SUBJECT CODE NO:- P-15
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(ALL-BRANCHES) Examination May/June 2017
Engineering Mathematics - III
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
i) Q. No. 1 and Q. No.6 are compulsory
ii) Solve any two questions from Q. Nos. 2, 3, 4 and 5.
iii) Solve any two questions from Q. Nos. 7, 8, 9 and 10.
iv) Use of non-programmable calculator is allowed.
v) Figures to the right indicate full marks.

Section A

Q.1   Solve any five from the following   10
a) Solve $(D^2 - 4D - 12)y = 0$
b) Solve $(D^2+2\pi D+\pi^2)y=0$
c) Find the P.I. of the equation
$(D^2 + D - 6)y = e^{2x}$
d) Find the P.I. of the equation
$(D^3 + 4D)y = sin2x$
e) Find the mean of the following data

Class	5-10	10-15	15-20	20-25	25-30	30-35	35-40
f:	6	5	15	10	5	4	3

f) Find the area under the normal curve between Z= -1.24 to 1.24
g) For a binomial distribution the mean is 12 and the variance is 4, find all the constants of the distribution.
h) A 2 lb weight – suspended from a spring stretches it 1.5 inches. If the weight is pulled 3 inches below the equilibrium position and released set up a differential equation of motion.

Q.2   a) Solve $(D^2 +2)y=e^x cos2x$ 05
b) Calculate the mean deviation from the median for the following data   05

Class	50-100	100-150	150-200	200-250	250-300	300-350
f:	7	18	25	31	15	4

c) An emf of 200V is in series with a 10 ohm resistor, a 1 henry inductor and 0.02 Farad capacitor At t=0,   05
the charge Q and current I are zero. Find Q and I at any time t.

Q.3   a) Calculate the mean and standard deviation for the data   05

Class	68-74	75-81	82-88	89-95	96-102	103-109
f:	5	31	40	20	3	1

b) Solve without using method of variation of parameters $(D^2 + 9)$ y = Sec 3x   05
c) The differential equation of a cantilever beam of length l and weighing w kgs/unit, subjected to a   05
horizontal compressive force P applied at the free end is given by

$EI \frac{d^2y}{dx^2}+Py = \frac{-1}{2}Wx^2$, if y =δ

And $\frac{dy}{dx}=0$ at x=l and

$\frac{d^2y}{dx^2}=0$ at x=0, find the maximum deflection of the beam

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Q.4 a) Solve by method of variation of parameters   05

$$(D^2 + 1)y = \frac{1}{1 + sinx}$$

b) The income distribution of a group of 10000 persons was found to be normal with mean Rs.7500 and   05
the standard deviation Rs.500. What is the number of persons of this group which have income
  i) exceeding Rs.6680 ii) exceeding Rs.8320.

c) If a weight 6 lbs hangs from a spring with constant K =12 and no damping force exists, find the motion   05
of weight when an external force 3 cos8t acts, initially x=0, $\frac{dx}{dt} = 0$ Determine whether resonance occurs.

Q.5 a) Solve $x^2 \frac{d^3y}{dx^3}+3x \frac{d^2y}{dx^2}+ \frac{dy}{dx}$ =x^2 log x   05

b) Fit the curve y = ae^{bx} for the data   05

X:	1	2	3	4	5	6
Y:	1.6	4.5	13.8	40.2	125	300

c) The first three moments of a distribution about the value 2 are 1, 16 and -40. Find mean, variance and   05
μ_3
Also find the first three moments about x=0

Section B

Q.6   Solve any five   10
a) Find the first approximate value of the root (i.e. X_1) by Newton – Raphson method for x e^x-2=0,
correct to 3 decimal place.
b) find f (8) for the data

x	5	6	9
f(x)	12	13	14

c) Find the values of x, y, z in the
first iteration by Gauss seidel
method for

  54x + y + z = 110
  2x + 15y + 6 z = 72
 -x + 6y + 27 z =85

d) Find grad φ at (1, -2, -1), if
φ = 3x^{2}y-y^{3}z^2
e) show that the vector
$\bar{v}$= e^{x}sinyi + e^x cosyj is irrotational
f)Evaluate $\int_c \bar{F}.d\bar{r}$ Where F = x^{2}i + xyj
c: y = 0
between points (0,0) to (a,0)

g) find $\nabla^2 (r \log r)$
h) Write statement of Stoke's theorem.

Q.7   a) Solve by Gauss Seidel Method   05
  10x + 2y + z = 9
  2 x + 20 y - 2z = -44

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-2x + 3y + 10ž =22

b) Find the directional derivative of   05

$f = x^2 - y^2 + 2 z^2$ at the point

(1,2, 3) in the direction towards the point (2,1,4)

c) Show that vector field   05

$\bar{F}$= 2x $(y^2 + z^3)$i + $2x^2$yj + $3x^2z^2$K

Is conservative. Find the work done in moving a particle from

(-1,2, 1) to (2, 3, 4)

Q.8   a) Find a root of the equation correct to three decimal places   05

logx – cosx = 0

b) Show that f(r)$\bar{r}$ is always irrotational   05

c) Evaluate by Green's theorem   05

$\int_c \bar{F}.d\bar{r}$, where $\bar{F}$ = x^2i + xyj

And c is a triangle having

Vertices A (0,2) , B(2,0) and C (4,2)

Q.9   a) Find $\frac{dy}{dx}$ at x = 1.9 for the data   05

x	1.1	1.3	1.5	1.7	1.9
y	0.21	0.69	1.25	1.89	2.61

b) Using stoke's theorem evaluate   05

$$\int_c [(x + y)dx + (2x - z)dy + (y + z)dz]$$

Where c is the boundary of the triangle with vertices (2,0,0), (0,3,0) and (0,0,6)

c) Show that $\bar{F}$ = (6xy + z^3)i + ($3x^2$-z)j + ($3xz^2$-y)k is irrotational. Find scalar ϕ such that F = ∇ϕ.   05

Q.10   a) Use Runge Kutta method of order 4   05

to approximate y when x=1.1,

given that y(1) = 1.2 and

$\frac{dy}{dx}$ = 3x + y^2, take h=0.1

b) Solve by Euler's modified method   05

$\frac{dy}{dx}$ = -xy^2, y(0) = 2

find y (0,2) by taking h = 0.2

c) Evaluate   05

$\iint_s \bar{F}.\hat{n}\, ds$ where

$\bar{F}$= 4xži -y^2j + yžK and S is the surface of the cube

bounded by x=0, x = 1, y=0, y=1,ž=0, ž=1

2017

Subject Code : 43

Electronics Devices & Circuits – I

Time : Three Hours

Max. Marks: 80

"Please check whether you have got the right the question paper"

Note: i)   Q.No. 1 & 6 are compulsory.
        ii) Solve three questions from each section.

SECTION – A

Q.1   Solve any Five.   10

    (i)   Give the Diode current equation.

    (ii)   Explain Zener and Avalanche breakdown.

    (iii)   What is CMOS?

    (iv)   Write any four specification of 1N4001 diode.

    (v)   Explain transition and diffusion capacitance.

    (vi)   What is emitter follower?

    (vii)   Draw construction and symbol of n-channel JFET.

    (viii) Define Ripple factor.

Q.2   (a)   With the help of neat diagram, waveforms explain full wave bridge rectifier with capacitive fitter.   08

    (b)   What is solar cell? Explain how a photo – voltaic cell generates electricity when irriadiated by sunlight. state two application of solar cell.   07

Q.3   (a)   Explain volatage divider biasing in detail.   08

    (b)   Draw hybrid equivalent circuit for CE configuration and derive expression for various hybrid parameters.   07

Q.4   (a)   Draw and explain CMOS inverter.   08

    (b)   Explain FET as VVR.   07

Q.5   Write short notes on any three :   5x3=15

    (i)   Thermal Runaway

    (ii)   Point contact diode

    (iii)   CMOS inverter

    (iv)   Cascoded amplifier.

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SECTION – B

Q.6 Solve any Five.   10

   (i)   Give two differences between amplifier and oscillator.

   (ii)   Give the types of negative feedback connections.

   (iii) Define Barkhausen's criteria.

   (iv)   Define positive feedback.

   (v)   Draw clap oscillator.

   (vi)   What is Gain-Bandwidth product?

   (vii) Define higher-cut off frequency.

   (viii) Draw opto coupler circuit.

Q.7 (a)   Draw and explain Hetero-junction Bipolar transistor.   08

     (b)   Draw and explain UJT Relaxation oscillator.   07

Q.8 (a)   Explain Hartley oscillator in details.   08

     (b)   Explain the effect of negative feedback on the input and output impedence.   07

Q.9 (a)   Explain video amplifier in detail.   08

     (b)   Explain high frequency IT model for a transistor.   07

Q.10 Write short notes on any three :   5x3=15

   (i)   Difference between positive and negative feedback.

   (ii)   Current series feedback amplifier

   (iii) Emitter follower at high frequency.

   (iv)   Colpitt oscillator.

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SUBJECT CODE NO:- P-74
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination May/June 2017
Network Analysis
(Revised)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i) i) Q.No.1 and Q.No.6 are compulsory.
ii) Solve any two questions from reaming Q. No. 2, 3, 4 and 5 in section A.
iii) Solve any Two questions from reaming Q. No. 7, 8, 9 and 10 in section B.
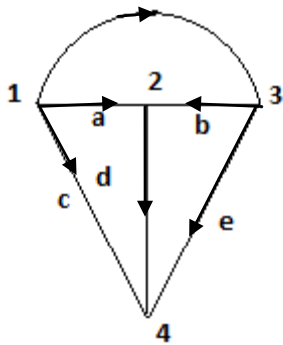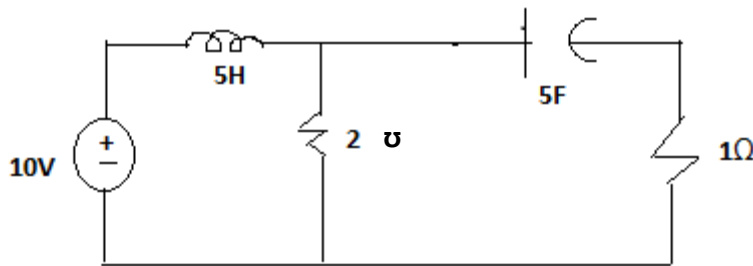
Section A

Q.1   Solve any five   10
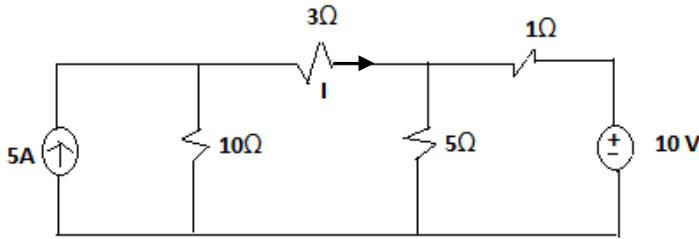i) Define tree & co-tree
ii) Find incidence matrix (A) for given graph.

iii) Write any two properties of incidence matrix(A)
iv) Define twigs & links.
v) Draw dual network for given network.

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vi) Write formula for number of possible trees for a given graph.

Q.2   a) State & prove reciprocity theorem.   07
   b) Write a note on coupled network.   08

Q.3   a) Using node analysis find I   07

       b) Derive formula for star to delta transformation.   08

Q.4   a) Derive design formula for T-type attenuator.   07
       b) Design the full series equalizer. The design resistance R_o =600 Ω & attenuation of 12 dB at 800 Hz.   08

Q.5   a) Design an m derived T section high pass filter with a cut off frequency 10 KHz, design impedance of 200Ω & m=0.4   07
       b) Derive formula for Z_o & propagation constant γ for given network.   08
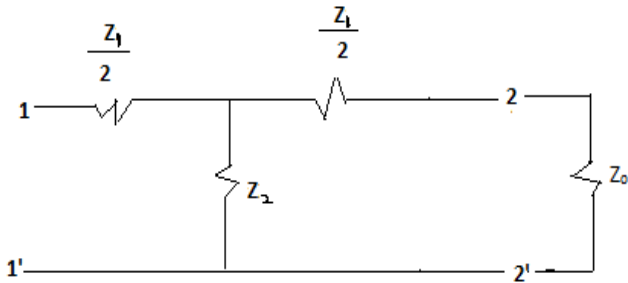

Section B

Q.6   Solve any five.   10
   1)   Define series resonance.
       2)   Write formula for f_c &f_L where voltage across capacitor & inductor is maximum in case of series resonance circuit.
       3)   Define Q factor.
       4)   What is relation between bandwidth, resonant frequency & Q factor?
       5)   Define selectivity & band width
       6)   Write working formula for resonance frequency for below fig.

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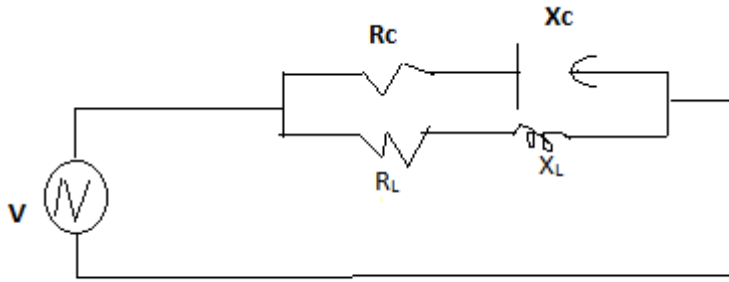
Q.7 a) Find h parameter for given network.   07
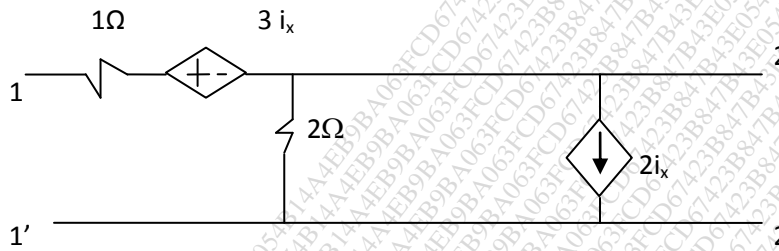
b) Two two port n/ws are connected in parallel what will be the resultant Y parameter of the combination. 08
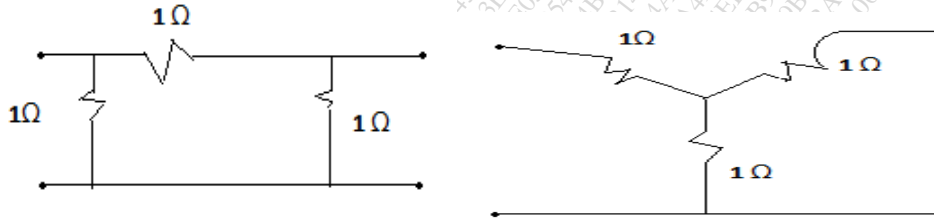
Q.8 a) Derive expression for ABCD parameters in terms of Z parameters.   07
b) Write note on application of two port network parameters.   08

Q.9 a) Derive formula for i, V_R, V_C, P_R, P_C for network given.   07
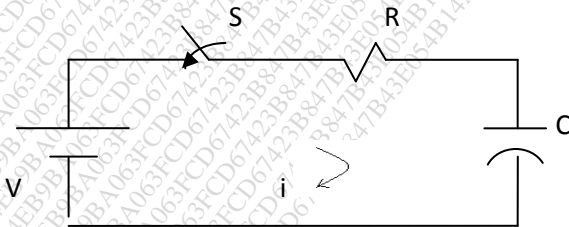
                                                                                                      08
b) Obtain Laplace transform for given function.
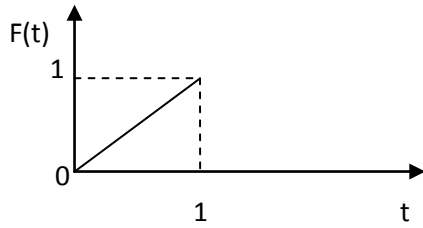
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Q.10   a) For circuit shown find current equation when the switch is Opened at t=o   07

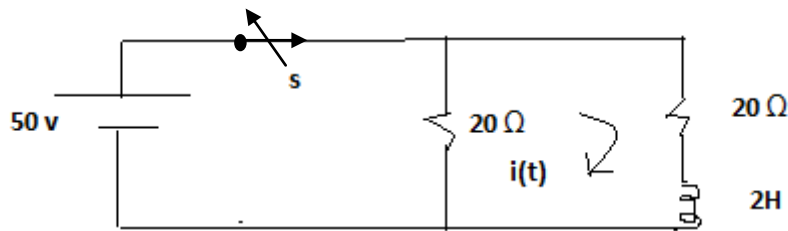b) Distinguish between series & parallel resonance.   08

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SUBJECT CODE NO:- P-107
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination May/June 2017
Communication Engineering
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
i) Question No.1 and 6 are compulsory
ii) Attempt any two question from remaining in each section
iii) Figure to the right indicate full marks
iv) Assume suitable data , if necessary

Section A

Q.1   Solve any five   10

1) Define AM, FM & PM

2) What is modulation index for AM & EM

3) What is VSB?

4) Define noise and state its different types

5) What is meant by Intermediate frequency? Give its typical values for Am & FM

6) Define selectivity & image frequency related to radio receiver

Q.2   a) Explain super heterodyne radio receiver with neat block diagrams   7

b) In a broadcast super heterodyne   radio receiver having no RF amplifier, the loaded Q of the antenna   8
coupling circuit is 100. if the intermediate frequency is 455 KHz , calculate
a) The image frequency and its rejection ratio at 1000 KHz and
b) The image frequency and its rejection ratio at 25 MHz

Q.3   a) Explain RF amplifier of AM Receiver with neat block diagram   7

b) Draw and explain the AM broadcast transmitter   8

Q.4   a) Draw and explain I.S.B. Block diagram   8

b) Explain the phase shift method far the generation of SSB   7

Q.5   a) What is the principle of AGC? Explain simple and delayed AGC in detail   8

b) Explain Direct Generation of FM   7

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Section B

Q.6 Solve any five   10
1) What is multiplexing
2) What is the function of mixer in receiver
3) Define narrow band and wideband FM
4) What are the advantages of DPCM over the PCM?
5) What is the function of loudspeaker
6) Define TDM

Q.7 a) What are the different types of loudspeaker? Explain any one in detail   8

b) Explain principle of TV signal Generation.   7

Q.8 a) Explain DPCM in detail   7

b) Explain the working Balanced slope detector with circuit diagram   8

Q.9 a)What are the types of Mino phone? Explain velocity Mino phone in detail   8

b) Explain Amplitude limiter with neat circuit diagram   7

Q.10 Write short note on (any three)   15
1) FDM
2) Tone control circuit
3) SSB Demodulator
4) PCM
5) Baffles & enclosures

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Total No. of Printed Pages:02

SUBJECT CODE NO:- P-141
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EC/ECT/IEC/E&C) Examination May/June 2017
Data Structure
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B   i) Q. No.1 from section A and 6 from section B are compulsory.
            ii) From remaining solve any two questions from each section.
                                    Section A

Q.1   Solve any five questions of the following:-   10
        (i) Define ADT.
        (ii) Explain arrays.
        (iii) What is stack? Explain operation of stack.
        (iv) Explain prefix, infix and postfix notation.
        (v) Explain call by value and call by references function.
        (vi) What is the "concept of linked list"?
        (vii) What do you mean by circular queue?
        (viii) What is data structure? Explain its types.

Q.2 (a) Write algorithm explain merging of two array where array A=[10 20 30 40 50] & B=[110 120 130] &   08
          C=[merging of A and B]
     (b) Using single dimensional, write a program to find average of numbers.   07

Q.3 (a) Convert following expression from infix to prefix and postfix.   08
          A+[(B+C)+(D+E)*F]/G
     (b) Differentiate between singly linked list, circular linked list, doubly linked list.   07

Q.4 (a) Write an algorithm for singly linked list insertion operation?   08
     (b) Write syntax of following data structure.   07
          (a) Array
          (b) Function
          (c) Structure
          (d) Pointer

Q.5   Write short notes on (any three):-   15
        (a) Doubly linked list
        (b) Circular queue
        (c) ADT
        (d) Polynomial manipulation

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Section B

Q.6   Solve any five questions of the following:-   10
(i) What is graph? Explain basic terminology of graph.
(ii) What is binary tree? Explain the types of binary tree.
(iii) What is sorting? What are the types of sorting?
(iv) What is searching? What are the types of searching?
(v) Explain static and dynamic representation of binary tree.
(vi) Explain in-order, pre-order and post-order.

Q.7 (a)   Explain graph representation with example.   08
    (b)   What is binary search tree? Construct a binary search tree for: 07
        14, 15, 4, 9, 8, 17, 3, 6, 18, 2

Q.8 (a)   Write an algorithm for BFS and DFS.   08
    (b)   Explain the Bubble sort with example.   07

Q.9 (a)   Sort numbers using radix sort method.   08
        241   447   109   225   385   556   088
    (b)   What is tree? Explain the basic terminology of tree.   07

Q.10   Write short notes on (Any three).   15
(a) Shortest path problem
(b) Sparse matrix
(c) B trees
(d) AVL tree

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SUBJECT CODE NO:- P-220
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches) Examination May/June 2017
Engineering Mathematics -IV
(Revised)

[Time: Three Hours] [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
i) Q.No.1 from and Q.No.6 are compulsory.
ii) Solve any two questions from remaining of each section.
iii) Figures to the right indicate full marks.
iv) Assume suitable data, if necessary.

Section A

Q.1 Solve any five from the following: 10

a. Find the analytic function whose imaginary part is e^xsiny.

b. Show that u= $\bar{e}^{\theta}$ cos (log r) is harmonic.

c. Find the image of the line y=2x, under the transformation W=Z²

d. Evaluate $\int_0^{1+i}(x^2 - iy)dz$ along the line y=x.

e. Evaluate $\int_c \frac{e^z}{z}$ dz, where c is |z|=1

f. Find the poles of the function and the corresponding residues at each pole of f(z)= $\frac{ze^z}{(z+1)^3}$

g. Solve $\frac{\partial u}{\partial x}=\frac{2\partial u}{\partial t}$+u, where u(x, 0)=6$e^{-3x}$.

OR

Find the Z-transform of f(k) =k, k≥ o.

h. Solve $\frac{\partial^2 z}{\partial x \partial y}$=sinx.

OR

Find the Z-transform of e^{-ak},k≥0,

Q.2 a. Show that the function f(z)=e^x(cosy + i sin y) is analytic and find its derivative. 05
b. Find the bilinear transformation which maps the point z=-1, 0, 1 onto the points W=0,i,3i. 05
c. Find the Z-transform of $\frac{\cos 2k}{k}$, k≥o. 05

OR

Solve $\frac{\partial^2 y}{\partial t^2}=C^2\frac{\partial^2 y}{\partial x^2}$, subject to the conditions 05
Y(0,t)=0, Y(l,t)=0, $\partial y/\partial t$ =0 at t=0
And   y(x,0)=$\frac{3a}{2l}$x, 0≤ $x \le \frac{2l}{3}$
=$\frac{3a}{l}$(l-x), $\frac{2l}{3} \le x \le l$.

Q.3 a. Find k such that f(x, y)=x³+3kxy² may be harmonic and find its conjugate harmonic function. 05
b. Evaluate $\int_c \bar{z}^2 dz$, Where c is |Z − 1|=1. 05
c. Find the inverse Z-transform of $\frac{Z}{(z-2)(z-3)}$,|Z| > 3. 05

OR

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Solve $\frac{\partial u}{\partial t}=\alpha^2 \frac{\partial^2 u}{\partial x^2}$ for $0< x < \pi, t > 0$ 05

$\frac{\partial u}{\partial x}$ =0 at x=0, $\frac{\partial u}{\partial x}$=0 at x= π and u(x, 0) =sinx.

Q.4   a. Expand f(z)=$\frac{1}{(z+1)(z+2)}$ for $0< |Z-1| < 1$.   05

   b. Evaluate $\oint_c \frac{sinz}{(z-1)^2(z^2-9)}$ dz, where c is $|Z-3|=\frac{1}{2}$. By cauchy's integral formula.   05

   c. Solve the difference equation by Z-transform $u_{K+2}-2u_{k+1}+u_k=2^K$, with Y_o=2, Y_1=1.   05

<div align="center">OR</div>

Solve $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}$=0, subject to the conditions   05

   u(0, y) = u(π, y)=0 for all y $\geq$ 0 and u(x, 0)=100 u(x, ∞)=0.

Q.5   a. Under the transformation W=Z+$\frac{a^2}{z}$, show that the map of the circle x^2+y^2=a^2 is a straight line, but the map of   05

the circle x^2+y^2=b^2 (b>a) is an ellipse.

   b. Evaluate $\oint_c \frac{z^2}{sin^3z\, cosz}$ dz, where c is $|Z+i|$=2 by cauchy's Residue theorem.   05

   c. Evaluate $\int_{-\pi}^{\pi} \frac{1}{1+sin^2\theta}$ dθ, by using Residue theorem.   05

<div align="center">Section-B</div>

Q.6   Solve any five from the following: 10

   a. Find Laplace transform of $te^{-2t}\delta(t-2)$.

   b. Find L[$f(t)$] and L[$f'(t)$] of the following function f(t)=3, 0$\leq t < 5$

<div align="center">=0, t>5.</div>

   c. Find the Laplace transform of f(t)= $(t-2)^2$,t>2

<div align="center">=0, t<2</div>

   d. Find inverse Laplace transform of$\frac{2s+2}{s^2+2s+10}$

   e. Find inverse Laplace transform of $\frac{e^{-\pi s}}{s^2+9}$

   f. find inverse Laplace transform of $s^{\frac{-7}{2}}$

   g. Find the Fourier cosine transform of f(x)=k, 0<x<a

<div align="center">=0,x>a</div>

   h. Find the Fourier transform of f(x)= x, 0<x<a

<div align="center">=0, other wise</div>

Q.7   a. Find the Laplace transform of $\int_o^t \frac{1+\bar e^t}{t}$dt.   05

   b. Find the inverse Laplace transform of $\tan^{-1}\frac{2}{5}$ 05

   c. Using Fourier transform , solve the equation $\frac{\partial u}{\partial t}$ =2$\frac{\partial^2 u}{\partial x^2}$, 0<x<$\infty$, t>0   05

   Subject to the conditions

   u(0,t)=0, t>0,   u(x,0)=e^{-x}, x>0,

   u and $\frac{\partial u}{\partial x}$ $\to$0 as x$\to$ ∞.

Q.8   A. Evaluate $\int_0^\infty e^{-5t}sinh^3t$ dt   05

   b. Find the inverse Laplace transform by convolution theorem of $\frac{1}{s(s^2+4)}$ 05

   c. Find f(x) satisfying the integral equation $\int_0^\infty f(x)sin\lambda x dx$=$\frac{sin\lambda}{\lambda}$ 05

Q.9   Express the following function in terms of Heaviside unit step function and hence find their Laplace transform   05

<div align="center">F(x)=sin t, 0<t<π</div>

<div align="center">=t, t>π</div>

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b. Solve $y'' - 6y' + 9y = t^2 e^{3t}$, y(0)=2, y' (0)=6 by Laplace transform.   05

c. Find the Fourier sine transform of   05

        f(x)=x, 0<x<1

           =2-x, 1<x<2

           =0, x>2

Q.10 a. Find the Laplace transform of f(t)= e^t, 0<t<2π , f(t)=f(t+2π).   05

b. Solve $\frac{dx}{dt}$+y=sin t , $\frac{dy}{dt}$+x=cost, X(0)=2, y(0)=0 by Laplace transform.   05

c. Find the Fourier transform of f(x)=$\frac{1}{2a}$, if $|x| \leq$a   05

             =0, if $|x|$>a.

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SUBJECT CODE NO:- P-245
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination May/June 2017
Signals & Systems
(Revised)

[Time: Three Hours]   **[Max.Marks:80]**
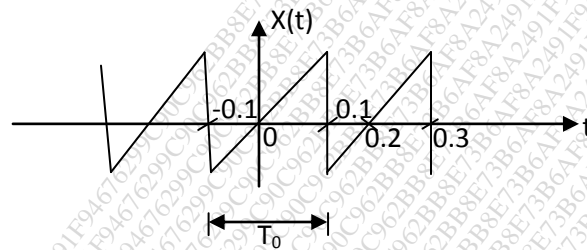
Please check whether you have got the right question paper.

N.B   i) Q. No.1 and Q. No. 6 are compulsory.
             ii) Attempt any two questions from Q. 2 to 5 and any two questions Q 7 to 10 from respective
             sections.
             iii) Assume suitable data as required.

                                        Section A

Q.1   Attempt any five from following.   10
          a)   What is mean by convolution? Explain.
          b)   What is fundamental frequency of following s/g x(t).

          c)   Explain aliasing effect.
          d)   Enlist and define-standard test s/g.
          e)   Define energy and power mathematically
          f)   Prove that nature of cosine wave is periodic.
          g)   Define stable and unstable system.

Q.2   a)   Sketch x(t)= A sin t $-\infty < t < \infty$ 08
               Also check whether it is energy signal/power signal.
          b)   What is signal? Classify and explain in detail.   07

Q.3   a)   For following system, check whether it is time variant or Time invariant.   08
          i.   Y(n)=x(n)+3u(n+1)
          ii.   Y(n)=x(n).u(n-n_0)
          iii.   Y(n)=x(n).coswon
          iv. $\frac{d}{dt}[y(t)] + ty(t) = x(t)$.

          b)   Explain various blocks used in Integro differential equation for CT & DT s/g.   07

Q.4   a)   Give mathematical and graphical representation of.   07
               (i) Decaying exponential function.
               (ii) Square wave

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(iii) Sine function
(iv) Signum function.

b) Obtain convolution bet?　　　　　　　　　　　　　　　　　　　　　　08
$X(t) = e^{-t^2}$
$h(t) = 3t^2$　for all t.

Q.5　Write short note on (Any three):-　　　　　　　　　　　　　　　　15
a) Effect of under sampling
b) Cross correlation and it's properties
c) Classification of system
d) Convolution and its properties.

Section B

Q.6　Attempt any five from following:-　　　　　　　　　　　　　　　　10
a) Define mathematical tool to convert time domain signal in to frequency domain.
b) Define cross co-relation $R_{21}(T)$
c) Express polar Fourier series equation.
d) What is value of autocorrelation function of power signal at origin? Explain.
e) Give analogy in between autocorrelation and convolution.
f) Give condition for FT exists.
g) State interrelation between autocorrelation & ESD.

Q.7　a) Obtain Fourier series representation of.　　　　　　　　　　　　08
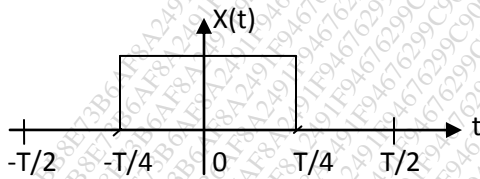
b) What is Fourier transformation (FT)? State and prove any four properties of FT.　　07

Q.8　a) What is correlation? Obtain correlogram of A sin $2\pi ft$.　　　　　08
b) Prove that cross correlation in between two energy signal corresponding to multiplication of FT　07
of one s/g & complex conjugate of FT of other s/g.

Q.9　a) Obtain Fourier transform of　　　　　　　　　　　　　　　　　08
$X(t) = e^{-at}u(t)$.
b) Prove that for energy s/g x(t); ESD & autocorrelation form FT pals.　　　07

Q.10　a) Determine autocorrelation, PSD & power of following s/g.　　　　10
5+4sin($10\pi t + 30$)
b) What is ESD? State and prove property of ESD.　　　　　　　　　05

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SUBJECT CODE NO:- P-276
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination May/June 2017
Digital Logic Design
(Revised)

[Time: Three Hours]   [Max.Marks:80]

"Please check whether you have got the right question paper".

N.B
        i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
        ii) From remaining solve any two questions from each section.
        iii) Figure to the right indicates full marks.

Section A

Q.1   **Solve any five question of the following**   10

    a)   Reduce the expression using k-MAP

         $Y= ABCD+A\bar{B}+D+AC+A\bar{B}C$

    b)   What is noise margin & Noise immunity?
    c)   What is passive & Active pull up?
    d)   Explain Half adder
    e)   Define encoder & decoder
    f)   What are the bipolar logic families?
    g)   Define multiplexer, what are the types of multiplexer?
    h)   Explain current hogging problem.

Q.2   a)   Explain 2 input TTL NAND gate in detail.   08
        b)   Explain characteristics of digital IC.   07
Q.3   a)   Simply the logic function using Quine mccluskey method.   08
            $F(A,B,C,D)= \varepsilon_m (2,7,8,9,10,12)$
        b)   Minimize the four variable logic function using K-map $F(A,B,C,D)= \varepsilon_m (1,3,5,8,9,11,15)+d(2,13)$ 07
Q.4   a)   Implement 16:1 mux using 4:1 mux   08
        b)   Design Binary to Gray code converter   07
Q.5   **Write short Note on (any three)**   15
    a)   magnitude comparator
    b)   parity generator & checker
    c)   sop & pos method
    d)   PLA & HDL
    e)   HDL

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Section B

Q.6 **Solve any five question of the following**   10
- a) Define Flip Flop List types of FF.
- b) Explain S-R Flip Flop Truth table.
- c) Compare synchronous & Asynchronous counter
- d) Explain Race around condition
- e) Compare sequential & combinational logic circuit.
- f) Define propogation delay.
- g) Define D to A converter. What are the types of D to A converter?
- h) What is flash memory?

Q.7   a) Perform the following conversion   08
-      I.   JK to T
-      II.   SR to JK
- b) Explain master slave J.K Flip Flop in detail.   07

Q.8   a) Draw & Explain Following operation of shift Register   08
-      I.   PIPO
-      II.   SIPO
- b) Design 4 bit parity generator using logic gates   07

Q.9   a) Design MOD-6 counter using J-K Flip Flop   08
- b) Explain Johnson's counter in detail.   07

Q.10 **Write short Note on (any three)**   15
- a) A to D converter
- b) Moore & Mealy machine
- c) State diagram & state table
- d) memory organization
- e) Bounce elimination switch

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SUBJECT CODE NO:- P-308
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination May/June 2017
Electronics Devices & Circuits - II
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Q.No.1 and Q.No.6 are compulsory.
             ii) Solve any two questions from remaining questions in each section.
             iii) Assume suitable data wherever necessary.
             iv) Figures to right indicate full marks.

Section A

Q.1   Solve <u>any five</u> of the following.   10
       a.   Which class of power amplifier has highest efficiency? Where they are used?
       b.   What is single ended & double ended input in differential Amplifier?
       c.   State the basic principle of CCD (change couple Device)
       d.   Define crossover & Harmonic Distortion.
       e.   State the following terms related to op-amp.
            $R_i = \infty\Omega$ ii) $R_o = 0\Omega$
       f.   List the two application of following devices
            i) IMPATT   ii) Tunnel Diode
       g.   Explain the principle of laser Diode
       h.   Define efficiency of power amplifier.

Q.2   a.   Explain in detail Read diode.   07
       b.   Explain current mirror circuit & level shifter in detail.   08

Q.3   a.   Explain class B push –pull power amplifier in detail.   08
       b.   What are different distortions observed in power amplifier? Explain in detail.   07

Q.4   a.   Explain AC analysis of differential amplifier.   07
       b.   Explain in detail schottky diode in detail.   08

Q.5   Write short notes on following   15
       a.   Heat sinks
       b.   CCD's
       c.   Features of OP-AMP.

Section-B

Q.6   Solve <u>any five</u> of the following.   10
       a.   Explain the need of commutating capacitors.
       b.   Draw the response of differentiator for input sine & Square wave
       c.   Enlist the application of clamper circuit
       d.   Define duty cycle.
       e.   What is sweep speed?
       f.   Explain need of blocking oscillator
       g.   Classify non sinusoidal oscillators.
       h.   What is difference between RC Control & diode control blocking oscillator.

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Q.7 a. Explain in detail diode clippers.   08
     b. Explain in detail RC integrator.   07

Q.8 a. Determine the period and frequency of oscillation for a stable multivibrator with component values 07
         R_1=2 KΩ, R_2=20 KΩ C_1=0.01μf, C_2=0.05μf
     b. Explain in detail working of bistable multivibrator. Give advantages & applications of bistable   08
         multivibrator.

Q.9 a. Explain in detail miller time based generator   07
     b. Explain different pulse duration controlling methods for blocking oscillator   08

Q.10 Write short note on following.   15
     1. Voltage time based generator
     2. Schmitt trigger
     3. RC differentiator

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SUBJECT CODE NO:- P-373
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C) Examination May/June 2017
Electrical Machines & Instrumentation
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
i) Attempt any three from each section.
ii) Q. no .1 and Q.no.6 are compulsory
iii) Attempt any two from remaining

Section A

Q.1 Attempt any five   10
a) Differentiable between DC machine and generator.
b) What are the applications of DC motors and generators?
c) What are the types of DC motors?
d) What is the working principle of 3.φ.I.m.
e) What is the significance of back EMF?
f) List the losses occwriting in 3-φ I.M .
g) List the applications of stepper motor.
h) What is working principle of repulsion type motor ?

Q.2 a) Explain the construction of DC machine with neat sketch.   08
b) A shunt generator drives 450A of 230V and the resistance of the shunt field and armature are 50Ω and   07
0.03Ω respectively .Calculate generated emf.

Q.3 a) A 3-φ 400/200v , Y-Y connected wound rotor induction motor has 0.06Ω rotor resistance and 0.3Ω stand   08
skill reactance /phase .find the additional resistance required in the rotor circuit is make the starting
torque equal to the maximum torque.
b) Explain the various speed control methods of 3-φ. Induction motors .   07

Q.4 a) Explain the different starters used for polyphase I.M .   08
b) Explain the construction of synchronous machine with neat sketch.   07

Q.5 a) Explain the construction and working of hysteresis motor.   07
b) Describe the operation of variable reluctance type stepper motor . How can its direction of rotation be   08
reversed?

Section B

Q.6 Attempt any five   10
a) Define transducer?
b) Define optocoupler ?
c) What is difference between analog and digital transducer
d) What is fire detector?
e) Explain the working principle of Thermo couple
f) Give the classification of displays.
g) List the properties of ESD.
h) What are the application of CRO?

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Q.7 a) With a suitable diagram explain the working of LVDT. List its applications 08
b) Explain interfacing techniques of transducer with microprocessor / microcontroller. 07
Q.8 a) What are the different types of photosensitive devices? Explain in brief. 08
b) Explain in brief the working of object counter and burglar alarm. 07
Q.9 a) Explain x-y reorder. With neat diagram 08
b) With neat block diagram and circuit diagram explain cold cathode display. 07
Q.10 Attempt any three 15
a) VAW meter
b) Vibration measurement
c) Properties of PSD
d) Sampling theorem and its proof
e) ESD (energy spectral density).

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