

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

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

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LEVEL: **FIRST**PROGRAM: **EE/IE/E&TC/IT**COURSE CODE: **CCF104/CCE104**COURSE NAME: **CHEMISTRY OF ENGINEERING MATERIALS**MAX. MARKS: **80**TIME: **3 HRS.**DATE: **20/11/2017**

Instruction:-

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

QN	S. Q N	Question Text	Cognition Level R/U/A	Co Code	Marks
Q.1		Attempt any FOUR			(08)
	a)	Why structure of an atom is always electrically neutral?	A	CCF104-1	
	b)	State Pauli's exclusion principle	R	CCF104-1	
	c)	Define i) Degree of ionisation ii) Electrolyte	R	CCF104-2	
	d)	State Faraday's Second law of electrolysis.	R	CCF104-2	
	e)	Write impurities in natural water.	U	CCF104-4	
	f)	Write two reactions of hard water with soap.	U	CCF104-4	
Q.2		Attempt any FOUR			(16)
	a)	Give four postulates of Lewis & Langmuirs concept of stable electronic configuration.	R	CCF104-1	
	b)	Write Arrhenius theory of ionisation.	U	CCF104-2	
	c)	Define corrosion & Electrochemical corrosion. Write classification of corrosion in detail.	R	CCF104-3	
	d)	Explain disadvantages of scale formation in boiler	U	CCF104-4	
	e)	Give disadvantages of hard water for cooking & bathing purpose.	U	CCF104-4	
	f)	Distinguish between hard water & soft water.	U	CCF104-4	
Q.3		Attempt any FOUR			(16)
	a)	Write orbital electronic configuration of i) $^{12}_6\text{C}$ ii) $^{23}_{11}\text{Na}$ iii) $^{35}_{17}\text{Cl}$ iv) $^{40}_{20}\text{Ca}$	A	CCF104-1	
	b)	Calculate the time in second in which 0.3gms of copper is deposited from CuSO_4 solution when a current of 0.5amp is passed, the chemical equivalent (eq.wt) of cu being 31.6	A	CCF104-2	
	c)	Draw a neat labelled diagram & explain metal spraying process.	A	CCF104-3	
	d)	Write two factors influencing immersed corrosion. Why galvanized containers are not used to preserve food stuffs?	U	CCF104-3	
				P.T.O.	

	e)	Define sterilization. Explain with chemical reactions sterilization by using chloramines.	U	CCF104-4	
	f)	Draw neat labelled diagram for Ion-exchange method. Write reactions in regeneration of cation & anion exchange resin.	U	CCF104-4	
Q.4		Attempt any FOUR			(08)
	a)	Define i) open circuit voltage ii) E.M.F.	R	CCF104-5	
	b)	Distinguish between primary cell & secondary cell(any two)	U	CCF104-5	
	c)	Write four important ores of copper with their molecular formula.	U	CCF104-6	
	d)	Draw a neat labelled diagram of froth flotation method.	U	CCF104-6	
	e)	Define ferrous & nonferrous alloys.	R	CCF104-6	
	f)	Write four characteristics of good insulators.	R	CCF104-7	
Q.5		Attempt any FOUR			(16)
	a)	Write construction, working of dry cell with diagram	U	CCF104-5	
	b)	Distinguish between calcination & roasting (any four points).	U	CCF104-6	
	c)	Draw a metallurgical flow chart for extraction of copper.	U	CCF104-6	
	d)	Give composition properties & applications of Brazing alloy.	U	CCF104-6	
	e)	Write four properties & four applications of graphite as a semiconductor.	R	CCF104-6	
	f)	Define composite material. Explain classification of composite material with example.	U	CCF104-7	
Q.6		Attempt any FOUR			(16)
	a)	Explain construction & working of solar cells with diagram.	A	CCF104-5	
	b)	Describe the process of smelting with diagram & reaction.	A	CCF104-6	
	c)	Give four uses & four application of copper.	U	CCF104-6	
	d)	Write four purposes of making alloy with examples.	U	CCF104-6	
	e)	Distinguish between addition & condensation polymerisation.	U	CCF104-7	
	f)	Write four characteristics & four uses of adhesives.	R	CCF104-7	

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

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

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

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

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

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

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

x	1	2	3
y	7	18	35

- b) Find the missing term in the following table

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

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

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

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

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

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

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

P.T.O

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

Q.4 Attempt any FOUR

(08)

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

Q.5 Attempt any FOUR

(16)

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

Q.6 Attempt any TWO

(16)

Find Fourier expansion of following function.

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

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EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

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

COURSE NAME: BASIC MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 15/12/2017

Instruction:-

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

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

P.T.O

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

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

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LEVEL: FIRST**PROGRAM: COMMON****COURSE CODE: CCF106/0108/R108/X110/CCE106** **COURSE NAME: ENGINEERING MATHEMATICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 21/11/2017**

Instruction:-

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

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

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

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EXAM SEAT NO.

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LEVEL: **THIRD**

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

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

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **28/11/2017**

Instruction:-

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

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

P.T. O.

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

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: IE/E&TC/IT/EE

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

COURSE NAME: APPLIED MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 28/11/2017

Instruction:-

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

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

P.T. O.

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

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

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

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

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

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

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

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

x	1	2	3
y	7	18	35

- b) Find the missing term in the following table

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

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

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

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

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

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

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

P.T.O

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

Q.4 Attempt any FOUR

(08)

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

Q.5 Attempt any FOUR

(16)

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

Q.6 Attempt any TWO

(16)

Find Fourier expansion of following function.

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

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: IE/E&TC

COURSE CODE: IEE/ETE309/IX/EJ209

**COURSE NAME: MICROPROCESSOR AND
INTERFACING**

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 22/11/2017

Instruction:-

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

Q.1 Attempt any FOUR

**Marks
(08)**

- a) Draw the block diagram of Bus organization of 8085 microprocessor.
- b) List various groups of instruction set of 8085 microprocessor.
- c) Enlist the maskable and non-maskable interrupts available for 8085 microprocessor.
- d) Enlist the feature of microprocessor 8085.
- e) Write instruction which are used to increment and decrement 16 bit address.
- f) Define stack pointer and state its function.

Q.2 Attempt any FOUR

(16)

- a) Write an assembly language program to add the two 16 bit numbers, whose sum is more than 16 bit. The first number is in memory location 4000H and 4001H. The second number is in memory location 4002H and 4003H. Store the result in memory location 4004H and 4005H, stored the carry at memory location 4006H.
- b) Explain PUSH and POP instruction with example.
- c) Draw & explain demultiplexing the bus AD0-AD7.
- d) What is addressing mode? Explain different addressing mode with example.
- e) Explain RST as software interrupt.
- f) Draw the timing diagram for LDA 5070H.

Q.3 Attempt any TWO

(16)

- a) Draw and explain block diagram of 8085 microprocessor.
- b) Write an assembly language program to transfer block of data. The data is stored in memory location C500H to C50FH. The data should be transferred to C50FH onwards on reverse order only.
- c) i) Explain the use of stack in CALL and RET instruction.
ii) Explain implementation of RST instruction with interrupt acknowledgement machine cycle.

P.T.O

Q.4 Attempt any **FOUR**

(08)

- Write function of following control signals of RS232C. i) CTS ii) RST iii) DSR iv) DTR.
- Draw interfacing diagram of 1kx8 memory chip. Whose memory map starts from 1φφφH?
- State configuration of 8255 ports if its control word contents are i) 8φH ii) 81H
- Write any four features of 8255 PPI.
- Describe function of $\overline{SP}/\overline{EN}$ pin of 8259 PIC.
- Describe rotating priority mode of 8259 PIC.

Q.5 Attempt any **TWO**

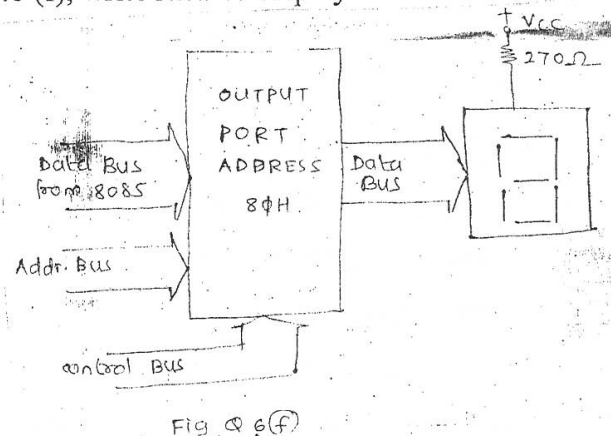
(16)

- Interface 4kx8 memory size to 8085 processor using 2kx8 memory chips. Draw interfacing diagram. Write memory map of each chip. Describe chip select logic.
- Assuming 8255 PPI addresses starting from 40H, write ALP to blink all LEDS connected to port A of 8255 if switch SW1 connected to port B pin1 is closed. If this switch is open then all LEDS should be off.
- Draw block diagram of 8259 PIC and describe each block.

Q.6 Attempt any **FOUR**

(16)

- Draw the format of following control words and describe each bit i) ICW1 ii) ICW2
- Draw and describe BSR control word format of 8255 PPI.
- Describe MODE 1 of 8255 PPI.
- Draw a labelled timing diagram of OUT instruction.
- Compare I/O mapped I/O with memory mapped I/O on the basis of
 - Number of address lines used
 - Maximum number of I/O that can be connected.
 - Instruction used for data transfer.
 - Control signals used.
- For the fig.Q.6 (f), write ALP to display BCD numbers with some delay.



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EXAM SEAT NO.

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LEVEL: FOURTH

PROGRAM: ELECTRONICS AND TELECOMMUNICATION

COURSE CODE: ETE403/EJ409

COURSE NAME: DATA COMMUNICATION AND

NETWORKING

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 20/11/2017

Instruction:-

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

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) Define delay distortion.
- b) Draw OSI model.
- c) Compare circuit switching and datagram packet switching (2 points)
- d) Give one advantage & one disadvantages of circuit switching.
- e) Define bursty data.
- f) Define Asynchronous transmission mode.

Q.2 Attempt any **FOUR**

(16)

- a) Draw block diagram of data communication system & explain each block in brief.
- b) Explain 4wire modem.
- c) What is the need for frame relay?
- d) Explain the relation between data rate and bandwidth.
- e) Draw and explain delay in circuit switching.
- f) Explain i) star topology ii) tree topology.

Q.3 Attempt any **FOUR**

(16)

- a) Explain i) De facto ii) De Jure
- b) Explain acknowledge phase in virtual circuit packet switching.
- c) List types of addressing & explain any one.
- d) Define time division multiplexing. Explain in brief.
- e) Explain different packet sizes in ATM.
- f) Give two function of each i) Network layer ii) Physical layer.

P.T.O

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

- a) Define the term Redundancy.
- b) Write a note on world wide web (www).
- c) What is mean by cryptography?
- d) Enlist the various types of errors.
- e) Draw the format of SMTP protocol.
- f) Define the term POP.

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

- a) Differentiate noiseless and noisy channels. (any 4 points)
- b) Explain internet protocol version 6 in detail.
- c) Write a detail note about TELNET.
- d) Draw and explain IEEE802.11 in detail.
- e) Explain the simple Stop-N-Wait protocol.
- f) Explain FHSS in detail.

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

- a) Define the term IAMP & explain it in detail.
- b) Explain following technologies from MAC layer a) DCF b) PCF
- c) Explain in detail Go-back-N ARQ protocol.
- d) Explain the encryption model in detail.
- e) Draw and explain hyper text transfer protocol in detail.
- f) Draw and explain piggybacking.

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ODD TERM END EXAM NOV. / DEC. 2017

EXAM SEAT NO.

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LEVEL :- FIFTH

PROGRAM : IE & E&TC

COURSE CODE :- IEE/ETE512

COURSE NAME :- PIC MICROCONTROLLER

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

Instruction :-

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

Section – I

Marks

Q.1 Attempt any FOUR

(08)

- a) State any two features of RISC architecture.
- b) What is the address range for the scratch pad section of the access bank?
- c) What is the status of C and Z flags after the execution of following code?
MOVLW FFH
ADDLW 1
- d) What is the difference between MOVWF and MOVF instruction?
- e) Indicate when the TMRΦIF flag is raised for each of the following mode
i) 16 bit ii) 8 bit.
- f) Find the T1CON value for 16 bit mode, no prescaler, timer oscillator OFF, with the clock coming from the PIC 18's crystal.

Q.2 Attempt any FOUR

(16)

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

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

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

P. T. O

Q.3 Attempt any **TWO**

(16)

- a) With the help of neat labelled diagram explain the architecture of PIC 18F microcontroller.
- b) With the help of neat diagram explain the 16 bit mode and 8 bit mode of timer Φ of PIC 18F microcontroller.
- c) Explain any four table processing instructions of PIC 18F microcontroller with example.

Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

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

Q.5 Attempt any **FOUR**

(16)

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

Q.6 Attempt any **FOUR**

(16)

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

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

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

Instruction:-

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

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

P.T.O

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

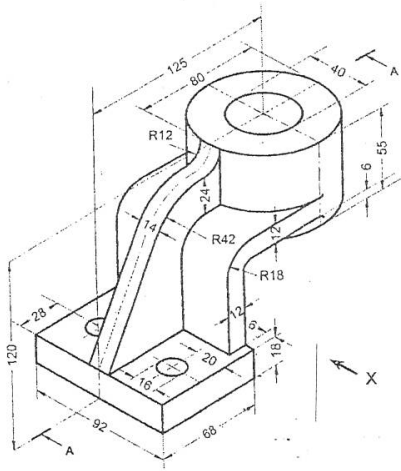


Fig. 1 ↗
Q. 2 (a)

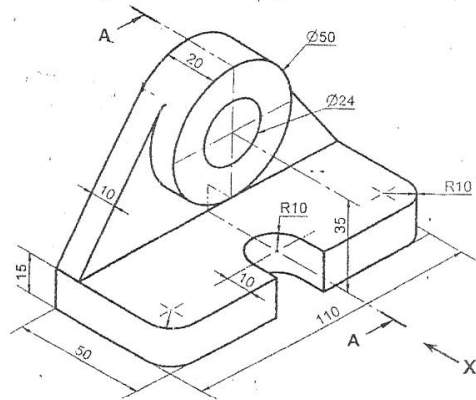


Fig. 2 ↗
Q. 2 (b)

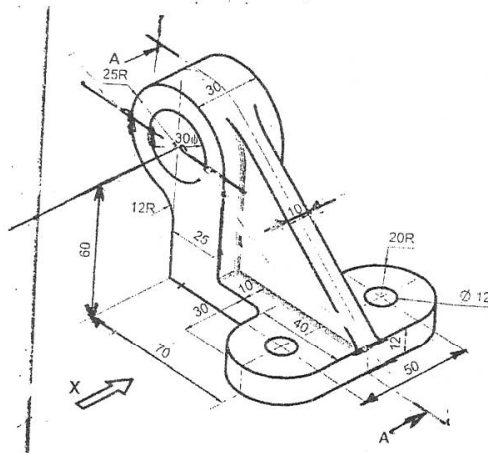


Fig. 3 ↗
Q. 2 (c)

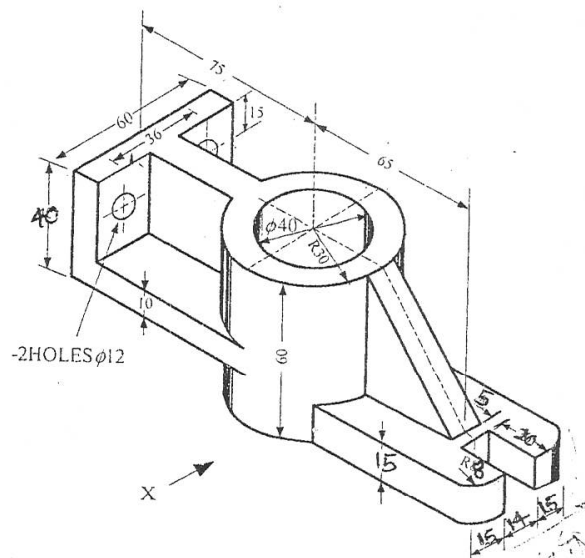


Fig. 4
Q.3 (a)

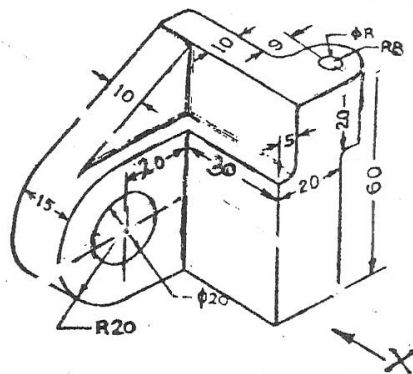


Fig. 5
Q.3 (b)

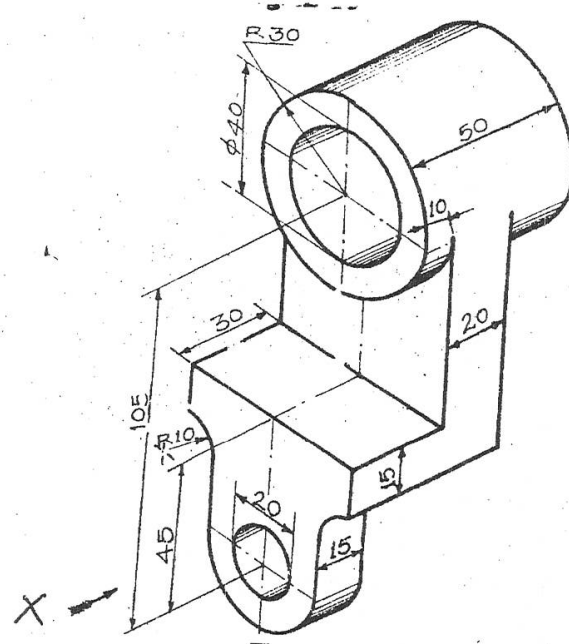
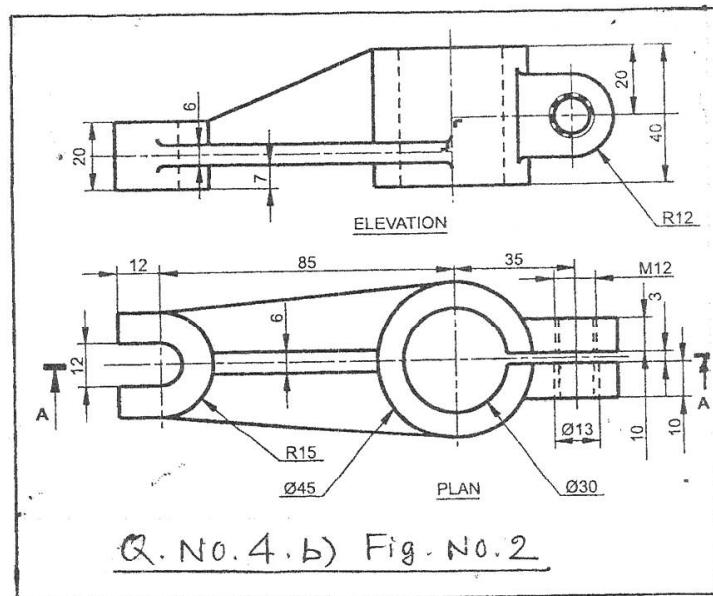
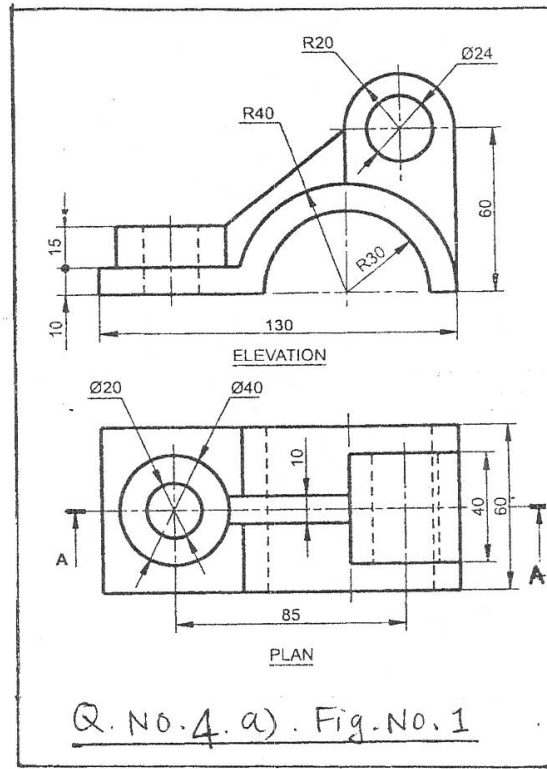
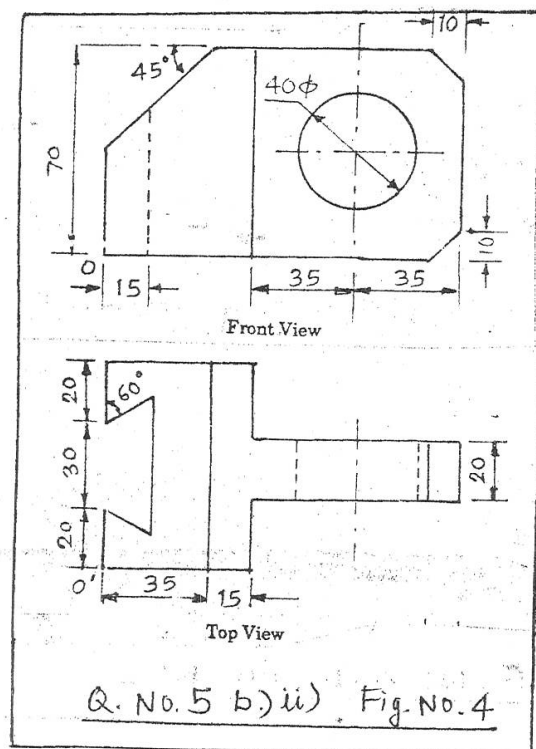
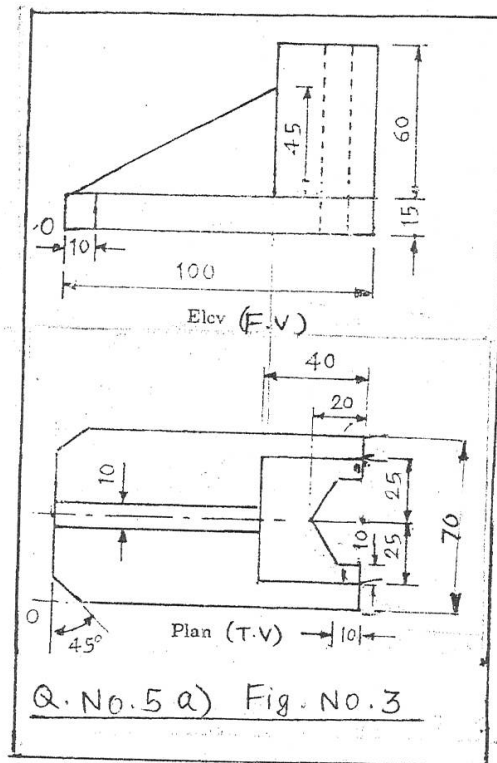
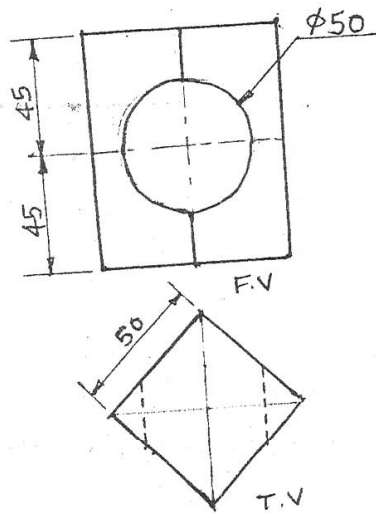


Fig. 6
Q. 3 (C)

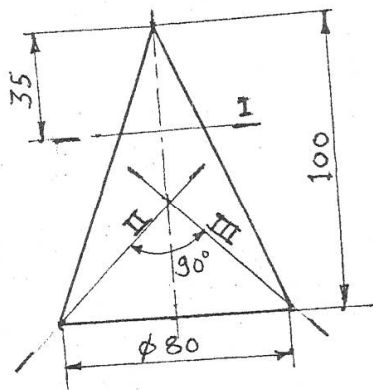




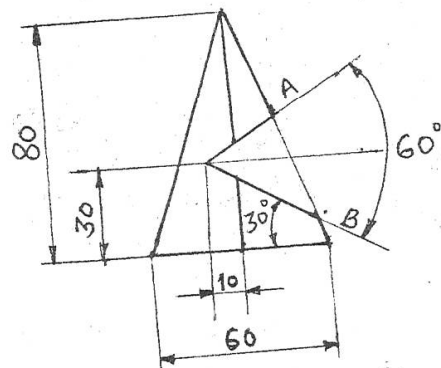
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Q. No. 6(a) Fig. No. 5



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



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

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

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

Instruction :-

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

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

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: THIRD

COURSE CODE: ETE310/IX208/EJ208

MAX. MARKS: 80

PROGRAM: E & TC

COURSE NAME: DIGITAL COMMUNICATION

TIME: 3 HRS.

DATE: 23/11/2017

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 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 signal to Noise Ratio (SNR).
- b) What are Application of CW modulation (Any Two point).
- c) Define Nquist rate.
- d) How to reduce granular noise.
- e) Define channel coading.
- f) What are the advantages of BPSK (Any Two Point).

Q.2 Attempt any FOUR

(16)

- a) State & explain Shannon Hartley theorem.
- b) Explain the working of PAM modulation with it's neat waveform.
- c) Explain QPSK (Quadrature Phase Shift Keying).
- d) Compare ASK and FSK (Any Four Point)
- e) Explain with neat diagram DPCM transmitter.
- f) With neat block diagram, explain FSK transmitter (generator).

Q.3 Attempt any FOUR

(16)

- a) Explain Adaptive delta Modulation transmitter.
- b) Draw block diagram of transmitter of QAM and Receiver of QAM.
- c) Explain the working of PWM demodulator with waveforms.
- d) Compare Analog Communication with Digital communication (Any four Point).
- e) State & explain Sampling theorem.
- f) State merits & demerits of BASK (any four) (Binary Amplitude shift keying)

P.T.O.

Q.4 Attempt any FOUR

(08)

- a) Draw the block diagram of model of spread spectrum digital communication system.
- b) Define WDM.
- c) Write any two applications of FDM.
- d) Define : i) NRZ coding.
ii) RZ coding.
- e) Write any two disadvantages of TDM.
- f) What are the causes of error and its effects ?

Q.5 Attempt any FOUR

(16)

- a) Write any four features of hamming codes. Explain how errors are detected and corrected by using hamming codes.
- b) Draw and explain DS-BPSK receiver system.
- c) A seven bit hamming code is received as 1110101. What is the correct code ? Assume the parity to be even.
- d) Explain single bit and burst error.
- e) Give the comparison between DS-SS and FH-SS system (any 4 points)
- f) With neat block diagram explain FDM transmitter.

Q.6 Attempt any FOUR

(16)

- a) With neat block diagram explain synchronous TDM system.
- b) Draw the block diagram of DS-BPSK transmitter system. Also write any two advantages and disadvantages of DS-SS system.
- c) Define the following terms,
 - i) Bit rate.
 - ii) Band rate.
 - iii) Minimum distance.
 - iv) Hamming distance.
- d) With neat block diagram explain the operation of slow frequency hopping transmitter.
- e) Give the comparison between FDMA and TDMA. (Any 4 points)
- f) Encode the data bits 0101 into a seven bit even parity hamming code.

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: ELECTRONICS AND TELECOMMUNICATION

COURSE CODE: ETE502/EJ307

COURSE NAME: OPTICAL FIBER COMMUNICATION

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 13/12/2017

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right 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 the term refraction.
- b) Write the types of optical fiber connectors.
- c) List down various losses in optical fibers.
- d) What is acceptance angle?
- e) Give classification of optical fibers.
- f) What is linear scattering? What are its types?

Q.2 Attempt any FOUR

(16)

- a) A silica optical fiber has a core refractive index of 1.50 and cladding refractive index of 1.47. Determine:
 - i) Critical angle at the core –cladding interface.
 - ii) Numerical aperture for the fiber.
- b) Explain fusion splicing technique with diagram.
- c) Explain dispersion in optical fiber in detail.
- d) Compare multimode step index and multimode graded index fiber with four points.
- e) Explain light propagation in multimode graded index fiber.
- f) Enlist fiber bend losses and explain any one in detail with neat diagram.

Q.3 Attempt any FOUR

(16)

- a) Explain Snell's law and total internal reflection in optical fiber cable.
- b) Compare intrinsic and extrinsic absorption in optical fiber.
- c) With neat diagram explain Eye pattern technique.
- d) Explain any four advantages and disadvantages of optical fiber.
- e) Define attenuation on OFC. Mention its unit and equation. State various causes of attenuation in OFC.
- f) Compare single mode and multimode fiber with four points.

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

- a) Why direct band gap material is used for LED?
- b) What is lasing threshold of Laser?
- c) What is dark current noise?
- d) Define term Responsivity.
- e) What are the drawbacks of avalanche photo diode?
- f) Write the function of SDM. When it is used?

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

- a) What is hetero junction? What are the different types of heterojunction? Mention the advantage of heterojunction over homojunction?
- b) Describe the population inversion for stimulated emission with the help of energy level diagram.
- c) Draw constructional diagram of edge emitting LED and explain construction of it.
- d) With suitable diagram describe working principle of PIN photodiode.
- e) What are the requirements of an ideal photodetector? Explain these in brief (Any four).
- f) What are different types of preamplifier used in a receiver? Explain any one of them with suitable diagram.

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

- a) Why link power budget is important in optical fiber communication system? Explain with an example.
- b) With neat diagram explain construction and working of Fabry-Perot cavity Resonator.
- c) With neat diagram explain construction and working of Avalanche photodiode.

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

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

Instruction:-

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

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

P.T.O

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

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EXAM SEAT NO.

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LEVEL :- FOURTH

PROGRAM : IE & E& TC

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

COURSE NAME :- PRINCIPLES OF CONTROL SYSTEMS

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

Instruction :-

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

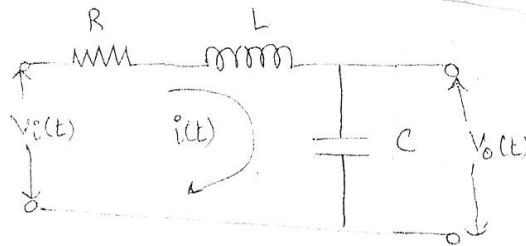
Section – I

Marks

Q.1 Attempt any FOUR

(08)

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



Q.2 Attempt any FOUR

(16)

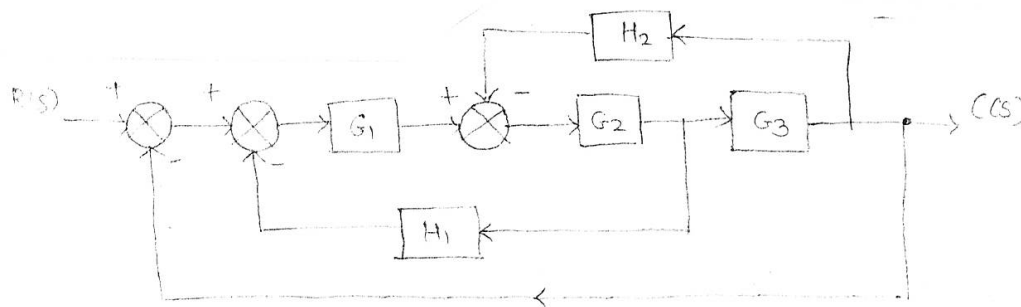
- a) Draw and explain block diagram of open loop system.
- b) Derive equation for transfer function of generalized closed loop system.
- c) Draw the standard test signals used in time domain analysis and state the mathematical statement for each.
- d) State any four advantages and disadvantages of frequency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

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

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

P.T.O.

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



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

Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

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

Q.5 Attempt any **FOUR**

(16)

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

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

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: IE / E&TC

COURSE CODE: ETE308/IEE308/EJ112

COURSE NAME: CIRCUITS & NETWORK

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 12/12/2017

Instruction:-

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

Q.1 Attempt any FOUR

**Marks
(08)**

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

Q.2 Attempt any FOUR

(16)

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

Q.3 Attempt any FOUR

(16)

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

(P.T.O.)

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

Q.4 Attempt any **FOUR**

(08)

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

Q.5 Attempt any **FOUR**

(16)

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

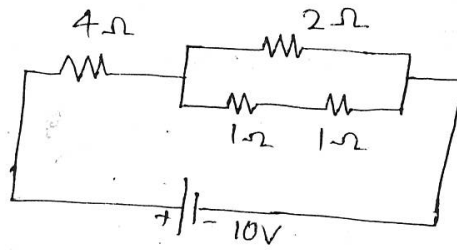
Q.6 Attempt any **FOUR**

(16)

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

Q-2 (b)

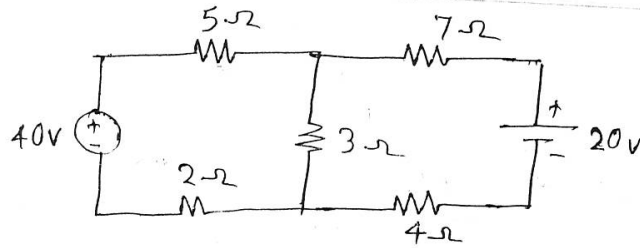
Fig-1



①

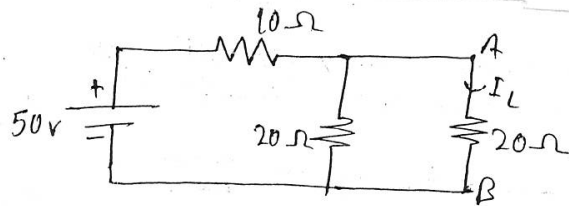
Q-2 (d)

Fig-2



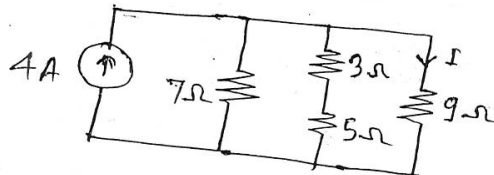
Q-2 (f)

Fig-3



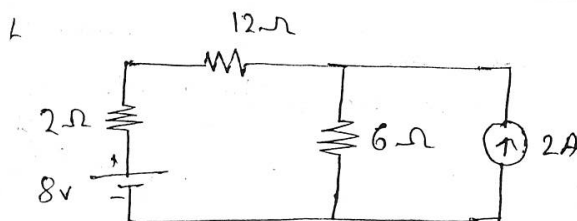
Q-3 (a)

Fig-4



Q-3 (c)

Fig-5

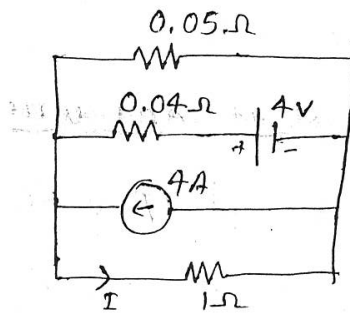


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Q-3 (e)

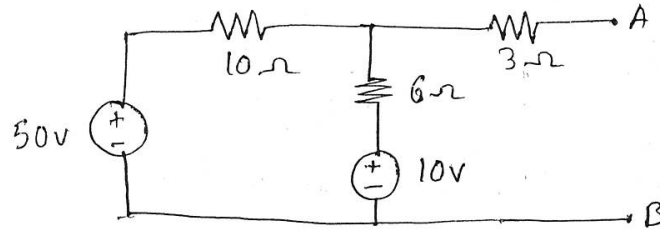
fig-6

(2)



Q-3 (f)

fig.-7



Q.4b) fig.8

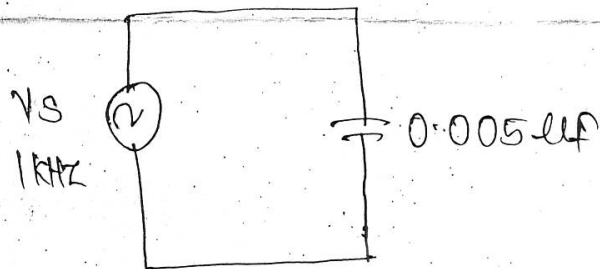
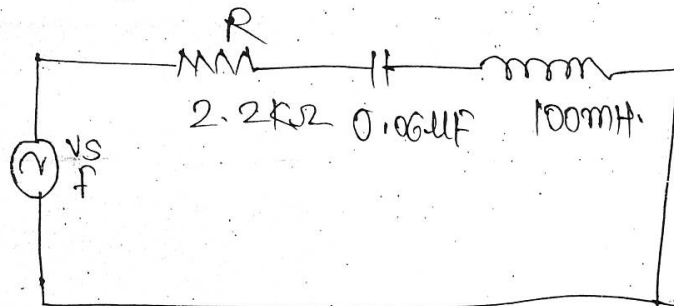
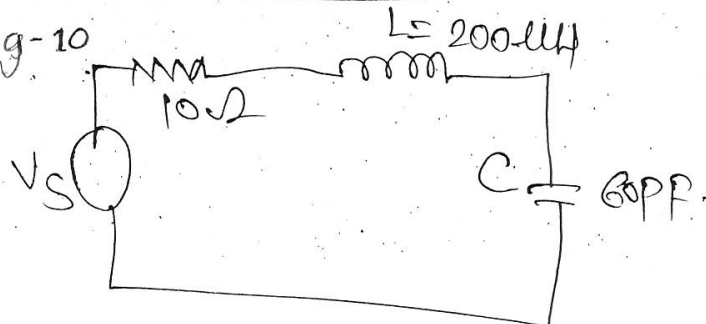


Fig.9

Q.5 a)

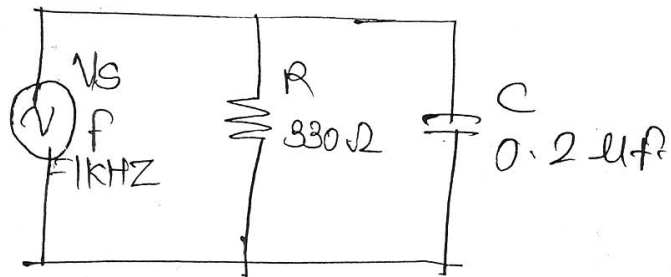


Q.5 d) Fig-10

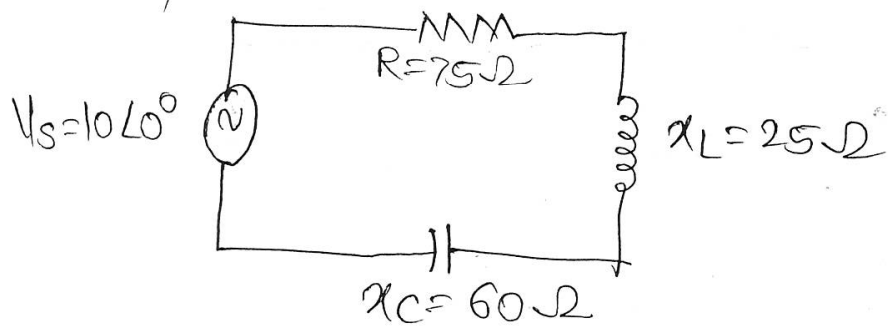


Q-6b) Fig 11

③



Q-6c) Fig-12



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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

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

COURSE NAME: BASIC MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 15/12/2017

Instruction:-

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

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

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

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ODD TERM END EXAM NOV. / DEC. 2017

EXAM SEAT NO.

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LEVEL : - FIFTH

PROGRAM : ELECTRONICS & TELECOMMUNICATION

COURSE CODE :- ETE508/EJ404

COURSE NAME :- INDUSTRIAL ORGANIZATION & MANAGEMENT

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 15 / 12/ 2017

Instruction :-

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

Marks

Q.1 Attempt any FOUR

(08)

- a) Define the term 'Trade'. State two advantages of it.
- b) Enlist two products of agro industry.
- c) State the specific importance of management.
- d) Define 'Organizing' is management function.
- e) What is 'Authority'? Give example.
- f) What is 'Span of control'?

Q.2 Attempt any FOUR

(16)

- a) What do you mean by 'Manufacturing'? How it differs from service sector?
- b) State the importancy of textile industry with Indian environment.
- c) How the Globalization is related with national growth? Explain.
- d) Describe various stages in planning.
- e) State the importance of Directing. How it is related with quality outcome?
- f) Describe various levels of management.

Q.3 Attempt any FOUR

(16)

- a) Describe the concept of scientific management given by F.W. Taylor.
- b) Enlist the advantages of cooperative societies. Name few cooperative societies you know.
- c) How a Joint stock company is formed? Explain.
- d) Compare between proprietorship and partnership.
- e) Describe functional organization with its advantages.
- f) Compare between centralized and decentralized departmentation.

Section – II		Marks
Q.4	Attempt any FOUR	(08)
	<ul style="list-style-type: none"> a) List the causes of personal factors for accident. b) State provisions of factory Act. c) List sources of raising of fixed capital. d) Explain the meaning of Excise Tax. e) Write the objective of inventory management. f) Write concept of quality in materials management. 	
Q.5	Attempt any FOUR	(16)
	<ul style="list-style-type: none"> a) Explain Leadership and Motivation in human resource management. b) Write the procedure of recruitment in human resource management. c) Define and write the functions of personnel management. d) Explain the Workmen's compensation Act. e) Write the objectives and functions of financial management. f) Explain the following i) Budgets and accounts ii) Custom Duty. 	
Q.6	Attempt any FOUR	(16)
	<ul style="list-style-type: none"> a) Explain the concept of following i) profit and Loss Account ii) Balance Sheet. b) Explain Economic Order Quantity by Graphical Representation in material management. c) Write on modern techniques of material management – JIT. d) Write the meaning of Quality circle and also write the purpose of Quality circle in Quality management. e) Explain TQM. f) Explain the meaning of CPM and PERT Techniques in project management. 	

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ODD TERM END EXAM NOV/DEC -2017

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: ELECTRONICS AND TELECOMMUNICATIONS

COURSE CODE: ETE501/EJ401

COURSE NAME: MOBILE COMMUNICATION AND

NETWORKING

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 14/12/2017

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
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Section – I

Marks

Q.1 Attempt any FOUR

(08)

- a) Define the terms: a) Base station b) paging
- b) Write any two advantages of microcell zone concept.
- c) What is hand off? List different types of hand off.
- d) What are disadvantage of sectoring?
- e) How co-channel interference in cellular system is reduced?
- f) Draw the frequency reuse pattern with cluster size 7 and 12.

Q.2 Attempt any FOUR

(16)

- a) Explain adjacent channel interference with necessary diagram.
- b) Explain the microcell zone concept with suitable diagram.
- c) Draw the block diagram of mobile unit. State the functions of logic and control unit in mobile handset.
- d) Draw block diagram of frequency synthesizer and explain its working.
- e) Explain with necessary diagram cellular telephone system.
- f) Explain in brief AMPS and GSM mobile radio system.

Q.3 Attempt any TWO

(16)

- a) With time diagram explain how cellular telephone call is made from land line phone to mobile phone and from mobile to mobile phone.

P.T.O.

- b) With neat block diagram explain function of each block of receiver unit and control unit.
- c) With necessary diagram explain in detail the following technique.
 - i) Cell splitting
 - ii) Sectoring

Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

- a) State different types of Traffic channels used in GSM.
- b) Enlist the different services offered by GSM.
- c) What is the function of VLR & OMC in GSM system?
- d) State the key features of IS95.
- e) What type of modulation is used in IS95 and GSM?
- f) List specifications of IMT2000.

Q.5 Attempt any **TWO**

(16)

- a) Draw architecture of GSM and explain each block in detail.
- b) Describe the call processing in IS-95 CDMA.
- c) What is WLL? List advantages of WLL. Describe operation of LMDS with suitable diagram.

Q.6 Attempt any **TWO**

(16)

- a) What do you mean by Authentication? Describe privacy and security in GSM.
- b) Draw system architecture of IS-95. Explain the working of blocks.
- c) What is Bluetooth? Explain the Bluetooth architecture with suitable diagram. State the applications of Bluetooth.
