and explain TRF AM receiver block diagram.

e) Explain half wave dipole antenna with radiation pattern.

f) Explain electromagnetic waves are transverse waves.

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

a) Explain working of Yaggi-Uda antenna. Write its applications

b) Draw and explain pre-emphasis and de-emphasis circuit.

c) With block diagram, explain working of PLL demodulator.

d) Explain in detail loop antenna.

e) Draw and explain ground wave propagation.

f) Compare Ground wave, sky wave and space wave propagation.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL:**FIRST.** PROGRAM: **EE/IE/IF/ET.**

COURSE CODE:**CCF102/CCE102/R103/R104/X102/X108**

COURSE NAME: **ENGINEERING PHYSICS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/04/2017**

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 if necessary.
7) Use of Mobile is strictly prohibited.

Marks

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

a) Define 1) Deforming force.
   2) Restoring force.
b) Which is more elastic steel or rubber? Why?
c) Define 1) Specific volume.
   2) Specific weight.
d) Define velocity gradient with S.I. unit.
e) What is Resonance effect? Give one example.
f) State any two examples of Nanostructured material.

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

a) Define stress. Explain its types.
b) A wire of diameter 2mm and of length 2.5mm extends by 1.5mm by applying a force of 15N. Find Young's modulus of wire.
c) Derive an expression for coefficient of viscosity of liquid by Stokes method.
d) 1) Define Surface Tension with S.I. unit.
   2) What is the effect of Temperature and Adulteration on Surface Tension.
e) State any four applications of Nanotechnology.
f) Differentiate between Longitudinal wave and Transverse wave.(any four).

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

a) State & explain Newton's Law of viscosity. Define coefficient of viscosity and state its S.I. unit.
b) Derive expression for Surface Tension by capillary rise method.
c) State any four applications of Surface Tension.
d) Define 1) Cohesive force. 2) Adhesive force.
   2) Molecular range. 4) Sphere of influence.
e) 1) State any two characteristics of Longitudinal wave.
   2) Define Nanoscale and Nanometer.
f) Define 1) Amplitude 2) Wave period.
   3) Frequency 4) Wavelength.

P.T.O.

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

a) Draw a neat ray diagram showing dispersion of white light through a prism.

b) Write formula for equivalent resistance of -
   1) Series combination of three resistances.
   2) Parallel combination of three resistances.

c) State full form of LASER.

d) Write any two properties of X-rays.

e) Draw a block diagram for optical communication link.

f) State any two applications of optical fibers.

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

a) State any four laws of refraction of light.

b) With a neat diagram, explain construction of meter-bridge. Also write balancing condition for meter-bridge.

c) A wire of length 2.5m and radius 0.2mm has a resistance of 15Ω. Calculate the specific resistance of the wire.

d) State any four characteristics of photons.

e) Distinguish between spontaneous emission and stimulated emission.(any four points)

f) With the help of neat labelled diagram, explain structure of optical fiber.

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

a) Derive prism formula. Draw the necessary ray diagram.

b) State any four applications of photoelectric effect.

c) Define the terms-1) Life time 2) Optical pumping.
   3) Population inversion 4) Active system.

d) Draw a neat diagram of Coolidge X-ray tube. Explain how quantity and quality of x-rays can be controlled in Coolidge X-ray tube.

e) With the help of a neat ray diagram, explain total internal reflection.

f) An accelerated electron emits a quantum of radiation of wavelength $3800A^0$. Calculate energy of the quantum.
   Given: $c = 3x10^8 m/s$
   $h = 6.625x10^{-34} Js$.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL:**FOURTH.** PROGRAM: **IE/E&TC ENGINEERING.**

COURSE CODE:**IEE/ETE406/IX/EJ308/IE311.**COURSE NAME: **ELECTRONIC CIRCUIT DESIGN**

MAX. MARKS: **80** ET311 TIME: **3 HRS.** DATE: **27/04/2017**

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 BJT.

b) Draw construction diagram & symbol of UJT.

c) Draw a circuit diagram of IC723 low voltage regulator.

d) Give the value of Vdc & ripple factor for L section filter.

e) Write down formulae for selection of 'Q' point

f) State the types of coupling in multistage amplifier.

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

a) Design a power supply using π-section filter to give a dc ouput of 30V,100mA,with a ripple not exceeding 0.01%.Use bridge rectifier.

b) Design a two stage RC coupled amplifier to meet the following specification R_L=3kΩ, R_S=600Ω, output voltage $9V_{(p-p)}$ with a supply voltage of 15V, lower 3dB frequency is 50Hz.

c) Design bootstrapped emitter follower circuit to provide the input impedance of 500kΩ for the lower 3dB frequency of 50Hz. The output voltage is 5V with load resistance of 5kΩ. R_S=600Ω.

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

a) Explain types of transformer.

b) Give the difference between BJT & FET (any four point)

c) Design a regular using IC723 to give the output of 6V at 80mA. The input voltage is give as 10V &V_{SC}=0.65V

d) Design an emitter follower regulator to meet the following specification. Vin=15 to 25V,V_o=10V, I_L=50mA

P.T.O.

e) Design a common source amplifier to provide gain of 10 at peak output voltage of 2.0V with $V_{GSQ} = \frac{1}{4} Vp$ & R_L=120kΩ. Supply voltage of 20V with lower 3dB frequency of 50Hz.(DC analysis only)

f) Design a power supply using capacitor filter to give dc output of 50V at 4kΩ load with ripple factor not exceeding 2%.

Section – II **Marks**

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

a) What is the conduction cycle for class A, class B, class AB, and class C power amplifiers?

b) Draw the diagram of class A power amplifier with resistive load.

c) State the meaning of complementary symmetry power amplifier.

d) State Barkhahusen's criteria.

e) Give the range of frequency of different class of oscillators(any two)

f) Draw the neat diagram of bistable multivibrator using op-amp.

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

a) 1) What are the design steps for class B power amplifier?
2) Write down the Wein Bridge oscillator using op-amp design steps.

b) Design an astable multivibrator using IC555 to produce output frequency in the range of 500Hz to 1kHz continuously at duty cycle of 65%,use suitable input supply.

c) Design a monostable multivibrator to produce pulse width of 50μs with supply voltage of 10V also design circuit to avoid false triggering on positive pulses.

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

a) Design a transformer coupled class A amplifier to meet following requirements P_O=2W at across 4Ω load resistance R_L. Use V_{CC}=12V.

b) Design a RC phase shift oscillator for the output frequency of oscillation of 10kHz with load impedance of 5kΩ and peak to peak output voltage ≥ 5V. Use V_{CC}=12V.

c) Design a Hartley oscillator using op-amp for V_O=4V_{rms}, f_o=1MHz, R_L=2.5kΩ.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **COMMON**

COURSE CODE: **EEE305/IEE301/ETE301/ITE301/EE201/IX201/EJ201/IT201/IE201/IF201/201**

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2017**

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) Evaluate $\int \left[e^{2\log x} + e^{x\log a}\right]dx$

b) Find $\int \frac{\sin\sqrt{x}}{\sqrt{x}}dx$

c) Evaluate $\int \frac{dx}{3+2x-x^2}$

d) Evaluate $\int_1^2 \frac{dx}{3x-2}$

e) Evaluate $\int_1^e \log x dx$

f) Find mean value of y=cosx over the range from $x=\frac{-\pi}{2}$ to $x=\frac{\pi}{2}$

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

a) Evaluate $\int \frac{dx}{(x^2+4)(x+1)}$

b) Evaluate $\int \frac{dx}{3\sin 2x + 2\cos 2x}$

c) Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}}dx$

d) Evaluate $\int_0^{\pi/4} \log(1+\tan x)dx$

e) Evaluate $\int_1^3 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5}+\sqrt[3]{9-x}}dx$

f) Using integration find the area of the circle $x^2+y^2=16$

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

a) Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt[n]{\cot x}}dx$

b) Evaluate $\int \frac{3\sin x + 4\cos x}{2\sin x - \cos x}dx$

P.T.O

c) Evaluate $\int \cos \sqrt[3]{x}\, dx$

d) Evaluate $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$

e) Find R.M.S value of the I=10sin100πt over a complete period.

f) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ and the line $y - 3x = 3$.

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

a) From the differential equation whose solution is y=acos3t+bsin3t

b) State order and degree of $y = \frac{dy}{dx} + \frac{c}{dy/dx}$

c) Show that $y^3 \sec^2 x\, dx + (3y^2 . \tan x - \sec^2 y)dy = 0$ is exact.

d) Find x and y satisfying the equation $(2+i)x + (i-3)y = 4$

e) Find the value of $i^{49} + i^{68} + i^{89} + i^{110}$

f) Find the complex conjugate of $\frac{3+5i}{1+2i}$

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

a) Solve: $\frac{dy}{dx} - \frac{2}{x}y = x^2 e^x$, if y=0 when x=1

b) Solve: $(e^x + 2x^2 y + y^3)dx + (a^y + 2x^2 y + 3xy^2)dy = 0$

c) Solve : $x^2 y dx = (x^3 + y^3)dy$

d) Express $1+i$ *in* $(x+iy)$ form.

e) Simplify using De Moivre's Theorem $\frac{(\cos 2\theta + i\sin 2\theta)^3 (\cos 3\theta - i\sin 3\theta)^4}{(\cos\theta + i\sin\theta)^2 (\cos 2\theta - i\sin 2\theta)^{-3}}$

f) If $\cos(x+iy) = \alpha + i\beta$ show that *i)* $\frac{\alpha^2}{\cos^2 x} - \frac{\beta^2}{\sin^2 x} = 1$ *ii)* $\frac{\alpha^2}{\cosh^2 y} + \frac{\beta}{\sinh^2 y} = 1$

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

a) Solve $\frac{dy}{dx} = \sin(x+y)$

b) Solve $\frac{dy}{dx} = \frac{xy}{(1-x)(1+y)}$

c) If the slope of the curve is $x^2 + 2x + 1$, find its equation if it passes through the point (1, 1)

d) Find 2 values of $(1-i)^{1/2}$

e) Using Euler's formula, prove the following

i) $\sin 2\theta = 2\sin\theta\cos\theta$

ii) $\cosh^2 x + \sinh^2 x = \cosh 2x$

f) Show that $\sqrt{3+i}$ is a cube root of $8i$

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **COMMON**

COURSE CODE:

CEE301/MEE301/SME301/MTE301/CE201/ME201/SM201/MT201/C201/M201/1201/2201

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2017**

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) Evaluate $\int \left[e^{2\log x} + e^{x\log a}\right] dx$

b) Find $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$

c) Evaluate $\int \frac{dx}{3+2x-x^2}$

d) Evaluate $\int_1^2 \frac{dx}{3x-2}$

e) Evaluate $\int_1^e \log x dx$

f) Find mean value of y=cosx over the range from $x = \frac{-\pi}{2}$ to $x = \frac{\pi}{2}$

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

a) Evaluate $\int \frac{dx}{(x^2+4)(x+1)}$

b) Evaluate $\int \frac{dx}{3\sin 2x + 2\cos 2x}$

c) Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

d) Evaluate $\int_0^{\pi/4} \log(1+\tan x) dx$

e) Evaluate $\int_1^3 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5}+\sqrt[3]{9-x}} dx$

f) Using integration find the area of the circle $x^2 + y^2 = 16$

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

a) Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt[n]{\cot x}} dx$

b) Evaluate $\int \frac{3\sin x + 4\cos x}{2\sin x - \cos x} dx$

c) Evaluate $\int \cos\sqrt[3]{x}\ dx$

d) Evaluate $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$

e) Find R.M.S value of the I=10sin100πt over a complete period.

f) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ and the line $y - 3x = 3$.

P.T.O

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

a) Form the differential equation by eliminating arbitrary constants if $y = A\cos 3x + B\sin 3x$

b) Solve $\sqrt{1-y^2}\,dx = \sqrt{1-x^2}\,dy$

c) state order and degree of the differential equation $\sqrt{1+\frac{dy}{dx}} = \frac{d^2y}{dx^2}$

d) Find range of the following data: 49, 13, 11, 12, 42, 29, 18, 27.

e) Find the probability of getting a sum of 3 when 2 unbiased dice is thrown.

f) The velocity of a body is given by $v = t(3+5t)$. How much distance does it travel in 4sec if it was initially at rest?

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

a) Solve: $\cos^2 x\frac{dy}{dx} + y = \tan x$

b) Solve: $v\frac{dv}{dx} = g - kv^2$ Where g and k are constants.

c) Solve: $(x+y+1)^2\frac{dy}{dx} = 1$

d) Calculate mean deviation about mean of the following data

Marks	3	4	5	6	7	8
No. of student	1	3	7	5	2	2

e) Calculate variance

C.I	0-10	10-20	20-30	30-40	40-50	50-60
fi	14	23	27	21	15	19

f) A husband and wife appeared for an interview for two vacancies in an office. The probability of husbands' selection is $\frac{2}{7}$ and that of wife selection is $\frac{1}{4}$. Find the probability that

i) Both of them are selected.

ii) Only one of them is selected.

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

a) If A and B are two events such that P(A)=0.8, P(B)=0.6, P(A∩ B)=0.5, find i) P(AUB) ii) $p(\frac{A}{B})$ iii) $p(\frac{B}{A})$

b) Solve: $(2xy + y - \tan y)dx + (x^2 - x\tan^2 y + \sec^2 y)dy = 0$

c) Solve: $y\,dx = x\,dy + \sqrt{xy}\,dx$

d) Find the equation of curve whose slope at any point is equal to $\frac{2y+x+1}{x}$ and which passes through the point (1, 0).

e) The mean weight of 150 students is 60kg. The mean weight of boys is 70kg with a S.D of 10kg. For the girls, the mean weight is 55kg. and the S.D is 15kg. Find the number of boys and the combined S.D.

f) The following table shows the marks obtained by 100 students in an examination. Calculate mean and variance.

Marks	1-10	11-20	21-30	31-40	41-50	51-60
No.of candidates	3	16	26	31	16	08

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **IE /E&TC**

COURSE CODE: **IEE/ETE312/IX/EJ210/R228** COURSE NAME: **HIGHER MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **05/05/2017**

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) If $f(x) = x^2 + 1$, find $\Delta^2 f(x)$, by assuming h=1

b) Find forward difference table of the following data.

x	0	5	10	15	20
f(x)	5	16	21	24	32

c) Evaluate $\Delta(\sin x)$

d) If $u = e^{xyz}$, *evaluate* $\dfrac{\partial^2 u}{\partial x \partial y}$

e) If $u = \log(x^2 + y^2)$, *prove that* $\dfrac{\partial^2 u}{\partial x \partial y} = \dfrac{\partial^2 u}{\partial y \partial x}$

f) If $u = x^2 + y^2 + z^2$, *prove that* $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} + \dfrac{\partial^2 u}{\partial z^2} = \dfrac{2}{u}$

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

a) Using Newton's forward difference formula compute the value of f(5.5)

x	5	6	7	8
f(x)	2.236	2.449	2.646	2.828

b) The numbers of members of a civil engineering society are given below.

x	1987	1988	1989	1990	1991
f(x)	150	192	241	---	374

Make the best estimate of members in 1990.

c) Find cubic polynomial which takes on the values $f_0 = 5, f_1 = 1, f_2 = 9, f_3 = 25, f_4 = 55$ hence find f_5

d) Find the missing term in the following table

x	0	1	2	3	4
y	1	3	9	--	81

e) If $u = \sin^{-1}\left(\dfrac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}}\right)$, *show that* $\dfrac{\partial u}{\partial x} = \dfrac{y}{x}\dfrac{\partial u}{\partial y}$ using Euler's theorem.

f) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, *prove that* $\dfrac{\partial u}{\partial x} + \dfrac{\partial u}{\partial y} + \dfrac{\partial u}{\partial z} = \dfrac{3}{x + y + z}$

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

a) Verify Euler's theorem for $z = \dfrac{x^2 y^2}{x^2 + y^2}$

P.T.O

b) If $u = x^2, v = y^2$, *prove that* $JJ' = 1$

c) If $u = 1-x,\ v = x(1-y),\ w = xy(1-z)$ *show that* $\dfrac{\partial(u,v,w)}{\partial(x,y,z)} = x^2 y$

d) If $u = \tan^{-1}\left(\dfrac{x^3+y^3}{x+y}\right)$, *prove that* $x^2\dfrac{\partial^2 u}{\partial x^2} + 2xy\dfrac{\partial^2 u}{\partial x \partial y} + y^2\dfrac{\partial^2 u}{\partial y^2} = 2\sin u.\cos 3u$

e) Express $f(x) = x^4 + 2x^3 + 2x^2 + x + 5$ in factorial notation and hence find the value of $\Delta^3 f(x)$ *at* $x = 2$

f) Evaluate $\Delta^3[(1-x)(1-2x)(1-3x)]$

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

a) Evaluate $L\{e^t t^2\}$

b) Evaluate $L^{-1}\left\{\dfrac{6}{2s-3}\right\}$

c) Find a_0 for the Fourier series for $f(x) = e^{-x}$ in the range $(0, 2\pi)$

d) Evaluate $L\{\sin 3t + \cos 2t\}$

e) Evaluate $L^{-1}\left\{\dfrac{5}{s^2+4}\right\}$

f) Find a_0 for the Fourier series $f(x) = 2x - x^2$ in (0, 3)

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

a) Find the inverse Laplace transform of $\dfrac{1}{(s-a)(s+a)^2}$ by using convolution theorem.

b) Solve the following differential equation by using Laplace transform $\dfrac{dy}{dx} - 4y = e^{3x}$, if y=0 at x=1

c) Find $L\{te^t \sin 2t.\cos t\}$

d) Evaluate $L^{-1}\left\{\dfrac{4s+5}{(s-1)^2(s+2)}\right\}$

e) Find $L\{(\sin 2t - \cos 2t)^2\}$

f) Evaluate $L^{-1}\left\{\dfrac{6S-4}{S^2-4S+20}\right\}$

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

a) Find the Fourier series expansion of $f(x) = \sin x,\ 0 \le x \le \pi$ $= 0,\ \pi \le x \le 2\pi$ Hence deduce, $\dfrac{1}{2} = \dfrac{1}{1.3} + \dfrac{1}{3.5} + \dfrac{1}{5.7} + \ldots\ldots$

b) Find the Fourier series for $f(x) = 0,\ -5 < x < 0$ $= 3,\ 0 < x < 5$

c) Find the Fourier series expansion of $f(x) = x + x^2$ *in* $(-\pi, \pi)$

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CE/ME/IE/SM/MT/E & TC**

COURSE CODE :- **MEE312/MTE311/IEE311/ETE311/MG227/R227**

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

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **05 / 05 / 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) Enlist any four renewable energy sources.

b) How energy sources are classified?

c) Define: Power Coefficient.

d) State the basic principle of wind energy conversion.

e) State the categories in which biomass resources fall.

f) State different biomass conversion technologies.

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

a) Why alternative energy sources are necessary?

b) Define : i) Hour angle ii) Declination iii) Azimuth angle iv) Zenith angle.

c) Describe the prospects of alternative energy sources.

d) Draw a block diagram showing basic components of wind energy conversion system.

e) Differentiate between biomass and conventional fuel.

f) How Wind Mills are classified?

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

a) Explain with neat sketch, Deenbandhu biogas plant.

b) What factors are considered for selection of site of Wind Mill?

c) Explain with neat sketch solar pond.

P.T.O.

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

a) How should be the site, favorable for a tidal power plant?

b) What are the difficulties in tidal power plant?

c) State two advantages and disadvantages of geothermal energy over other energy forms.

d) State the principles of Energy conservation.

e) State the meaning of the term ' Simple Pay back Period'.

f) What is fuel cell? State the main components.

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

a) Explain single basin and double basin arrangement of tidal power plant.

b) Describe the working and main types and OTEC power plants.

c) Write four advantages and four limitations of small scale hydroelectric power generation.

d) Explain Geothermal energy power plant.

e) Draw a simple MHD generator and explain principle of MHD power generation.

f) Write various components of SHP and state their functions.

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

a) Write classification of small hydro power station. State type of turbine suitable for micro hydel plant and explain.

b) Explain the concept of waste heat utilization.

c) State the types of energy audit and explain in short.

d) Explain the meaning of Co-generation and its benefits in industries.

e) Discuss the energy conservation technologies.

f) Draw and explain Sankey diagram for energy audit of a factory.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM :- **ELECTRONICS & TELECOMMUNICATION**
COURSE CODE :- **ETE403**
COURSE NAME :- **DATA COMMUNICATION & NETWORKING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **06 / 05 / 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 o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

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

a) Enlist various network devices (any four)

b) Define the term data rate and give its unit.

c) Give classification of services used in switching techniques.

d) Define i) Protocol ii) Standards.

e) What is mean by signal propagation?

f) Enlist various network topologies. (any four)

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

a) Draw and explain half duplex and full duplex transmission modes.

b) Explain the channel effect on transmission.

c) Draw and explain ring topology and hybrid topology.

d) Explain in detail connection oriented services.

e) Differentiate circuit switching and packet switching (any four points)

f) Explain working principle of switches and routers.

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

a) Differentiate MAN & WAN. (any four points)

b) Draw and explain WDM.

c) Explain the message switching technique in detail.

d) Define and clear the concept 'ATM'

e) Explain the frame Relay format in detail.

f) Draw the TCP/IP reference model and explain working principle of physical layer and network layer.

P.T.O.

Section – II	Marks

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

a) Enlist two protocols for each i) Noisy channel ii) Noiseless channel.

b) Draw format of URL and define each block.

c) Classify IEEE standards.

d) What is Piggybacking?

e) Draw diagram for FTP.

f) Define i) BSS ii) ESS.

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

a) Explain simple stop and wait protocol.

b) With an example, explain IPV6.

c) Draw and explain encryption model of cryptography.

d) Explain Go-Back-N ARQ.

e) How management is done in SNMP?

f) Explain Proxy Firewall.

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

a) Explain CRC method of error detection.

b) What is DNS? Explain.

c) Draw and explain traditional Ethernet frame.

d) Explain i) Flow control ii) Error control.

e) Compare SMTP & SNMP (four points)

f) Explain any two asynchronous technique used for MAC.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

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

COURSE NAME: **ENGINEERING MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **06/05/2017**

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 the centroid of a triangle whose vertices are (1, 4) (2, 3) (0, -1)

b) Find the distance between the parallel lines $3x+2y-8=0$ and $3x+2y-4=0$

c) Find the acute angle between the lines $3x-2y+4=0$ *and* $2x-3y-7=0$

d) Find the equation of a circle whose center is at origin and radius 5

e) Find the equation of a circle whose diameter is the line segment joining the points (9, 0) & (0, 6)

f) Starting with the approximations $x_0=y_0=z_0=0$, for solving a set of equations by Gauss-Seidel method. If the next approximation gives $x_1=0.85,\ y_1=1.0275$. Find z_1. Given that $z=\frac{1}{10}[25-2x+3y]$

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

a) Show that the points (-2, 1), (-1, 3) and (1, 7) are collinear.

b) Determine which of the two circles is greater: $x^2+y^2-3x+4y=0$ and $x^2+y^2-6x+8y=0$

c) Find the equation of a circle passing through the point (2, 5) and (-5, 4) and whose center lying on the line $2x-3y+5=0$

d) Find the equation of a line passing through the points of intersection of the lines $2x+3y=13,\ 5x-y=7$ and passing through (1, -1)

e) Find the equation of perpendicular bisector of the join of A(-2, 3) and B(8, -1)

f) Use Jacobi's method to solve the equations $5x+2y+z=12,\ x+4y+2z=15,$ $x+2y+5z=20$ (Third iterations only)

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

a) Using Gauss Seidel method solve $10x=2y+2z+6,\ 10y=x+2z+7,$ $10z=x+y+8$ (upto Third iterations)

b) Using Jacobi's method solve $5x-y-2z=-3,\ 3x+5y-z=10,\ -2x-y+4z=8$ (three iterations only)

c) Use Regula-Falsi method to solve $x^3-3x+5=0$ (upto second approximation)

d) Find $\sqrt[3]{29}$ by Regula-Falsi method upto second iteration

e) Find the square root of 12 by the method of bisection (upto 4 approximations)

f) Solve $x^3-6x+2=0$ by Bisection method (upto four iterations)

P.T.O

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

a) Test whether the function is even or odd if $f(x) = x^3 + 5\sin x$

b) Evaluate $\lim_{x \to 3} \frac{x^3 - 27}{x - 3}$

c) Evaluate $\lim_{x \to 0} \frac{\sin 5x}{3x}$

d) Find $\frac{dy}{dx}$ *if* $y = \cos^2 x$

e) Find $\frac{dy}{dx}$ *if* $y = \log(x^2 + 2x + 5)$

f) Find the slop of tangent to the curve $y = x^3$ *at* $x = 4$

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

a) If $y = f(x) = \frac{x+1}{x-1}$, $x \neq 1$ then show that $x = f(y)$

b) Evaluate $\lim_{x \to \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \pi/4}$

c) If $y = x^y$ *prove that* $\frac{dy}{dx} = \frac{y^2}{x(1 - y\log x)}$

d) Find the derivative of $x.\sin^{-1} x$

e) Find $\frac{dy}{dx}$ *if* $y = \log\left[x + \sqrt{x^2 + a^2}\right]$

f) Discuss the stationary (Maximum & Minimum values) of $x^3 - 6x^2 + 9x - 2$

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

a) If $f(x) = 16^x + \log_2^x$ then find $f(1/4)$ $f(1/2)$

b) Evaluate $\lim_{x \to 4} \frac{x^4 - 64x}{\sqrt{x^2 + 9} - 5}$

c) Differentiate w. r. t x; $\tan^{-1}\left(\frac{x}{\sqrt{1 - x^2}}\right)$

d) Find $\frac{dy}{dx}$ *if* $13x^2 + 2x^2y + y^3 = 1$

e) If $y = (\sin x)^{\log x}$ *find* $\frac{dy}{dx}$

f) If $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$ *find* $\frac{dy}{dx}$

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