Code No.: **30111/40111**

MR13/ MR14

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Structural Analysis-I**

Branch: **CE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. What is a perfect frame?
2. Define Linear Arch.
3. What is the degree of indeterminacy of a propped cantilever beam?
4. Write the Three moment equation?
5. Define influence line diagram.

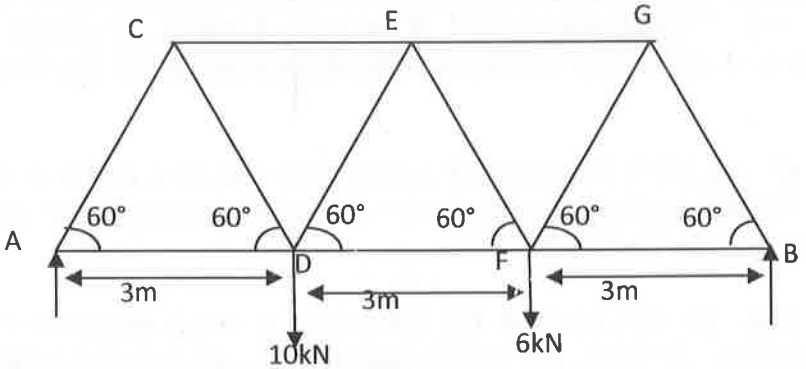
II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. What is mean by pin jointed frame? What are the assumption made in analysis of pin jointed frames?
2. What is the difference between 3 hinged arch and 2 hinged arch?
3. What are the advantages of arch?
4. State and explain castigliano's theorem I?
5. Write down the expression for deflection of propped cantilever beam carrying UDL on its entire span?
6. Differentiate statically determinate and indeterminate beams?
7. What is the effect of sinking of a fixed support in a fixed beam and write down the expression for sinking support?
8. What do you understand by distribution factor in moment distribution method?
9. What is the basic assumption made in slope deflection method?
10. Draw Influence lines for support reactions in a simply supported beam?

PART-B

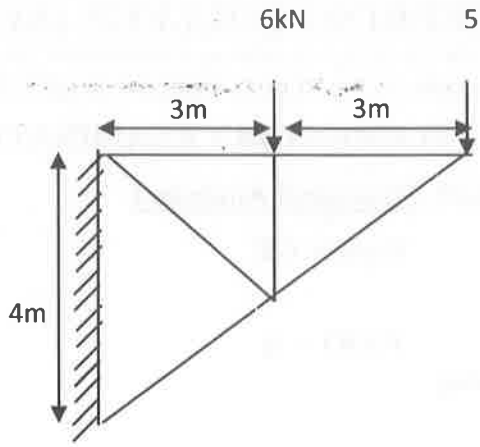
Answer ALL questions of the following **5x10 Marks= 50Marks**

1.A simply supported, pin jointed frame contains equilateral triangles is loaded at the lower panel joints as shown in figure. Find the forces in the members CE, DE, EF, DF using method of sections.



OR

2. Using the method of tension coefficients Analyze the cantilever plane truss shown in figure. and find the member forces.



3 .a) A cantilever beam is subjected a uniformly distributed load of 'w' per meter run throughout its span. Find the deflection at the free end of a cantilever at the free end using strain energy method.

b) A simply supported beam carries a point load P eccentrically on the span. Find the deflection under the load using strain energy method.

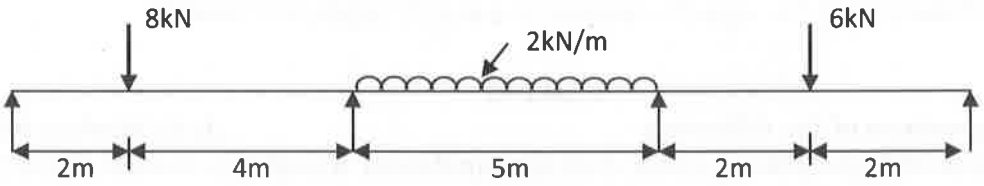
OR

4. A three hinged parabolic arch ACB of span 30 m has its support at depth 4 m and 16 below crown hinge C. The arch carries a point load of 60 kN at a distance of 5 m from C and a point load of 120 kN at a distance of 10 m from C. Find the reactions at supports and bending moment under the loads.
5. A fixed beam AB of uniform section of span 6 m. The beam subjected a uniformly distributed load of 15 kN/m over its entire span and a point load of 30 kN at mid span. Determine the fixed end moments at the ends and the reaction. Draw BMD and SFD. Determine deflection under the point load.

OR

6. Analyze a propped cantilever 'AB' of 10 span subjected to two point loads and prop is at 'B'. A point load 50 kN acting at C which is at 3 m distance from fixed end 'A'. Another point load 100 kN is acting at a distance of 6 m from 'A'. Draw Shear force diagram and Bending moment diagrams.

7. Analyze the continuous beam shown in figure by Clapeyron's theorem of three moments. Draw BMD and SFD. Assume EI is constant.



OR

8..A continuous beam ABC covers two consecutive spans AB and BC of length 5 m and 6 m, carrying loads of 10 kN/m and 15 kN/m respectively. If the ends A and B are simply supported, find the support reactions at A, B and C. Use Moment distribution method. Draw the shear force and bending moment diagram.

9. Two loads of 200 kN and 250 kN spaced at 5 meters apart crosses a girder of 25 meters span from left to right with 200 kN leading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values.

OR

10.A system of four loads 80, 160, 160 and 120 kN crosses a simply supported beam of span 25 m with 120 kN load leading. The loads are equally spaced at 1m. determine the values of the following using influence lines:

i) maximum bending moment at a section 10 m from left support and

ii) absolute maximum shear force and bending moment in the beam.

Code No.: 30108/40108

MR13 & MR14

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: Hydraulics & Hydraulic Machinery

Branch: CE

Time: 3 hours **Max. Marks: 75**

PART-A

I. Answer ALL Questions of the following **5x1M=5M**

1. What is the major force that is responsible for the flow to happen in an open channel flow?
2. What is omitted variable in model studies?
3. A nozzle is plugged at end of a pipe. What is the flowing jet energy at nozzle?
4. How do you control the sudden rise of pressure in penstock pipe?
5. How do you estimate the hydro power potential?

II. Answer ALL Questions of the following **10x2M=20M**

1. What is energy correction factor? Why do we apply this correction factor?
2. Draw velocity distribution for a concave curve flow?
3. What is the selection criteria of repeating variables in Buckingham pi method
4. A model airplane is test in laboratory. What model law you apply and what is the equation?
5. Water jet is striking at splitter of a bucket in pelton wheel turbine. Draw inlet velocity triangle.
6. What is the purpose of governors in Hydel stations?
7. What is cavitation?
8. Draw iso efficiency curve for a turbine? Indicate maximum and minimum efficiency points.
9. What is impeller? In what way, it is different from runner.
10. what is design head and design discharge in centrifugal pump? Draw a graph and indicate them

PART-B

Answer ALL Questions of the following **5x10M=50M**

1. (a) Derive an expression for the discharge through open channel flow using Chezy's formula?
   (b) A trapezoidal earthen channel 10 m base and side slopes of 2:1 carries water for irrigation purpose. The height of free surface of water above the bed is 5 m. The bed slope to the ground is 1 in 2000. Use Chezy's formula for finding discharge and use Manning's formula for finding Chezy's constant?

OR

2. (a) Define back water curve and derive an expression for finding the length of back water curve.
   (b) A rectangle channel of 6 m wide with a bed slope of 1 in 2000 carrying water with a depth of 1m. A dam was placed across the channel increasing the depth of flow at the dam to 1.4 m. Find the depth of flow at 150 m upstream of the dam.

3 (a) Define Reynold and Froude number, find expressions for them. Explain their significance in fluid flow problems.

(b) A model of an airplane is 1 in 40 of prototype is tested in water and found the pressure loss of $8x10^5$ N/m^2. Find pressure drop in prototype. Density of air and water are 1.24 kg/m^3 and 1000 kg/m^3.

OR

4 (a). Sate Buckingham pi theorem? What are the advantages of dimensional analysis?

(b) A model boat, 1 in 50 of its prototype experienced 0.2 N of resistance when simulating a speed of 5 m/s prototype. Find the corresponding resistance of the prototype considering resistance at free surface only. Water is used for model as well as prototype also.

5 (a) Develop a momentum equation for work done when jet of water flows over a radially fixed vane.

(b) A horizontal jet of water 100 mm dia, moving with a velocity of 15 m/s strikes a vertical fixed plate. Calculate the force exerted by the jet on plate. What would it be if the jet were issuing under pressure head of 24 m of water? Neglect losses in nozzle.

OR

6 (a) Prove that force of impact of water jet on semicircular vane is two times the force on a flat plate.

(b) A water jet when strikes to a symmetrical moving blade which is moving with a velocity of 20 m/s is deflected through an angle of 150^0. The quantity of water issued through a nozzle of 25 cm^2 is 0.1 m^3/s. Find the power developed and velocity of water leaving the blade.

7 (a) write a short note on Francis turbine and describe its construction and working principle.

(b) A hydraulic turbine develops 5000 kw power when running at 240 RPM under a head of 220 m. Assuming overall efficiency of 80%, find out unit speed, unit discharge, and unit power.

OR

8 (a) Explain how Kinetic energy is converted to pressure energy by increasing cross section of draft tube? What are the advantages of a draft tube.

(b) Calculate the number of jets required and their dia for a pelton wheel which is to develop 12000 Kw under a head of 410 m when running at a speed of 600 RPM. Assuming jet dia is not to exceed 0.10 of the wheel dia. Take coefficient of velocity of the jet as 0.98, the peripheral velocity of the wheel 0.46 times the velocity of the jet and efficiency of turbine as 87%.

9 (a) State different types of heads in centrifugal pumps and differentiate between them.

(b) A centrifugal pump delivers 0.04 m^3/s of water against total static head of 20 m. The total pipe length (suction + delivery) is 100 m and dia is 10 cm. Find the power required to drive the pump taking overall efficiency as 75%. Take friction factor as 0.05

OR

10 (a) Classify the hydro power plants? Sketch and indicate all the components of a hydel plant.

(b) Explain characteristic curves of a pump? What are its uses?

Code No.: **30M10/40M05**

MR13 & MR14

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Probability & Statistics**

Branch: **CE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Write any two applications of Normal Distribution
2. Define the regression lines of X on Y and Y on X.
3. Define i) Parameters ii) statistics.
4. Define (M/M/1) : (N/FIFO) model
5. Define markov chain.

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. If X is a poisson variate such that P(X=1) = 24 P (X=3) then find P(X=0).
2. Derive the mean of Normal distribution.
3. Define Joint Probability mass function.
4. Write the formula for covariance between two continuous random variables.
5. Describe the Procedure involved in Testing of hypothesis.
6. State some applications of chi-square distribution
7. Define Pure Birth and Death process.
8. Arrival rate is 10 per day service rate is 16 per day .The consists of 8 working hours find expected idle time per day.
9. Show that the transition probability matrix of markov chain $\begin{bmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{bmatrix}$ is irreducible
10. Which one of the following matrices are regular a) $\begin{bmatrix} \frac{1}{3} & 0 \\ \frac{1}{3} & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. A random variable X has the following probability function:

X_i	-3	-2	-1	0	1	2	3
$P(X_i)$	K	0.1	K	0.2	2K	0.4	2K

Find i) K ii) Mean iii) Variance

OR

2. The guaranteed average life of a certain type of electric light bulbs is 1000hours with a standard deviation of 125 hours. It is decided to sample the output so as to ensure that 90percent of the bulbs do not fall short of the guaranteed average more than 2.5 percent. What must be the minimum size of the sample?

3. From the following data calculate the rank correlation coefficient after making adjustment for tied ranks

X	48	33	40	9	16	16	65	24	16	57
Y	13	13	24	6	15	4	20	9	16	19

OR

4. The following table gives the score obtained by 11 students in English and Telugu Translation. Find the rank correlation coefficient

Scores in English	40	46	54	60	70	80	82	85	85	90	95
Scores in Telugu	45	45	50	43	40	75	55	72	65	42	70

What inference would you draw from the estimate?

5. The means of simple samples of sizes 1000 and 2000 are 67.5 and 68.0 cm respectively. Can the samples be regarded as drawn from the same population of S.D.2.5 cm.

OR

6. An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level of significance.
7. At a railway station, only one train is handled at a time. The railway yard is sufficient only for two trains to wait while other is given signal to leave the station. Trains arrive at the station at an average rate of 6 per hour and the railway station can handle them on an average 12 per hour. Assuming poisson arrivals and exponential service distribution, find the steady state probabilities for various number of trains in the system. Find also the average waiting time of a new train coming into the yard.

OR

8. Assume the goods trains are coming in a yard at the rate of 30 trains per day and suppose that inter arrival time follows an exponential distribution .The service time per each train is assumed to be exponential with an average of 36 minutes. If the yard can admit 9 trains at a time, calculate the probability that e yard is empty and find the average queue length.
9. A fair die is tossed repeatedly. If Xn denotes the maximum of the numbers occurring in the first n tosses, find the transition probability matrix P of the markov chain {Xn },find P^2 and $P(X_2=6)$.

OR

10. a) Let X_1, X_2..... be independent random variables such that $P\{X_i = j\} = \alpha_j, j \geq 0$. Note that a record occurs at time n if $X_n > \max(X_1, X_2.....X_{n-1})$, where $X_0 = -\infty$, and if a record does occur at time n call X_n, the record value. Let R_i denote the i^{th} record value.

    b) Let T, denote the time between the i^{th} and $(i+1)^{th}$ record. Is $(T_i, i\geq 1)$ a Markov chain? Compute its transition probabilities where appropriate.

Code No.: 30110/40110 | MR13 & MR14

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Strength of Materials-II**

Branch: **CE**

Time: 3 hours **Max. Marks: 75**

PART-A

I. Answer ALL questions of the following **5 x 1M=5 M**

1. Write torque equation.
2. What is equivalent length of column?
3. Define core of a section
4. Name the stresses set up in thin cylinders subjected to internal fluid pressure.
5. Define neutral axis in unsymmetrical bending.

II. Answer ALL questions of the following **10 x 2M=20 M**

1. Write the equations for shear stress, angle of twist, stiffness, Energy stored in closed coil Spring subjected to axial load.
2. write the equation for maximum torque transmitted by circular solid shaft.
3. What is meant by eccentric loading? Explain its effect on short column
4. What are the end conditions for a long column?
5. Show the forces acting across the section of rectangular dam.
6. State middle third rule.
7. What are the different methods of reducing hoop stresses'?
8. Write the expression for radial pressure and Hoop stress for thick cylindrical shell.
9. What is the principle involved in locating shear centre?
10. What are the assumptions made in deriving the stresses due to unsymmetrical bending?

PART-B

Answer ALL questions of the following **5 x 10 M=50 M**

1. An open coil helical spring made of 10mm dia wirc has 15 coils of 50mm radius with 20 degree angle of helix. Determine the deflection of the spring when subjected to axial load 300N. Take E=200Gpa, C=80Gpa.

OR

2. Find the angle of twist per metre length of a hollow shaft of 100 mm external diameter and 60 mm internal diameter, if the shear stress is not to exceed 35MPa. Take modulus of rigidity G= 85GPa.

3. Derive the formula for maximum stress if the strut pined at both the ends subjected to an axial thrust P and transfers point load W at the centre.

OR

4. A load of 75 kN is carried by a column made of cast-iron. The external and internal diameters are 200 mm and 180 mm respectively. If the eccentricity of the load is 35 mm. Find (i) the maximum and minimum stress intensities. (ii) Upto what eccentricity there is no tensile stress in the column.

5. A concrete dam of rectangular section 15m high, 6m wide contains water upto a height of 13m. Find:(a)Total pressure on lm length of the dam. (b)The point where the resultant cut the base. (c)Maximum and minimum intensities of stress at the base. Assume weight of concrete as 25KN/m^3.

OR

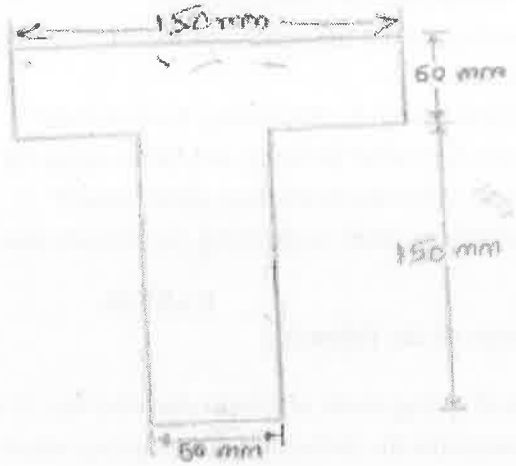
6. A square chimney 24 m high has an opening of 1.25 m x 1.25 m inside. The external dimensions are 2.5 m x 2.5 m. The horizontal intensity of wind pressure is 1.3 kN/m^2 and the unit weight of masonry is 22 kN/m^3. Calculate the maximum and minimum stress intensities at the base of chimney.

7. Derive the expression for initial difference in radii at the junction of a compound cylinder for shrinkage.

OR

8. A cylindrical shell 3m long which is closed at on ends has an internal diameter of lm and a wall thickness of 15mm. Calculate the hoop and longitudinal stresses induced and also change in dimensions of the shell if it is subjected to an internal pressure of 2N/mm^2. Take E=200KN/mm^2 and Poisson's ratio = 0.3.

9. A beam is of T-section as shown in Fig. The beam is simply supported over a span of 4 m and carries a uniformly distributed load of 1.7 kN/m run over the entire span. Determine the maximum tensile and maximum compressive stress.



OR

10. A beam of rectangular section 100mm x 120mm deep is subjected to a BM of 900KN-mm, the trace of the plane of loading being at right angles to one of the diagonals. Locate the neutral axis of the section and determine the maximum bending stress induced in the section.

Code No.: 30230/40230

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Basic Electrical And Electronics Engineering**

Branch: **Common to CE & MINING**

Time: 3 hours **Max. Marks: 75**

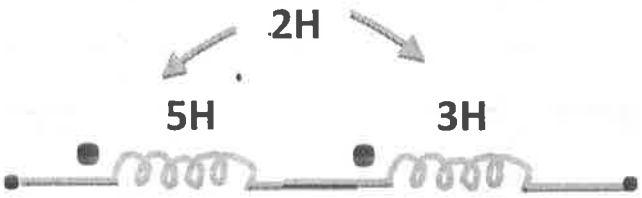
PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Give the relation between power and Energy.
2. Define reluctance.
3. What is the function of pole shoe in DC machine?
4. Draw the circuit diagram of bridge rectifier.
5. Define sensitivity.

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Explain Faradays laws of electromagnetic induction.
2. State Reciprocity theorem.
3. Find the equivalent inductance in the following circuit.

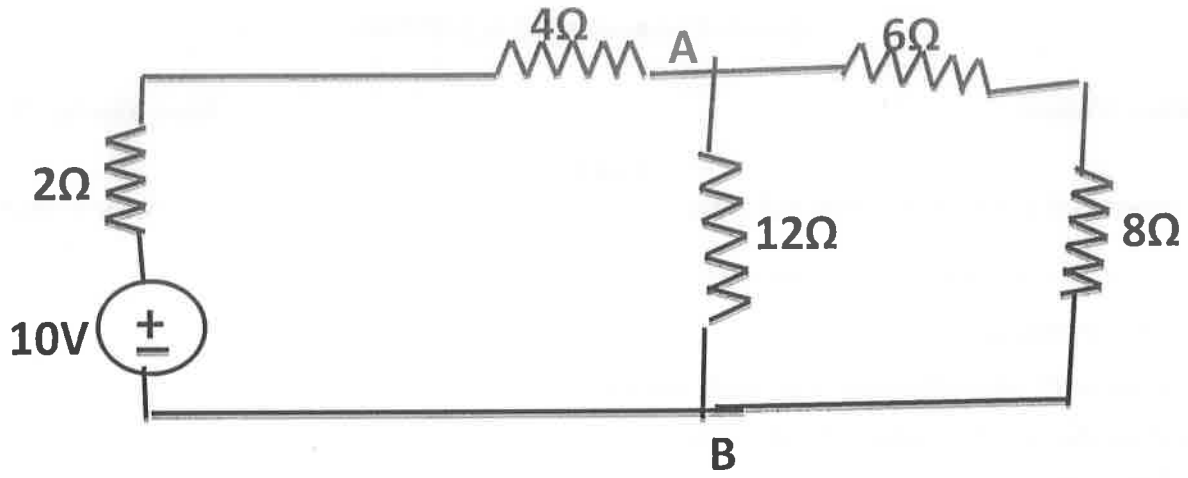


4. How does the change in frequency affect the operation of a given transformer?
5. Explain the importance of back emf in DC motor?
6. Explain the need of starter for starting a DC motor.
7. Mention the values of Ripple factor for half wave and full wave rectifiers.
8. Explain the amplification action of transistor.
9. Write the conditions for oscillations?
10. Draw the circuit diagram of RC Phase shift Oscillator and formula for frequency of oscillations.

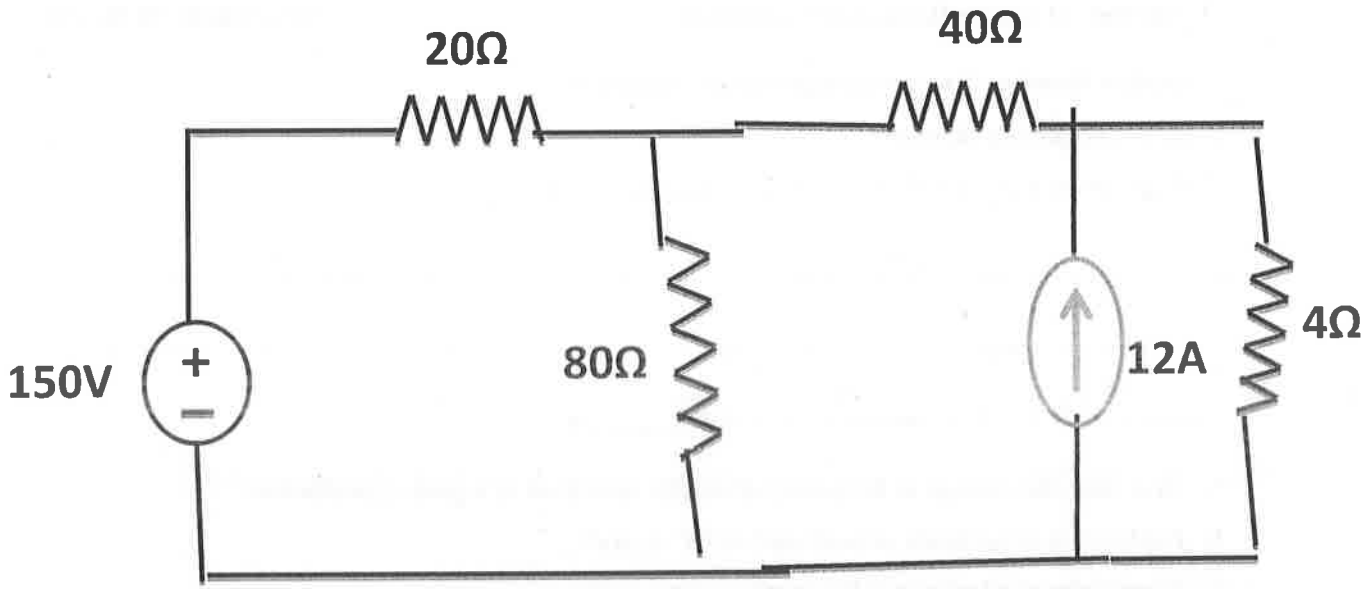
PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

Q1. a). Verify the Reciprocity Theorem with respect to AB. (5M)



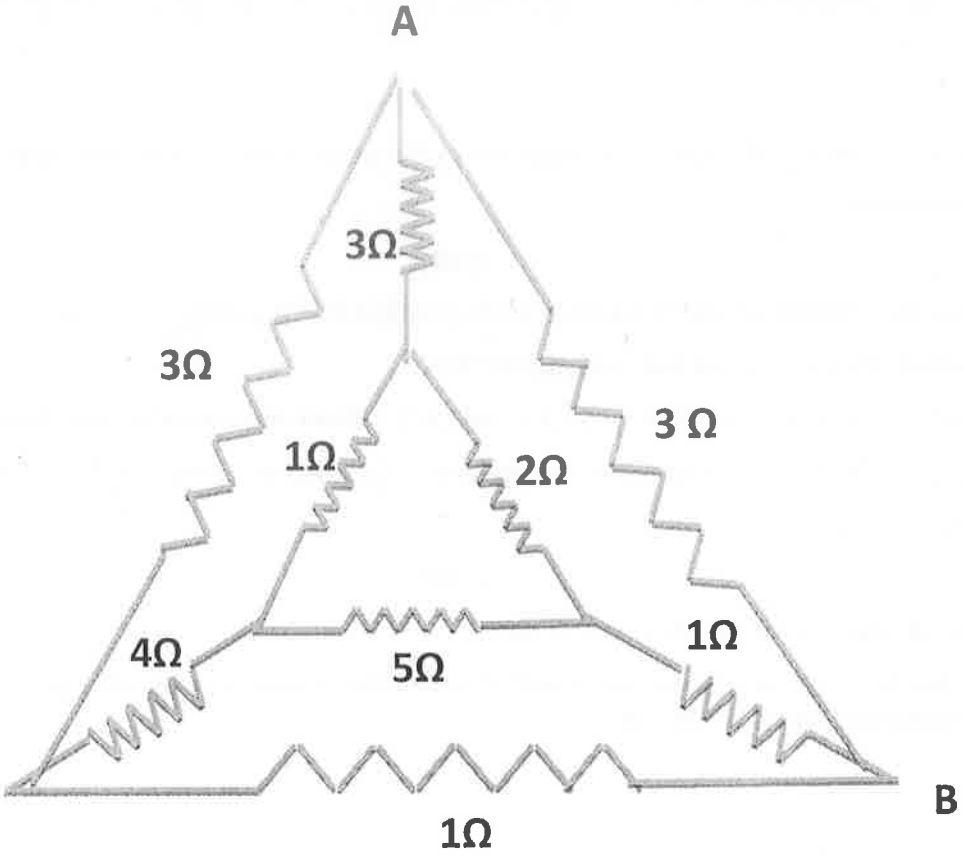
b). Find the current through 4 Ω resistor by using super position theorem. (5M)



(OR)

Q2. a). Explain Ideal and practical energy sources. (5M)

b). Find the equivalent resistance across AB for the network shown below. (5M)



Q3. a). Write the analogy between electric and magnetic circuits. (5M)

b). The following results were obtained from tests on 30 KVA, 3000/110 V, and transformer

O.C. test: 3000V, 0.5 A, 350 W

S.C. test: 150 V, 10 V, 500 W

Compute the efficiency of the transformer at full load with 0.8 lagging power factor. (5M)

(OR)

Q4. a). Briefly explain the importance of coupling coefficient. (3M)

b). A single phase transformer has a turn ratio of 6. The resistance and reactance of primary winding are 0.9Ω and 5Ω respectively and those of the secondary are 0.03Ω and 0.13Ω respectively. If 330 V at 50 Hz be applied to the high voltage winding with the low-voltage winding short circuited. Find the current in the low-voltage winding and its power factor. Neglect magnetizing current. (7M)

Q5. a). The armature of a 4 pole, lap-wound 220V DC generator has 500 conductors and runs at 1200 RPM .calculate the flux/pole at no load. (5M)

b). What are the various losses of dc motors? (5M)

(OR)

Q6. a). Derive the expression for torque developed in the armature of a DC motor. (5M)

b). Discuss any two methods for speed control of a DC shunt motor in detail. (5M)

Q7. Draw the circuit of a BJT in C.E configuration and explain about the input and output characteristics. (5M)

(OR)

Q8. Explain the construction and working of an SCR with relevant graphs. (5M)

Q9. a). Explain the construction and working of CRO. (6M)

b).Hartley oscillator is designed with L1 = 2mH, L2 = 20μH and a variable capacitance. Determine the range of capacitance values if the frequency of oscillation is varied from 2050 KHz to 3050 KHz. (4M)

(OR)

Q10 a). Briefly explain the Barkhausen criterion. (4M)

b). Classify various oscillators based on O/P waveforms, circuit components, operating frequencies and feedback used. (6M)