Total No. of Printed Pages:2

SUBJECT CODE NO:- H-139
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
AC Machines
(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 from each section, <u>any two</u> questions from remaining questions.
      iii) Assume suitable data whenever necessary

Section A

Q.1   Solve any five questions of the following   10

    1) A $50H_Z$, 4 pole, 3 phase Induction motor has rotor current of frequency $2\ H_Z$
        Determine (i)the slip and (ii) speed of the motor
    2) Define the term cogging
    3) Mention the type of starters.
    4) Why does slip vary with the load?
    5) Why the slots on the rotor of an Induction motor are usually skewed.
    6) State why the single phase Induction motor do not have the starting torque
    7) Mention any two applications of hysteresis motor
    8) State different methods of speed control of 3 phase I.M.

Q.2   a) Explain working of star delta starter for 3 phase induction motor   07

        b) Explain in detail the principal of operation of a single phase capacitor start, and Induction   08
            run motor along with phasor diagram

Q.3   a) Explain the method of speed control of 3 phase Induction motor by rotor circuit resistance.   07

        b) 3 phase induction motor having star connected rotor has induced emf of 50v between slip ring 08
            at standstill on open circuit. The rotor has a resistance and reactance per phase of 0.5Ω & 4.5
            Ω respectively find the current per phase and p.f. at starting when (1) The slip ring are short
            circuited (2) Slip rings are connected to a star connected rheostat of 4Ω per phase.

Q.4   a) Explain in detail the power flow diagram of induction motor. A 6 pole $50\ H_Z$ 3 phase   07
            induction.

        b) Motor runs at 960 RPM when the torque on shaft is 200 NM. If the stator losses are 1500   08
            watt and friction and wind age losses are 500 watt. Find
            (1) Rotor cu loss
            (2) Efficiency of motor.

Q.5   Write short notes on   15
      1) Induction generator
      2) FHP synchronous motor
      3) Hysteresis motor.

Section B

Q.6   Solve any five of the following   10

    1. What is the function of damper winding in alternator?
    2. Calculate the value of distribution factor for a 3 phase winding of a 4 pole alternator having 36 slots
    3. What do you mean by synchronous reactance of alternator?
    4. Write two differences between salient pole and cylindrical rotor
    5. What is pole pitch
    6. Enlist the different methods of excitation system of alternator
    7. What is meant by phase spread
    8. When show rotor excitation be applied during starting of a synchronous motor

Q.7   a) Explain the synchronous impedance method for obtaining voltage regulation of an alternator   07

      b) A 3phase 50 H$_Z$ star connected alternator has 60 slots with 4 conductors per slot and flux per   08
      pole is 0.0543 wb, find EMF generated per phase, and emf generated between line terminals. Determine pitch factor and distribution factor when number of slots per pole are 9 and coil is short pitched by 3 slots

Q.8   a) Derive equation of power output in cylindrical rotor alternator   07

      b) Explain the construction and working of a synchronous motor   08

Q.9   a) What are the advantages of parallel operation of alternator and write conditions to be   07
      followed while paralleling the alternator with infinite Bus bar.

      b) Explain in detail the different torques in a synchronous motor   08

Q.10   Write short note on   15

      1) Armature reaction and its effects
      2) Alternator on infinite bus bar
      3) V curves and its Experimental setups.

Total No. of Printed Pages:05

SUBJECT CODE NO:- H-111
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics - IV
(REVISED)

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

Please check whether you have got the right question paper.

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

Section A

Q.1   Attempt <u>any five</u>   10

1. Find the Laplace transform of $sin2t\ sin3t$

2. Find Laplace transform of $t^2 H\ (t-2)$

3. Find Laplace transform of $f(t) = (t-2)^2, t > 2$
   $$= 0, \qquad t < 2$$

4. Find the inverse Laplace transform of $\frac{S+2}{S^2-4S+13}$

5. Find the inverse Laplace transform of $\frac{S\ e^{-3s}}{S^2-1}$

6. Form the partial differential equation from

$$(x-h)^2 + (y-k)^2 = a^2 - z^2$$

OR

Find Z-transform of $\sin h\left(\frac{k\pi}{2}\right), k \geq 0$

7. Solve: $pq = p + q$

OR

Find the z-transform of $ke^{ak}, K \geq 0$

8. Solve $x\frac{\partial z}{\partial x} - 4y\frac{\partial z}{\partial y} = 0$

   OR

   Find the z-transform of $2^k \cos h \propto k, \ k \geq 0$

Q.2

a. Find the Laplace transform of $\int_0^t t \cos^2 t \, dt$ 05

b. Find the inverse Laplace transform of $\tan^{-1}(s)$ 05

c. Solve: $p^2 + q^2 = Z$ 05

   OR

   Find z-transform of $\cos(\frac{k\pi}{3} + 5)$

Q.3

a. Evaluate : $\int_0^\infty e^t \frac{\sin^2 t}{t} \, dt$ 05

b. Find the inverse Laplace transform by using convolution theorem   05

$$\frac{S}{S^4 + 8S^2 + 16}$$

c. Solve $x^2 p + y^2 q + z^2 = 0$ 05

   OR

   Find the inverse z- transform of $\frac{z}{(z-2)(z+3)^2}$, $|z| > 3$

Q.4

a. Find the Laplace transform of periodic function   05

$$f(t) = E, 0 < t < \frac{p}{2}$$
$$= -E, \quad \frac{p}{2} < t < p$$
And $\quad f(t) = f(t + p)$

b. Solve by Laplace transform $\quad y'' + 2y' + 5y = e^{-t}\sin t$; given   05
that $\quad y(0) = 0, y'(0) = 1$

c. Obtain the solution of $\quad \frac{\partial v}{\partial t} = k\frac{\partial^2 v}{\partial x^2}$ under the conditions   05

i. $\quad v \neq \infty, t \to \infty$
ii. $\quad v = 0, for \ x = 0 \ and \ x = \pi$
iii. $\quad u = \pi x - x^2 \ as \ \ t = 0$ in the range of $(0, \pi)$

OR

Find the z-transform of $k^2, k \geq 0$

Q.5   a.   Express the following function in terms of Heaviside unit step function and hence find its   05
Laplace transform $f(t) = (t + 1), 0 < t < 2$
$$= 3, \qquad t > 2$$

     b.   Solve the simultaneous L.D.E. by Laplace transform method   05

$$\frac{dx}{dt} + 4y = 0, \frac{dy}{dt} - 9x = 0, \text{ given}$$

$$x = 2, y = 1 \text{ at } t = 0$$

     c.   Solve $\frac{\partial^2 u}{\partial x^2} + \frac{d^2 u}{\partial y^2} = 0$ which satisfies the conditions $u(0, y) = 0 = u(l, y)$ 05
$$\text{And } u(x, \infty) = 0, \qquad u(x, 0) = kx$$
OR
Solve the difference equation by using z- transform
$6y(k + 2) - y(k + 1) - y(k) = 0, k \geq 0$
Given y(0)= y(1) =1

Section B

Q.6   Attempt any five   10
     a.   Prepare a forward difference table for the data
       x : 2   4   6   8   10
       y :15   23   27   33   40

     b.   Find the first approximate value of the root (i.e. x_1) by Newton Raphson method for
       $\log x - x + 3 = 0$

     c.   Find the values of x, y, z in the first iteration of Gauss –Seidal method
       $83x + 11y - 4z = 95$
       $7x + 52y + 13z = 104$
       $3x + 8y + 29z = 71$

     d.   Find f(8) for the data
       x :   5   6   9
       f(x) :   12   13   14

     e.   Find the residues at each of its poles of
       $f(z) = \frac{3z^2}{(z-1)(z+3)}$

f. Evaluate $\int_c sinhz\ dz$, where c : $|z| = 1$

g. Show that coshz is analytic every where

h. State Cauchy-Riemann equations in Cartesian and polar form

Q.7 a. Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$ and y (1)=1. Find the approximate value of y at x=1.2 using Euler's modified method   05

b. Use runge-kutta fourth order method to find y at x=0.2. given that   05

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, \qquad y(0) = 1$$

c. Under the transformation $w = \frac{1}{z}$ find the image of $x^2 + y^2 - 6x = 0$ 05

Q.8 a. Find the root of the equation $x\ log_{10}^x = 1.2$ by Newton-Raphson method   05

b. Prove that $u = r^3 \cos 3\theta - rsin\theta$ is harmonic and hence find its harmonic conjugate   05

c. Evaluate by cauchy's Residue Theorem   05

$\oint_c \frac{z^2}{(z-1)(z+2)^2} dz,$ c: $|z| = \frac{3}{2}$

Q.9 a. State cauchy's integral formula and hence evaluate   05

$\oint_c \frac{z+1}{(z^3-4z)} dz,$ where $c: |Z + 2| = \frac{3}{2}$

b. Find the bilinear transformation which maps the points -1, 0, 1 into the points $-1, -i, i$ of w-plane respectively   05

c. Fit a second degree parabola to the following data   05

x :	0	1	2	3	4
y :	-4	-1	4	11	20

Q.10 a. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=0 for the data   05

x :	0	1	2	3	4
y :	2	5	10	14	19

b. Find the analytic function $f(z) = u + iv$ if $v = \left(r - \frac{1}{r}\right)\sin\theta$ 05

c. Evaluate $\int_0^{\pi - \pi i} e^{\bar{z}} dz$, along the curve $x = t, y = -t$ 05

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-112
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics -IV
(OLD)

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

Please check whether you have got the right question paper.
N.B
  i.   Q.No.1 and 6 are compulsory.
  ii.   Solve <u>any two</u> 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 <u>any five</u> from the following   10

   a) Find k such that $f(z) = \frac{1}{2}\log(x^2 + y^2) + i\tan^{-1}\left(\frac{ky}{x}\right)$ is analytic.

   b) Find the image of $|z| = 2$ under the mapping $W = z + 3 + 2i$.

   c) State Cauchy's integral theorem.

   d) Determine the singularity and the residue of the function $f(z) = \frac{\sin z}{z}$.

   e) Expand $f(z) = \cos z$ about $z = \frac{\pi}{2}$ by using Taylor's series.

   f) Evaluate $\int_0^{2i} \sin hz\, dz$.

   g) Solve: $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$.

OR

Find Z-transform of $F(k) = \frac{1}{k}, k \geq 1$

   h) Solve: $2x\frac{\partial z}{\partial x} - 3y\frac{\partial z}{\partial y} = 0$.

OR

Find Z-transform of $F(k) = \frac{a^k}{k!}, k \geq 0$

Q.2   a) Find the analytic function $f(z) = u(r,\theta) + iv(r,\theta)$ such that $v(r,\theta) = r^2\cos 2\theta - r\cos\theta + 2$ 05

       b) Evaluate $\int_{(0,0)}^{(1,1)}(3x^2 + 4xy + 3y^2)\,dx + 2(x^2 + 3xy + 4y^2)\,dy$ along $y^2 = x$ 05

       c) Evaluate $\int_0^\infty \frac{dx}{(a^2+x^2)^2}$ by using residue theorem.   05

Q.3   a) Evaluate $\oint_C \frac{\sin^6 z}{\left(z-\frac{\pi}{2}\right)^3}dz$, where C is $|z| = 2$ by Cauchy's integral formula.   05

       b) Show that the real and imaginary part of analytic function $f(z) = u + iv$ is harmonic function.   05

c) Obtain the solution of partial differential equation $\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$, with subject to the condition $\quad$ 05

$u(0,t) = 0, \; u(l,t) = 0, u = 3\sin\frac{\pi}{l}x$, when $t = 0$. For all values of $0 < x < l$.

OR

Find Z-transform of $F(k) = 3^k \cos\left(\frac{k\pi}{2} + \frac{\pi}{4}\right), k \geq 0$

Q.4   a) Find and plot the image of triangular region with vertices $(0,0)$, $(0,1)$ and $(1,0)$ under the $\quad$ 05
transformation $w = (1 - i)\,z + 3$.

b) Expand $f(z) = \frac{1}{(1-z)(z-2)}$ into Laurent series for $i)\; 1 < |z| < 2$ $\qquad$ 05

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

    i) $v = 0 \; when \; y \to \infty$

    j) $v = 0$ when $x = 0$ for all values of y

    k) $v = 0 \; at \; x = \pi$

    l) $v = v_0$ when $y = 0 \; for \; 0 < x < \pi$

OR

Solve $y(k + 2) - 5y(k + 1) + 6y(k) = u(k); y(0) = 0, y(1) = 1$

Q.5   a) Find the bilinear transformation which maps the point $z = 0, -i, -1$ into the points $\quad$ 05
$$w = i, 1, 0.$$

b) Evaluate $\int_0^{2\pi} \frac{d\theta}{2 + \cos\theta}$ by calculus of residue. $\qquad$ 05

c) The vibration of an elastic string is governed by the partial differential equation $\qquad$ 05

$\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}$. The π and the ends are fixed. The initial velocity is zero and the initial deflection

$u(x, 0) = 2(\sin x + \sin 3x)$. Find the deflection $u(x, t)$ of the vibrating sting for $t > 0$.

OR

Find inverse z-transform of $\frac{z^2 + z}{z^3 - 3z^2 + 3z - 1}, |z| > 1$

SECTION-B

Q.6   Solve <u>any five</u> of the following $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ 10

   a) Find Laplace transform of $e^{-t} \sin t \, H(t - 2\pi)$

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

   c) Find inverse transform of $\frac{1}{(s+3)^{\frac{3}{2}}}$

   d) State second shifting theorem of Laplace transform

   e) Find Laplace transform of $t \cos 2t$.

   f) State inverse convolution theorem of Laplace transform.

g) Find Fourier transform of $\quad f(x) = x, |x| \le a$
$\qquad\qquad\qquad\qquad\qquad\qquad = 0, \ otherwise$

h) Find Fourier sine transform of $\frac{1}{x}$

Q.7

a) Evaluate $\int_0^\infty \sin 4t \ \delta\left(t - \frac{\pi}{8}\right) dt$ 05

b) Find inverse Laplace transform of $\frac{1}{s} \log \sqrt{\frac{s^2+1}{s^2}}$ 05

c) Find Fourier sine and cosine transform $f(x) = ae^{-\alpha x} - be^{-\beta x}$ 05

Q.8

a) Find Laplace transform of $\frac{\sin^2 t}{t}$ 05

b) Find inverse Laplace transform of $\frac{s^2}{(s^2+a^2)^2}$ 05

c) Solve the integral equation $\int_0^\infty f(x) \cos \lambda x \ dx = e^{-\lambda}, \lambda > 0$.   05

Q.9

a) Express the function in terms of Heaviside unit step function hence find their Laplace   05
transform of

$$f(t) = 4, \quad 1 < t < 2$$
$$= -2, \quad 2 < t < 3$$
$$= 5, \quad t > 3$$

b) Find f(x) if its Fourier sine transform is $\frac{\lambda}{\lambda^2+1}$ 05

c) Solve $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = e^{-x} \sin x, \ where \ y(0) = 0 \ and \ \frac{dy}{dx} = 1 \ at \ x = 0$ 05

Q.10

a) Find Laplace transform of   05

$$f(t) = 1, \quad 0 < t < 1$$
$$= 0, \quad 1 < t < 2 \qquad if \ f(t) = f(t+3)$$
$$= -1, \quad t > 2$$

b) Solve $\frac{dx}{dt} - y = e^t; \frac{dy}{dt} + x = \sin t, x(0) = 1, y(0) = 0$ by Laplace transform method.   05

c) Using Fourier transform, solve the equation $\frac{\partial u}{\partial t} = k\frac{\partial^2 u}{\partial t^2}$ for $x \ge 0, t \ge 0$ under the given   05
condition $u = u_0$ at $t = 0, t > 0 \ and \ u(x, 0) = 0, x \ge 0$.

SUBJECT CODE NO:- H-209
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Power Trans.and Distri.
(REVISED)

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

Please check whether you have got the right question paper.

N.B
1) Solve any 2 questions from section A.
2) Solve any 2 questions from section B.
3) Q.1 and Q.6 are compulsory.

Section A

Q.1 Attempt any five questions.   10
   a) What are the desirable properties of an insulator?
   b) What is block rate tariff and flat rate tariff?
   c) What are the advantages and disadvantages of HVDC transmission?
   d) What are the constants of an overhead line?
   e) Classify transmission line on the basis of voltages.
   f) Define transmission efficiency.
   g) Define Ferranti effect.
   h) Draw a single line diagram showing a typical distributing system.

Q.2 a) A short 3ϕ overhead transmission line has impedance per phase of 5+j20.2, when sending   05
      end and receiving end voltages are 46.85 KV and 33KV respectively. At 0.8 P.F., lagging,
      calculate:
      a) Current
      b) Voltage
      c) Regulation and
      d) Transmission efficiency
   b) What are surge arresters? Where and why do we use this equipment?   05
   c) Explain any two types of A.C. distribution solution.   05

Q.3 a) Derive an expression for loop inductance of a single phase line.   05
   b) Explain why bundled conductors are used for transmission voltage above 220 KV.   05
   c) Write a note on GMR and GMD.   05

Q.4 a) Explain the effects of high voltage on volume of copper and on efficiency.   05
   b) Derive the expression for nominal T method.   05
   c) The towers of height 30m and 90m respectively support a transmission line conductor at a   05
      water crossing. The horizontal distance between the towers is 500meters. If the tension in the
      conductors is 1600kg, find the minimum clearance of the conductor at water and clearance
      midway between supports. The weight of conductor is 1.5 kg/m. The basis of the towers can
      be considered to be at water level.

Q.5 Write short notes: 15
   a) Different types of loads in power station
   b) Methods of improving string efficiency
   c) Storage batteries in substation

Section B

Q.6   Attempt any five: 10
- a) What is serving?
- b) What is meant by short, medium and long transmission line?
- c) What is sag? Illustrate the same by a figure.
- d) State the effect of low P.F. on
    - a) Efficiency of transmission line
    - b) Regulation of transmission line
- e) What is effect of capacitance on a transmission line?
- f) What is spacing between conductors?
- g) Define insulation resistance.
- h) Compare the merits and demerits of underground system versus overhead system.

Q.7   a) A three phase, 50hz, 132kv overhead line has conductors placed in a horizontal plane 4   05
           meters apart. The conductor diameter is 2cm. if the length of the line is 110 KMS, calculate
           the charging current per phase assuming complete transposition.
- b) Derive the expression for capacitance of 3 phase line with unsymmetrical spacing.   05
- c) Discuss the various types of line supports with the aid of neat sketches.   05

Q.8   a) Derive the expression for capacitance of single phase with earth and without earth effect.   05
- b) Using rigorous method, derive the expression for the sending end voltage & current for a   05
           long transmission line.
- c) A three phase, 50 Hz transmission line 100kms long delivers 200MW power at 0.9 power   05
           factor lagging at 110KV. The resistance and reactance of line per phase per kilometre are
           0.2Ω and 0.4Ω respectively, while the capacitance admittance is 2.5×10^{-6} Siemens, per km
           per phase. Calculate the current and voltage at sending end transmission efficiency. Use
           nominal T method.

Q.9   a) Explain with neat sketches, the methods of laying underground cables in special locations   05
- b) Draw a neat sketch of an underground cable. Explain its construction.   05
- c) Explain the methods of locating cable fault.   05

Q.10   Write short notes(any three)   15
- a) ABCD parameters
- b) Grading of cables
- c) Circuit breakers and insulators
- d) XLPE cables

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-210
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
A.C. Machines
(OLD)

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

Please check whether you have got the right question paper.

N.B
1. Question No.1 & 6 are compulsory.
2. Solve any two questions from Q.no.2 to Q.no. 5
3. Solve any two questions from Q.no.7 to Q.no. 10
4. Assume suitable data if required

Section A

Q.1   Attempt any five   10
   a) What is the necessity short circuit rotor conductor in a squirrel cage induction motor
   b) Define slip in 3ph induction motor what is its value at starting and at synchronous speed
   c) How does the slip vary with load
   d) In case of 3- phase induction motor why slip is always positive
   e) What are the main advantages of a cage motor
   f) State the working principles of hysteresis motor
   g) What is a servo motor
   h) Give the two applications of servomotors & Hysteresis motor

Q.2   a) A squirrel cage induction motor is rated 25KW, 440V, 3-ph , 50H$_z$. On full load it   05
           draws 28.7KW with line current 50A and runs at 720 rpm calculate
        i) Slip   ii) power factor   iii) efficiency

        b) Explain about induction Generator   05
        c) Explain the procedure of No- load and Blocked rotor test of 3 – phase induction motor   05

Q.3   a) Explain in detail different stages of power development in induction motor   05
        b) Explain about construction and working of repulsion motor   05
        c) Explain the types of capacitor start motors   05

Q.4   a) Draw equivalent circuit of single ph. Induction motor describing all the parameters   05
        b) Derive the expression of maximum power output of 3- ph induction motor   05
        c) Explain the construction & working of Hysteresis motor   05

Q.5   a) Describe any one speed control methods of 3- ph induction motor   05
        b) Why starter is required to start 3 –ph induction motor? List the types of starter used for   05
           induction motor
        c) Explain the construction& working of A.C servomotors   05

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Section B

Q.6   Attempt any five   10
        a) What is a exciter
        b) How will you minimized hunting
        c) What is meant by 'V' curves of synchronous motor
        d) Why synchronous motor runs only at synchronous speed
        e) Define synchronous reactance
        f) Define pitch and distribution factor
        g) Write application of synchronous motor
        h) Define voltage regulation of alternator

Q.7   a) Derive E.M.F equation of Alternator   05
        b) Explain the synchronization procedure of single phase alternator   05
        c) A 3 – phase , 50H$_Z$, 8-pole alternator has a star- connected winding with 120 slots and 8   05
           conductors per slot the flux per pole is 0.05 wb, sinusoidally distributed determine
           phase & line voltage

Q.8   a) Explain in detail the different torques in synchronous motor   05
        b) Explain Hunting & damping in synchronous motor   05
        c) Explain the starting methods of synchronous motor   05

Q.9   a) Explain the power flow within a synchronous motor   05
        b) Explain the procedure of determining of voltage regulation of alternator   05
        c) Explain the effect of harmonies on pitch and distribution factor of an alternator   05

Q.10   Write short notes on
        a) V- curves   05
        b) Synchronous condenser   05
        c) Zero power factor method   05

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-175
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Power Transmission & Dist.
(OLD)

[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) answer any two questions from Q.no2 to Q.no 5 from section A.
             iii)answer any two question from Q.no 7 to Q.no 10 from section B.

Section -A

Q.1   Attempt any <u>five</u>   10
             a) Define minimum demand & demand factors
             b) List major electrical equipment in transmission substation
             c) What is interconnected system of distribution?
             d) What is proximity effect?
             e) What is transposition of transmission line?
             f) What is radial main distribution system?
             g) Define string efficiency. Will it equal to 100%?

Q.2   a) Define load curves .what is its importance?   05
             b) Describe the desirable characteristics of tariff   05
             c) Explain any two types of A.C. distribution system   05

Q.3   a) Explain what is GMR & GMD.   05
             b) Write a note on Instrument Transformer   05
             c) In a 33kv overhead line, there are 3 units in the string of insulator. If the capacitance   05
             between each insulator pin & earth is 11%of the self-capacitance of each insulator, find
                        i) The distribution of voltage over 3-insulators &
                        ii) String effeciancy.

Q.4   a) Find the expression for the flux linkages due to single current caring conductor   05
             b) Explain any one method of improving string efficiency   05
             c) A single phase transmission line has two parallel conductors 3 meter apart ,the radius of   05
             each conductor being 1c.m calculate loop inductance per km length of line of material of
             conductors is
                        i) Cooper
                        ii) Steel with relative permeability of 100

Q.5 Write a short note on any <u>three</u>   15
   1) Types of insulators
   2) Substation
   3) Ring & redial main system
   4) Ferranti effect

Section -B

Q.6 Attempt any <u>five</u>   10
   a) What is mean by sag? Illustrate some by figure.
   b) What is effect of capacitance in transmission line?
   c) What are types of line based on length?
   d) What is cable? State its necessity
   e) Evaluate circuit constants for short transmission line
   f) Define terms voltage regulation and transmission efficiency of a line.
   g) Compare merits & demerits of underground system versus overhead system

Q.7 a) Draw equivalent circuit & vector diagram for medium transmission line state assumption   05
   made
   b) What is corona? what are the factors affecting it?   05
   c) A single 3-phase line operated at 50 hz is arranged unequally as $D_{12} = 1.5m$, $D_{23} = 3m$ 05
   $D_{31} = 2.6m$ The conductor diameter is 8mm & line is regularly transposed. Determine
   Inductance & capacitance per KM.

Q.8 a) Derive the expression for capacitance of three phase line with equilateral spacing   05
   b) Explain phenomenon of corona. How corona effect can be reduced(state any two points)   05
   c) An overhead 3 phase line delivers 5000kw at 22kv at 0.8 pf lagging. the resistance and   05
   reactance of each conductor is 4Ω & 6Ω respectively .determine
   i)sending end voltage ,
   ii)percentage regulation &
   iii) Transmission efficiency.

Q.9 a) Draw neat sketch of underground cable .explain its construction   05
   b) Discuss various types of line supports   05
   c) Using rigorous method , derive expression for sending end voltage & current for long   05
   transmission line

Q.10 Write a short notes on any <u>three</u>   15
   a) XLPE cable
   b) Grading of table
   c) Circuit breaker &insulator
   d) ABCD parameter

Total No. of Printed Pages:6

SUBJECT CODE NO:- H-140
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Network Analysis
(OLD)

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

Please check whether you have got the right question paper.

N.B
1. Q.no.1 from section A & Q.no.6 from section B are compulsory.
2. Attempt any two questions from the remaining questions.
3. Assume suitable data if necessary.

Section A

Q.1   Solve any five   10
   a) Enlist the applications of the Laplace transform
   b) State substitution theorem
   c) What is coefficient of coupling
   d) Give the principle of duality
   e) What is super node
   f) Draw the dual of the network
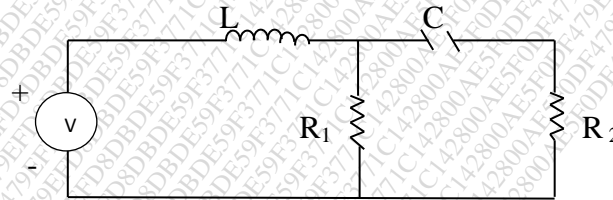
   g) Define step & impulse function
   h) What are the types of different controlled sources? Show with symbols.

Q.2   a) Explain in detail Nodal analysis with an example.   05
       b) Find current through the 3 +i4 ohm impedance in fig.1   05
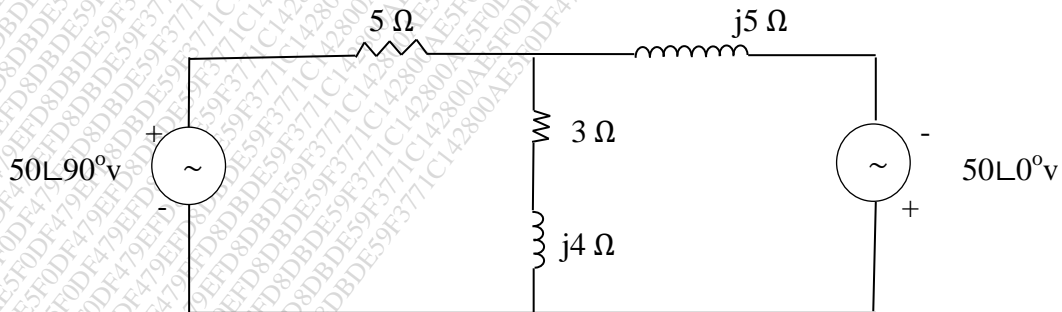

Fig .1

c) Obtain the thevenins equivalent circuit across A-B of the circuit in fig.2   05
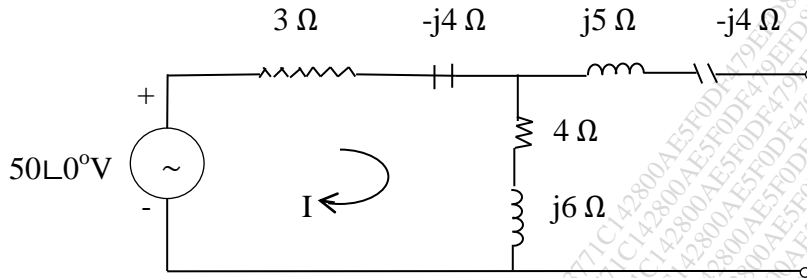

Fig. 2

Q.3   a) State & prove millman's theorem   05
           b) Find i_1 & i_2 from the circuit in fig 3   05
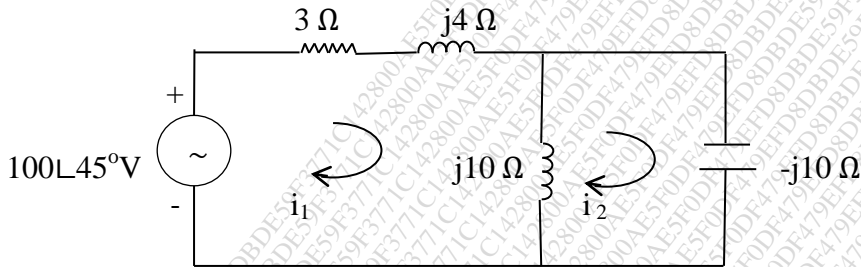

fig 3

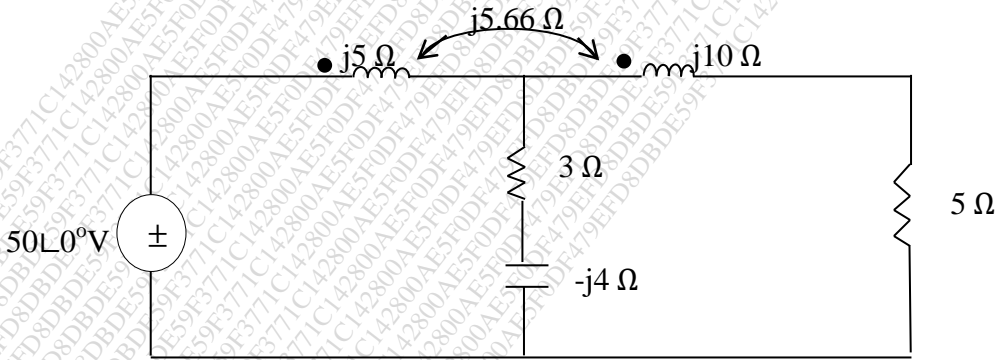c) Find the voltage across 5 Ω resistor using mesh analysis in fig 4   05

Fig.4

Q.4   a) In the network shown in fig.5 switch is closed Assuming all initial conditions as zero, find 05

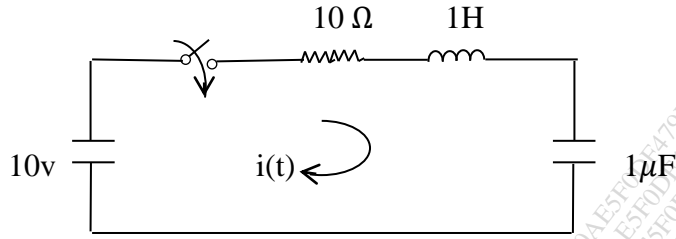$$i, \frac{di}{dt} \quad and \quad \frac{di^2}{dt^2} \quad at\ t = 0^+$$

Fig 5

b) In the network of fig.6, the switch is essentially at the position 1 on the steady state   05
having reached the switch is changed to position 2 find current i(t).
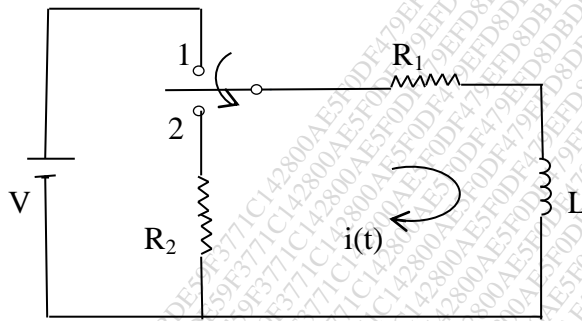

Fig 6

c) In the network of fig.7 determine currents $i_1(t)$ & $i_2(t)$ when the switch is closed at t=0   05

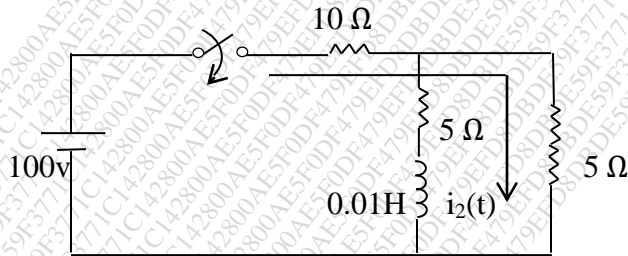Fig.7

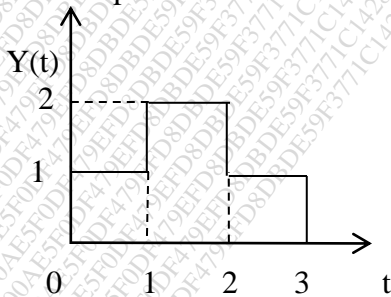Q.5   a) Find the Laplace transform of the function in fig 8   05

Fig.8

b) Find the inverse Laplace transform of the following function
$$\frac{s^2/(s+3)}{(s+1)(s+4)^2}$$
05

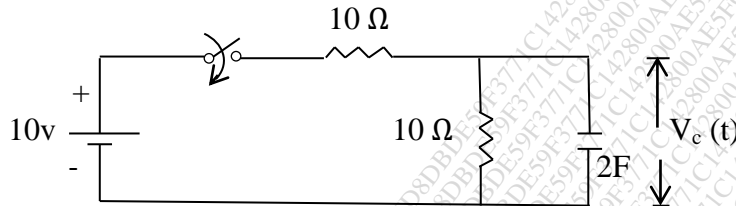c) The switch in the network shown in fig. 9 is closed at t=o determine the voltage across the capacitor
05

Fig.9

Section B

Q.6　Solve any five
10
   a) Draw the T- network & ladder n/w
   b) Define stability of a active network
   c) Define RMS value of an alternating quantity
   d) What is a two port network?
   e) Define energy & power when a network is excited by purely sinusoidal voltage
   f) Write the trigonometric form of the Fourier series
   g) Write the physical significance of reactive power
   h) Define network function state its significance.

Q.7　a) State all the instruction on pole zero location for transfer function　05
　　　b) Derive the inter conversion to convert Y parameters into H parameters　05
　　　c) Find the driving – point admittance function of the network shown in fig. 10　05
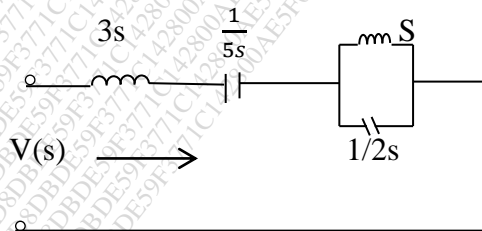
Fig.10

Q.8   a) Find Z – parameters for the network shown in fig.11   05
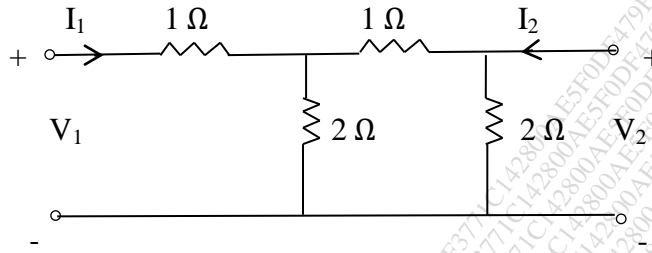
Fig .11

b) For the network shown in fig 12 find Z & Y parameters   05
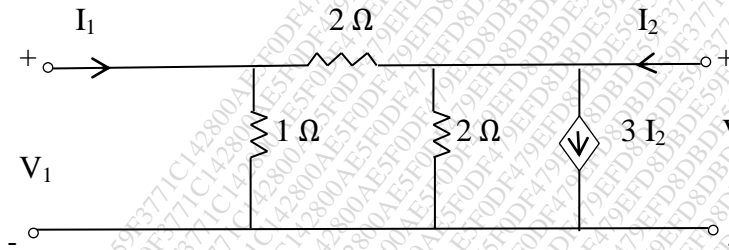
Fig.12

c) Obtain the pole zero plot of the following functions   05

$$F(s) = \frac{s(s + 2)}{s^2 + 2s + 2}$$

Q.9   a) What is insertion loss? Explain   05
       b) Calculate the average value, rms value & form factor of the output of a half wave rectifier 05
           when input to rectifier $i^0 3$ purely sinusoidal alternating current.
       c) For the network shown fig.13 plot poles & zeros of function I_o/I_i 05
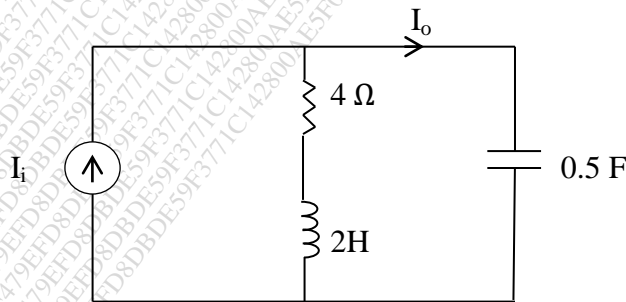
Fig.13

Q.10 a) What is Fourier transform? State & prove properties of Fourier transform. 05
      b) Evaluate Fourier series of the waveform shown in the fig14 05

Fig.14

c) Find the Fourier series for a square wave defined as 05

$$f(t) = +A \quad o < t < T/2$$
$$= -A \quad \frac{+T}{2} < t < T$$

Total No. of Printed Pages:02

SUBJECT CODE NO: H-282
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Analog & Digital Circuits
(OLD)

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

Please check whether you have got the right question paper.

N.B
i) <u>Question No.1 and Q.No.6 are compulsory</u>.
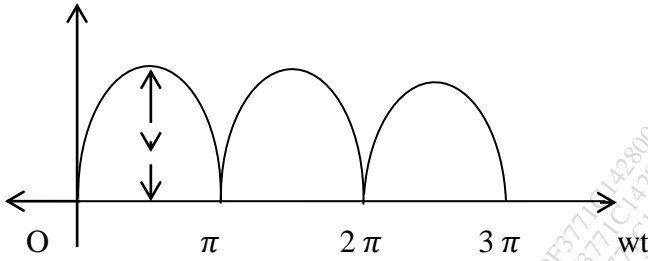ii) Attempt from each section <u>any two questions</u> from the <u>remaining questions</u>.
iii) Assume suitable data where necessary.
iv) Figures to the right indicate full mark.

Section A

Q.1 Answer <u>any five</u> 10
    A. Mention some commonly used active filters.
    B. State important features for instrumentation amplifier?
    C. Draw the pin diagram of 555 and name each pin.
    D. Draw the circuit diagram of differentiator.
    E. Define Slew rate of op amp.
    F. Draw the symbol of BJT and Define biasing BJT.
    G. Define DC Load Line.
    H. State important features for instrumentation amplifier?

Q.2 A) Explain operation of CB configuration with neat circuit diagram and output characteristics 08
    of CB mode BJT.
    B) Draw and explain with suitable circuit diagram and wave forms the Schmitt-trigger using 07
    op-amp.

Q.3 A) Explain common emitter configuration of BJT. 07
    B) Explain Op-Amp parameter in detail. 08

Q.4 A) Explain Astable Multivibrator using IC555. 07
    B) With neat diagram explain the class B push. Pull amplifier? 08

Q.5 Write short note on (<u>any three</u>) 15
    I.   Zero crossing detector
    II.   Transformer coupled amplifier
    III.   LM 317 voltage regulator
    IV.   First order low pass filter

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Section B

Q.6 Answer <u>any five</u>. 10
- A. Define asynchronous and synchronous counters.
- B. Construct the k-map for the three variable truth table in which the O/P is high for the following i/p condition 1101, 1010, 0101, 1111.
- C. Convert 0.640625 decimal number in its octal equivalent.
- D. Convert hexadecimal no. BC.25 into octal no. Define biasing BJT.
- E. Find 2's compliment of $(11001100)_2$
- F. List various types of flip flop.
- G. What are the advantages of Dynamic RAM?

Q.7 A) Draw the logic diagram and excitation table of 08
- i) D-flip flop
- ii) J-K flip flop

B) Design 4-bit up-down Counter. 07

Q.8 A) Explain the operation of PROMS and EPROMS. 07

B) What are the advantages and disadvantages of Dual slope ADC? Comment on their major applications. 08

Q.9 A) Represent decimal no.8620 in 08
- i) BCDcode
- ii) Excess – 3code
- iii) Hexadecimal
- iv) Octal no

B) Explain edge triggered J K Flip-flop in detail. 07

Q.10 Write short note on (<u>any three</u>) 15
- i) Shift Registers
- ii) Demorgon's theory
- iii) Gray code
- iv) Twisted ring counter

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-399
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Power Generation & its Economics
(OLD)

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

Please check whether you have got the right question paper.

N.B   1. Q.No.1 and 6 are compulsory.
       2. Attempt any two questions from remaining four questions from each section.
       3. Assume suitable data if necessary.
       4. Figure to the right indicates full marks.

Section A

Q.1   Solve any five questions: 10
       a) What is function of condenser in steam power plant?
       b) Write the function of nuclear reactor.
       c) What are the main components of diesel power plant?
       d) Draw sketch of pen stock.
       e) What is the function of gate?
       f) Write the draught system.
       g) What is the function of surge tank in hydroelectric power plant?

       h) What is the meaning of the terms
           1) Atomic energy
           2) Isotopes

Q.2   a) Write a short note on selection of coal for thermal power plant and list the site selection factor   08
           of thermal power plant.

       b) With a neat diagram explain water tube boiler.   07

Q.3   a) Explain the site selection factors of hydroelectric power plant.   08

       b) With a neat diagram explain the operation of Kaplan turbine.   07

Q.4   a) Draw a neat diagram of a diesel power plant showing all the systems. Briefly explain the   08
           function of each system.

       b) Explain the nuclear reaction in nuclear power plant.   07

Q.5   Write a short notes on: (any three)
       a) Nuclear reactor   05
       b) Water hammer   05
       c) Nuclear materials used in nuclear reactor   05
       d) Selection of coal in thermal power plant.   05

1

399

Section B

Q.6   Solve any five questions: 10
    a) Write the types of MHD Generators.
    b) Applications where solar energy used
    c) Forms of geothermal energy.
    d) What is meant by base load plant?
    e) What are the basic requirements for locating a wind power plant?
    f) What is the function of surge tank in hydroelectric power plant?
    g) List the methods used for finding out the depreciation cost

    h) Define
      1) Load factor
      2) Diversity factor

Q.7   a) With a neat diagram explain open cycle gas turbine power plant.   08

    b) Explain horizontal axis wind mill with neat sketch.   07

Q.8   a) Write advantages & disadvantages of tidal power plant   07

    b) Draw a neat diagram of a pump storage plant.   08

Q.9   a) Discuss the basic requirements of peak load plants.   07

    b) Explain the comparison of all power plants.   08

Q.10   a) Explain base load & peak load plant   05
    b) Write short note on choice of size & number of generator units   05
    c) Solar energy   05

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-400
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EE/EEE/EEP) (CGPA)
Electrical Power Generation & its Economics
(REVISED)

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

Please check whether you have got the right question paper.
N.B   1. Q.no.1 from section A and Q.no.6 from section B are compulsory.
       2. Attempt any two questions from the remaining questions in each section.
       3. Assume suitable data if necessary.
       4. Figure to the right indicate full marks.

Section A

Q.1   Solve any five questions: 10
       a) What is a Boiler?
       b) What is the use of condenser?
       c) What is importance of coal weighing?
       d) What are the equipment's used for coal transfer?
       e) Define Hydrology.
       f) Write function of water hammer and surge tank.
       g) What is a nuclear reactor?
       h) When and where diesel electric power plants are used.

Q.2   a) What are the factors for selection of site for a thermal station?   05

       b) Explain Ash handling in thermal power plant.   05

       c) Write the uses of thermal stations.   05

Q.3   a) Explain working of hydro power plant.   05

       b) Explain the role of hydroelectric stations in power industry.   05

       c) Draw the hydrograph and find average monthly flow.   05

Month	Discharge m^3/sec	Month	Discharge m^3/sec
Jan	2500	July	1000
Feb	3000	August	800
March	2400	Sept	600
April	2000	Oct	500
May	1500	Nov	200
June	1500	Dec	1500

1

400

Q.4　　a)　Discuss the function　　　　　　　　　　　　　　　　　　　　　　　05
　　　　　　　1)　Penstock
　　　　　　　2)　Surge tank
　　　　　　　3)　Spill way

　　　　b)　What are the prospectus and development of nuclear power plain in India?　　05

　　　　c)　What are main components in diesel power plant?　　　　　　　　　　　05

Q.5　　Write short note on:　　　　　　　　　　　　　　　　　　　　　　　　　15
　　　　a)　Economizer
　　　　b)　Nuclear waste disposal
　　　　c)　Francis turbine

Section B

Q.6　　Solve any five questions:　　　　　　　　　　　　　　　　　　　　　　10
　　　　a)　Draw sketch of wind power mill.
　　　　b)　Write application where solar energy used.
　　　　c)　List the method of finding out the depreciation cost.
　　　　d)　Draw the input output curves of thermal plant.
　　　　e)　What is meant by zero energy house?
　　　　f)　What are the forms of geothermal energy?
　　　　g)　Enlist the types of MHD generators.
　　　　h)　What is the function of fuel cell?

Q.7　　a)　Explain the components of gas power plant and its functions.　　　　　05

　　　　b)　Why gas power plant used as peak load power plants?　　　　　　　05

　　　　c)　Differentiate between open cycle and closed cycle gas turbine plants.　05

Q.8　　a)　Explain MHD plant with diagram.　　　　　　　　　　　　　　　　05

　　　　b)　Explain solar energy generation.　　　　　　　　　　　　　　　　05

　　　　c)　Compare all power plants.　　　　　　　　　　　　　　　　　　　05

Q.9　　a)　What is the cost of electrical energy explain.　　　　　　　　　　　05

　　　　b)　What are the constraints of economic generation?　　　　　　　　05

　　　　c)　Explain tidal power generation.　　　　　　　　　　　　　　　　05

2

400

Q.10   a) How is cost reduced by doing interconnecting generators?   05

      b) Draw a neat diagram of a pump storage plant.   05

      c) What are the fuels required for gas turbine plants explain.   05

3

400

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-330
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Transformers & DC Machines
(OLD)

[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.2 to Q.5.
                       iii) Solve any two questions from Q.7 to Q.10.
                       iv)Assume suitable data wherever necessary

Section A

Q.1   Answer the following (any five)   10

    a) How are transformer classified according to construction? Give two important points of
       comparison.
    b) What are the different types of losses in transformer? How are they reduced?
    c) Why is the efficiency of transformer highest in all electrical machines?
    d) What are the different types of three phase transformer connections? Where are they used?
    e) What is the need of parallel operation of transformer?
    f) What is stepper motor? Write its four different applications.
    g) Give two important points of comparison between D.C. servo motor and conventional motor.
    h) Define voltage regulation of transformer comment on voltage regulation for capacitive load.

Q.2   a) Derive emf equation of transformer.   05
       b) Draw the approximate equivalent circuit of transformer refers to primary side and indicates   05
          how it differs from exact equivalent circuit.
       c) A single phase transformer has 400 primary turns and 100 secondary turns. The net cross   05
          sectional area of core is 60cm². It the primary winding is connected 50Hz, 500 volts supply.
          Calculate
          i.   Peak value of flux density in the core
          ii.   The voltage induced in the secondary winding

Q.3   a) Draw the physical connections and phasor diagram of following connection   05
          i.   Dzo
          ii.   Yd 11
       b) Derive an expression for saving of copper in autotransformers as compare to conventional   05
          transformer.
       c) A 10KVA, 200/400 volts, 50Hz, single phase transformer gives the following test results.   05

O.C	Test	H.V wdg	200 volts	1.3A	120watt
S.C.	Test	L.V wdg	22 volts	30A	200watt

330   1

Q.4   a) What is Scott connection. Draw its connection diagram   05
       b) Compare three phase transformer with bank of three single phase transformers.   05
       c) Discuss back to back test for separation of losses in two identical single phase transformer.   05

Q.5   Write short notes (<u>Any three</u>)   10
       a) Variable reluctance stepper motor
       b) D.C servomotor
       c) Equivalent circuit of transformer
       d) Auto-transformer
       e) No load operation of transformer

Section B

Q.6   Attempt the following (<u>any five</u>)   10
       a) State the working principles of D.C. generator.

       b) Why armature winding in D.C machines placed on rotating parts.

       c) Give two comparisons of lap and wave winding.

       d) Draw power flow diagram of D.C. machines.

       e) Draw the external characteristics of D.C. shunt generator.

       f) What do you mean by back emf give its significance?

       g) It the applied voltage of D.C machine is 230volts. Then what will be back emf for maximum
          power developed

       h) Calculate voltage induced in armature winding of 4 pole lap wound. D.C. machine having
          728conductors and running at 1800 rpm. The flux per pole is 30 mwb.

Q.7   a) Discuss with suitable sketch the main parts of D.C. machines with their function.   05

       b) Derive emf equation of D.C. generator.   05

       c) An 8 pole D.C shunt generator has 778 wave connected armature conductor running at   05

          500rpm. Supplies a load of 12.5 ohms. Resistance at terminal voltage of 250 volts. The

          armature resistance is 0.24 ohm and field resistance 250ohms. Find out armature current &

          the induced emf.

Q.8   a) What do you understand by armature reaction? Explain the concept of demagnetizing and   05
           cross magnetizing ampere turns.

       b) Define and explain process of communication in D.C. generator with neat sketch.   05

       c) Discuss the advantages of using several small D.C. generators in parallel over the use of   05
           single large generator.

Q.9   a) With the help of neat diagram, explain working of four point starter. How is it different from   08
           three-point starter?

       b) Explain the process of communication for a d.c. generator. What are the causes of bad   07
           commutation? Explain methods of improve the commutation.

Q.10   Explain the following (<u>any three</u>)   15
       a) Three point starter
       b) Swinburne test
       c) Voltage buildup of D.C. generator
       d) Losses in D.C. machines
       e) Speed control of D.C. shunt motor

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-331
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EE/EEE/EEP) (CGPA)
Transformers & DC Machines
(REVISED)

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

Please check whether you have got the right question paper.

N.B
1. Q.1 and Q.6 are compulsory.
2. Solve any two questions from Q.2 to Q.5
3. Solve any two questions from Q.7 to Q.10
4. Assume suitable data if necessary .

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Section A

Q.1   Attempt any five.   10
1) What will happen if transformer primary is fed with DC supply?
2) What is the material used for construction of core of transformer? Why?
3) What is all day efficiency of transformer?
4) Why L-V is kept nearer to core?
5) State the emf equation of X'mer and explain transformation Ratio of X'mer?
6) Explain the function of following parts
   i)   Breather
   ii)   Cooling fins.
7) A 1ϕ transformer has 500 turns in primary and 1200 turns in secondary cross- sectional Area is 80CM^2. If primary is connected to 50Hz supply at 500 Volts. Calculate
   i)   Peak flux density
   ii)   Voltage induced in secondary.
8) Give two comparisons of shell type and core type transformers.

Q.2   a) With the help of circuit diagram. Explain OC and SC test on single phase transformers.   08
         b) A 4KVA, 200/400V , 1ϕ transformer has equivalent resistance and reactance ref to low   07
            voltage side equal to 0.5Ω and 1.5Ω respectively , find terminal voltage on the high
            voltage side when it supplies 3/4th of full load.

Q.3   a) What are the standard 3 phase transformer connections, explain phasor group and clock   07
            notations.

         b) A 50KVA , 1ϕ transformer of 2300V/230V rating has the primary and secondary   08
            winding resistance of 2Ω and 0.02 Ωrespectively. The iron losses equal to 412 watts,
            calculate the efficiency
            i)   At half load
            ii)   At full load, when the power factor of the load is 0.8

1

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Q.4   a)   Derive the emf equation of transformer and Define: 07
               i)   Transformation Ratio
               ii)   Turns Ratio

          b)   Define efficiency of transformer and derive the condition for maximum efficiency.   08

Q.5   Explain the following (any three)   15
               1)   Brushless DC motor
               2)   Sumpner's test
               3)   Three phase transformer and Bank of three single phase transformer
               4)   Stepper motor
               5)   Losses in transformer

Section B

Q.6   Attempt any five   10
               1)   State Flemings Right hand Rule
               2)   What are the different types of DC motor?
               3)   Explain the working principle of DC Generator.
               4)   What is the use of Dummy coil
               5)   A shunt generator delivers 450A at 230 V and resistance of shunt field wdg and Armature
                    are 50Ω and 0.03Ω respectively calculate generated emf.
               6)   What are the different losses in DC generator?
               7)   What is the necessity of starter?
               8)   What is the significance of Back emf.

Q.7   a)   Explain Armature Reaction in DC m/c with neat sketch.   08
          b)   What are the different characteristics for DC series motor explain.   07

Q.8   a)   What are the different power stages in DC generator?   08
               A long shunt generator running at 1200rpm supplies 22Kw at a terminal voltage of 220V
               the resistance of armature, shunt field and series field are 0.05, 110 and 0.06Ω resp the
               overall efficiency at the above load is 90% find
               i)   Cu losses
               ii)   Iron and friction loss
               iii) Torque exacted by prime mover

          b)   With neat sketch explain the different parts of DC motor.   07

Q.9   a)   With the help of neat diagram, explain the working of 3 point starter.   08
          b)   Derive emf equation of DC Generator.   07

2

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Q.10 Explain the following (any three) 15
   a) Causes of bad communication and remedies in DC machine.
   b) Armature windings in DC machine
   c) Swinburne test
   d) Solid state starters
   e) Parallel operation of DC generator

Total No. of Printed Pages:2

SUBJECT CODE NO: H-365
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Electrical Measuring Techniques
(OLD)

[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 the remaining questions of each section
            iii) Assume suitable data whenever required

Section A

Q.1   Solve any five of the following   10
      a) Define accuracy and precision
      b) What do you mean by drift and dead zone?
      c) The measured value of resistance is 10.35Ω where as its value is 10.20Ω determine the absolute error
      d) Explain the absolute instruments
      e) What is meant by limiting error?
      f) Why eddy current damping is not possible in moving iron instruments?
      g) Define quality factor
      h) What are the advantages of poly phase wattmeter

Q.2   a) Draw and explain generalized block diagram of instrumentation system with example   08
      b) The data related to the Balanced AC bridge is as below: 07
          Arm AB: R_1= 225Ω
          Arm BC: R_2= 150Ω in series with $C_2 = 0.55\mu f$
          Arm CD: Unknown
          Arm DA: R_3=100Ω in series with L=8MH
          The oscillator frequency is 1KHz
          Calculate the constants of arm CD

Q.3   a) Derive the expression for torque for a moving iron instrument.   08
      b) The coil of PMMC instrument has 42 turns and mean width of 2.5 cm of the axis length of the   07
          coil is 1.5cm if the flux density is 0.1 wb/m². Calculate the torque on moving coil for a current
          of 10 MA

Q.4   a) Derive the equation for power measurement in three phase system for unbalanced load using   08
          three wattmeter method
      b) At 3 phase, 440V motor load has a power factor of 0.8 lagging the two wattmeters connected   07
          to measure the power shows the input to be 30 KW. Find the reading an each instrument

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Q.5   Write short notes :   15
   a) Earth tester
   b) Dynamo meter type wattmeter
   c) Universal shunt

Section B

Q.6   Solve <u>any five</u> of the following   10
   a) What are the applications of CRO?
   b) What is difference between dual trance and dual beam CRO?
   c) What is mean by transducer?
   d) List the applications of capacitive transducers
   e) How does PT differs from power transformer?
   f) An energy meter designed to make 100 revolutions of disc for one unit of energy. Calculate no. of revolutions made by it when connected to load carrying 25A at 230V and 0.75 p.f. for an one hour
   g) What is strain gauge?
   h) Write the working principle of inductive transducers

Q.7   a) What are the different errors that occur in 1∅ conventional energy meters?   08
       b) A 230V, 50Hz, 1∅ energy meter has a constant of 200 rev/kwh. While supplying a non-   07
          inductive load of 5A at normal voltage. The meter completes 10 revolutions in 4 minutes.
          Calculate the percentage error of the instrument

Q.8   a) Explain the basic principle of inductive and capacitive transducer   08
       b) Explain the advantages and disadvantages of relation transducers   07

Q.9   a) What are errors in wattmeter? How they are compensated?   08
       b) Explain the connection diagram of CT and PT in circuit.   07

Q.10   Write short notes on: 15
   a) Resistive transducers
   b) Law p.f. wattmeter
   c) Universal shunt

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-366
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EE/EEE/EEP) (CGPA)
Electrical Measuring Techniques
(REVISED)

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

Please check whether you have got the right question paper.
N.B   i) Q.1 and Q.6 are compulsory.
             ii) Attempt any two questions from remaining in each section.
             iii) Assume suitable data, if necessary.

Section A

Q.1   Solve any five of the following   10

             (i)   Define reproducibility and Drift.
             (ii)   What do you understand by calibration of an instruments.
             (iii)   A meter reads 137.50 V and true value of voltage is 137.45V.
                      Determine (a) Static error   (n) the static correction for this instrument.
             (iv)   What are different sources and detectors used in a.c. bridges
             (v)   What is the difference between accuracy and precision?
             (vi)   Ordinary Wattmeters cannot be used to measure power in circuits having low p.f….
                      why?
             (vii)   Draw a general network of ac bridge and obtain equation at balance.
             (viii)   In a particular measurement the wattmeter readings were found to be 5000W and
                      1000W.
                      Calculate power and p.f.

Q.2   (a) Describe construction and working of moving iron type of instruments.   08
             (b) A permanent magnet moving coil instrument has a coil of dimensions 15mm x 12mm. The   07
             flux density in the air gap is 1.8×10^{-3} Wb/m^2 and Spring constant is 0.14×10^{-6} Nm/rad.
             Determine the number of turns required to produce angular deflection of 90 degrees. When
             a current of 5mA is flowing through the coil.

Q.3   (a) Explain construction and working of Megger   08
             (b) A bridge consist of the following   07
             Arm ab- a choke coil having resistance R_1 and inductance L_1
             Arm bc – a non inductive resistance R3
             Arm cd – a mica condenser C_4 in series with a non-inductive resistance R_4.
             Arm da – a non inductive resistance a R2 when this bridge is fed from a source of 500 Hz,
             balance is obtained when R_2=2410Ω, R_3 = 750 Ω, C_4=0.35 μF and R_4=64.5 Ω. The series
             resistance of capacitor is = 0.4 Ω. Calculate the resistance and inductance of choke coil.

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Q.4   (a) Describe construction and working of electrodynamometer type of Wattmeter   08
       (b) A Wattmeter has a current coil of 0.03 Ω resistance and a pressure coil of 6000 Ω resistance   07
           Calculate the percentage error if the wattmeter is so connected that
           (i)   The current coil is on the load side
           (ii)   The pressure coil is on the load side

Q.5   (a) With the help of neat diagram, Explain working of 'Andersons Bridge' to measure   08
           inductance.
       (b) Explain use of shunts and multipliers for extension of range of ammeters and voltmeters.   07

Section B

Q.6   Answer the following (Any five)   10

       i)   What is turns compensation and why is it done
       ii)   What are the limitations of Oscilloscope?
       iii)   What is the effect of shaded band and energy meters?
       iv)   What is the difference between transducer and inverse transducer
       v)   What are Lissajous pattern?
       vi)   Wrote applications of CRO.
       vii)   What is phase angle error of potential transformer
       viii)   What are advantages of Electrical transducers?

Q.7   (a) Explain the sources of errors in single phase Energymeter   08
       (b) An energy meter is designed to make 100 revolutions of disc for one unit of energy.   07
           Calculate the number of revolutions made by it when connected to load carrying 40A at
           230V and 0.4 p.f. for an hour. If it actually makes 360 revolutions find percentage.

Q.8   (a) Draw block diagram and explain working of dual beam CR.O.   08
       (b) With the help of suitable example, explain working principle of inductive and capacitive   07
           transducer.

Q.9   (a) Explain two-Wattmeter method of power measurement in three-phase circuit for   08
           unbalanced load.
       (b) What are advantages of instrument transformers over shunts and multipliers?   07

Q.10   (a) What are errors in potential transformer and how are they reduced?   08
       (b) Explain method of reactive power measurement in single phase circuit.   07

Total No. of Printed Pages:2

SUBJECT CODE NO: H-435
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EE/EEE/EEP) (CGPA)
Elective - I Electrical Engineering Materials
(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 form the remaining form each section

Section A

Q.1   Attempt any five   10
    1)   Define magnetization
    2)   Define photoconductivity
    3)   State application of SF_6 gas
    4)   State properties of good solid insulating material
    5)   What is dielectric constant?
    6)   Define Di-magnetism and Para-magnetism
    7)   What is Polarizability?

Q.2   a)   Explain construction, working and application of photoemissive cell.   08
       b)   Differentiate between pyro-electric and ferro-electric materials with examples   07

Q.3   a)   What are the criteria for selecting of Insulating material for cables? Explain with neat diagram   08
       b)   Discuss the properties, application and nature of varnish and transformer oil.   07

Q.4   a)   List and explain factor affecting Breakdown strength of Gaseous Insulating material in detail?   08
       b)   Explain primary and secondary Ionization process in gases?   07

Q.5   Write short notes on   15
       i)   Oriental polarization
       ii)   Soft magnetic material
       iii)   Magnetic Recording material
       iv)   P.V. Cell
       v)   Material used for Insulation

Section B

Q.6   Solve any five   10
       a)   State properties of good conductor
       b)   State applications of Nano-tubes
       c)   Define energy band
       d)   State working principle of thermocouple
       e)   What is alloying?
       f)   Why carbon is preferred for brushes in Electric machines?

1

Q.7   a)   With diagram explain carbon capacitor tubes and Nano-wires   08
      b)   Explain application of Nano-materials   07

Q.8   a)   State and explain various material used for lamp filament and fuse   08
      b)   Explain the material used for transmission line   07

Q.9   a)   How to measure partial discharge-IS 13585-1994   08
      b)   Explain Testing of High Voltage cables   07

Q.10   Write a notes on (<u>any three</u>)   15
      a)   Tungsten and magnin
      b)   Super conductivity
      c)   Molecular machines
      d)   Single electron transistor

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-444
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE)
Electrical Engineering Materials
(OLD)

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

Please check whether you have got the right question paper.
N.B   1) Q.1 from Section A and Q.6 from Section B are compulsory.
              2) Attempt any two questions from the remaining each section.
              (Total 4) + Q.1 + Q.6 = 6 Grand Total

Section A

Q.1   Solve any five   10

     (a) Define permeability and permitivity
     (b) What do you mean by polarization Enlist it's types
     (c) Write the clausius Mossotti Equation and name each term in it.
     (d) How insulating materials are classified on the basis of temperature. Give its classification.
     (e) Define susceptibility.
     (f) State properties of SF6 gas.
     (g) State the factors affecting breakdown strength.

Q.2   (a) Explain principle, construction, working and application of PV cell.   08
     (b) What is dielectric loss? Derive the expression for loss tangent. Give its significance.   07

Q.3   (a) Draw magnetization curve and explain ferromagnetic behavior below critical temperature.   08
     (b) Explain Antiferromagnetism. How it will be differ from Ferromagnetism.   07

Q.4   (a) A parallel plate capacitor 0.18 x 0.20 m^2 in area are separated by dielectric of thickness   08
       0.04m and dielectric constant is 6.4. The capacitor is so formed is connected across 600 ac
       supply. Calculate i) Capacitance of capacitor ii) Charge on plate of capacitor (iii) Electric
       field intensity (iv) Energy stored.

     (b) State and explain insulating material used for power and distribution transformer.   07

Q.5   Solve any three   15

     (a) Transformer oil & its application
     (b) Micanites& its properties
     (c) Ceramics & its types
     (d) Photo emissive cell.

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Section B

Q.6   Solve any five   10

        (a) State properties and applications of Eureka
        (b) State properties and applications of Aluminum.
        (c) Define partial Discharge.
        (d) What are the nanowires & its application?
        (e) Define superconductivity.
        (f) What is necessary of fuse and its type?
        (g) What is mean by thermal bimetal?

Q.7   a) What should be the desirable properties required for transmission line material. Explain it in   08
            detail.
        b) What is carbon nanotubes and explain its application in detail.   07

Q.8   a) Measurement of loss tangent of dielectric loss angle by using Schering Bridge   08
            IS 13585-1994. Explain.
        b) Measurement of flux density by Gauss Meter. Explain.   07

Q.9   a) Explain the properties and application of conducting material like   08
            i)   Nichrome
            ii)   Silver
            iii)   Tungsten
            iv)   Nickel-chromium alloy.
        b) Explain the procedure for measurement of breakdown strength of Gaseous insulating material. 07

Q.10   Attempt any three   15

            (a) Thermocouple
            (b) Concept of Energy band
            (c) Single Electron transistor
            (d) Material used for lamp filament

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-281
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Analog and Integrated Circuits
(REVISED)

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

Please check whether you have got the right question paper.

N.B
1. Question No.1 and Q. No. 6 are compulsory.
2. Attempt from each section any two Questions from the remaining question.
3. Assume suitable data where necessary.

Section A

Q.1   Answer any five   10
1. What is peak detector?
2. Define CMRR?
3. What is BICMOS?
4. List the applications of instrumentation amplifier?
5. Draw pin diagram of IC 555
6. In which two modes IC 555 timer operates?
7. What is voltage transfer curve of an op-amp?
8. List the ac and dc parameters of op-amp?

Q.2   a) Explain with circuit diagram concept of virtual short and virtual ground concept?   07
       b) What are the compensation techniques of op-amp. Explain noise and frequency   08
          compensation?

Q.3   a) What is zero crossing detectors explain with circuit diagram and output wave forms?   07
       b) Explain operation of mostable multivibrator using IC 555. With circuit diagram and   08
          output wave forms.

Q.4   a) Explain application of op-amp as a differentiator with neat circuit diagram and output   07
          wave forms.
       b) Explain working of square wave generator with circuit diagram & output wave forms.   08

Q.5   Write short notes on (any three)   15
1. Schmitt trigger using op-amp
2. Low voltage ac and dc voltmeter
3. Precision rectifier
4. Instrumentation Amplifier.

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Section B

Q.6   Solve any five   10
1. What is band reject-filter?
2. State applications of PLL?
3. Define voltage regulator?
4. What is PLL?
5. What is switching regulator?
6. What is all pass filter?
7. Define frequency response of filter.
8. List most commonly used active filters?

Q.7   a) Explain the difference between band-pass and band reject filters?   07
b) With neat circuit diagram describe the working of high pass active filter?   08

Q.8   a) Explain application of PLL as frequency demodulation?   07
b) Describe the operating principle of PLL with block diagram.   08

Q.9   a) Describe the function of voltage regulator IC 723 with pin diagram?   07
b) Explain the circuit diagram of basic op-amp series voltage regulator.   08

Q.10   Write short notes on (any three)   15
1. Passive filters
2. Switching regulator IC78S40
3. ICLM565 PLL
4. Butterworth filter.

Total No. of Printed Pages:5

SUBJECT CODE NO:- H-174
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Network Analysis
(REVISED)

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

Please check whether you have got the right question paper.

N.B
1. Use & assume suitable data if required.
2. Q.No.1 from section A & Q.No.6 Section B are compulsory.
3. Solve any two questions from the remaining questions in each section A & B.

Section A

Q.1   Solve any five: 10
a) Define Mutual Inductance.
b) Define convolution integral.
c) Explain linear & nonlinear circuit elements.
d) Sate the Superposition's Theorem.
e) Replace the circuit into single current source and resistor.
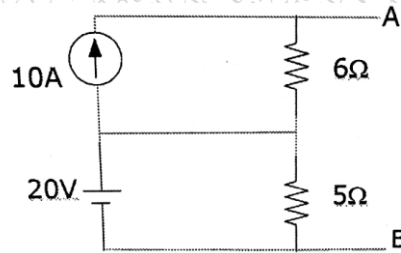
f) Explain dependent & independent sources & their types.
g) Find Laplace transform of Unit ramp function.
h) Give the principal of Duality.

Q.2   a) Find the current through 10Ω resistor by using super-mesh analysis.   05

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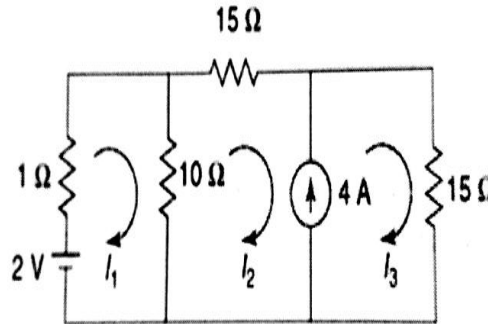
b) Determine the voltage across 2Ω impedance. 05
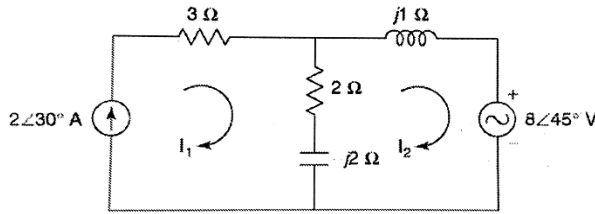
c) Find the voltage V_1 & V_2 in the circuit using nodal analysis. 05
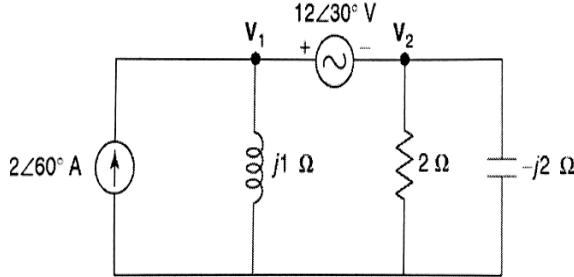
Q.3   a) State & explain Millman's Theorem in details along with example. 05
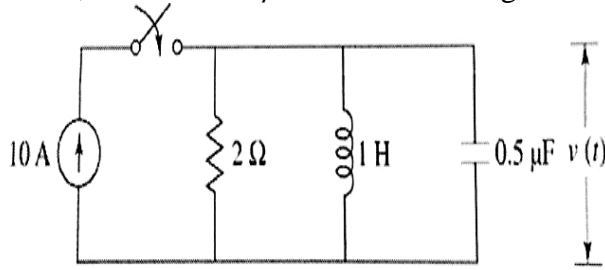
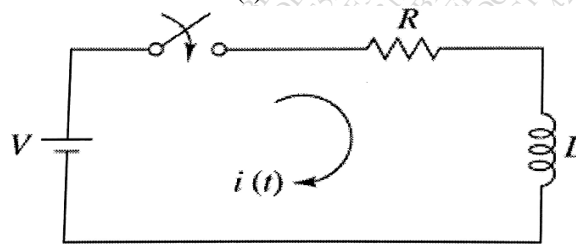b) Determine the voltage across $(2 + j5)\Omega$ impedance. 05
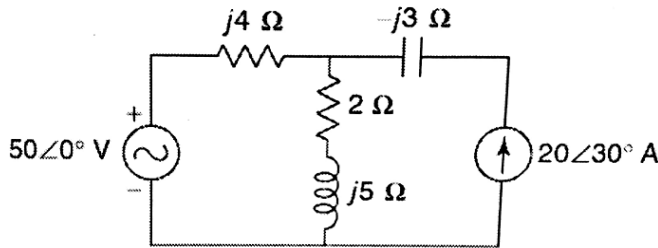
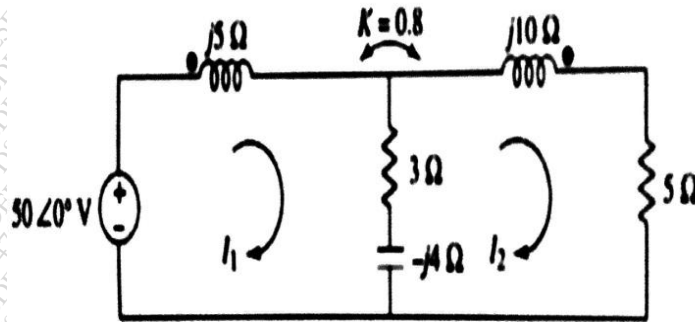c) Obtain Thevenin's Equivalent circuit for terminal A & B. 05

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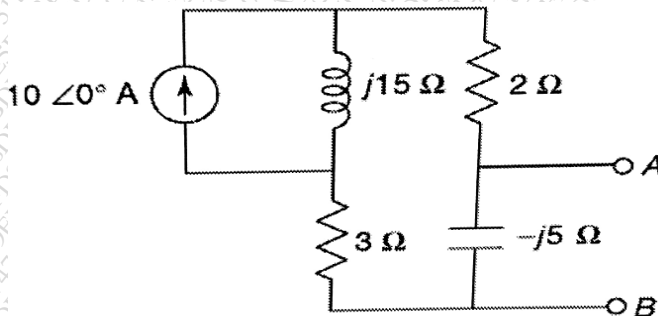
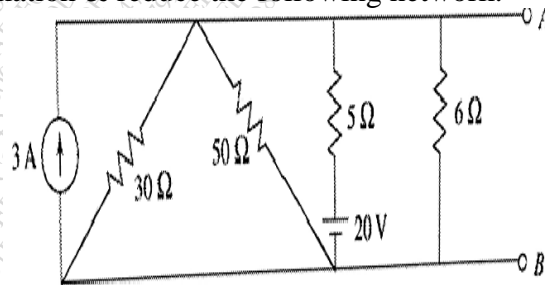Q.4   a) Find v, dv/ dt & $d^2v/\ dt^2$ for following circuit.   08

    b) With help of Laplace transform find i(t)   07

Q.5   a) Find the voltage across 5Ω resistor.   07

   b) Explain Source transformation & reduce the following network.   04

    c) Explain Source shifting in detail along with example.   04

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Section B

Q.6   Solve any five: 10
   a) Write application of Laplace transform.
   b) What is reactive power? Give its physical significance.
   c) Write open circuit impedance (Z) parameters of two port network.
   d) Define Fourier coefficients.
   e) Write Transmission Parameters & their equations.
   f) What is reactive power? Give its physical significance.
   g) What is Fourier series & what are the application of Fourier transform.
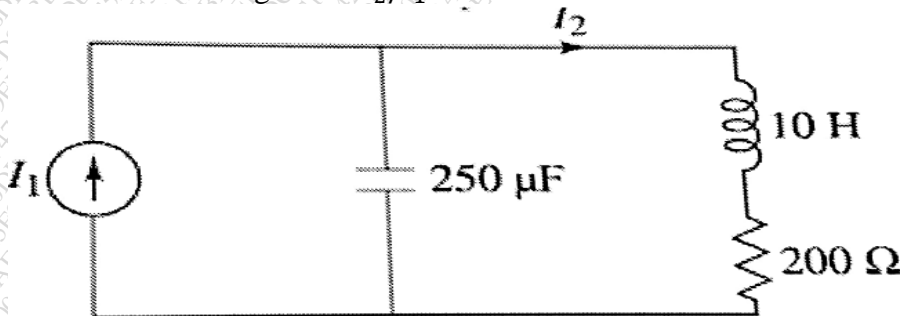   h) Explain restrictions on Pole and Zero Location for transfer functions.

Q.7   a) Find Poles & Zeros of the impedance of the given network & plot them on s-plane.   08

$Z(s) \longrightarrow$ 1 F   2 Ω $\frac{1}{2}$ H
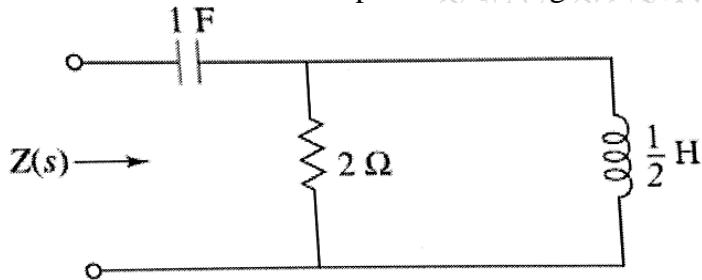
   b) Determine Transfer Function V_2/V_1 07

I_1 s V_a s I_b V_b $I_2 = 0$ V_1 2   2 V_2
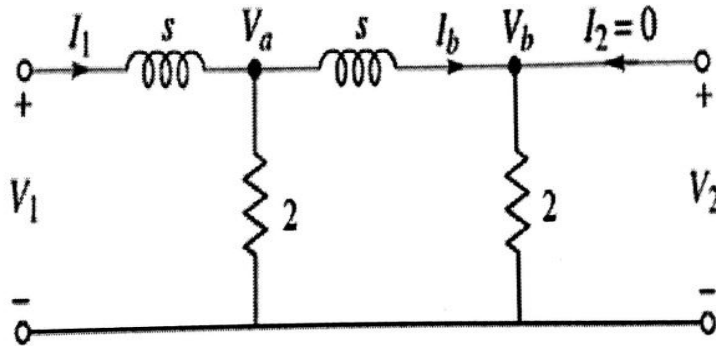
Q.8   a) Draw Pole zero diagram of I_2/I_1.   05

I_2 I_1 250 μF   10 H   200 Ω

   b) State the limitation on pole & zero location in transfer function of two port network.   05

4

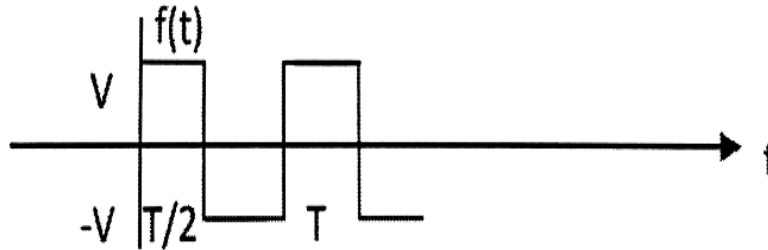c) Explain Insertion Loss in detail   05

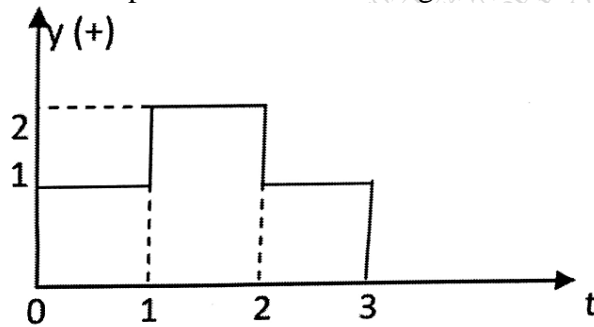Q.9   a) Find Fourier Coefficient of following waveform.   05

b) Find the Laplace transform of the given waveform.   05

c) Explain in brief concept of even and odd functions.   05

Q.10   a) Derive the concept of the reciprocity for z parameters.   08

b) Find the Fourier series for square wave defined as $f(t) = +A \quad 0 < t < T/2$ 07
$$= -A \quad T/2 < t < T$$

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