

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

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

**II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: **STRENGTH OF MATERIALS-II**Branch: **CE**Time: **3 hours**Max. Marks: **75****PART – A****I. Answer ALL questions of the following****5x1M=5 M**

1. Define polar moment of inertia.
2. What is equivalent length of column?
3. What are the dam failures?
4. Core of a circular section is a \_\_\_\_\_.
5. Point of location of shear centre for angle section is \_\_\_\_\_.

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

1. Define polar modulus of section.
2. Derive the expression for power, transmitted by a shaft.
3. What is maximum bending moment equation for a strut subjected transfer point load at centre?
4. Distinguish between short and long column.
5. What are the conditions to prevent dam failure?
6. What do you mean by direct stress and bending stress?
7. Write the expressions radial pressure and hoop stresses for thick spherical shell.
8. A seamless pipe of 1m diameter is to carry fluid under a pressure of 2MPa. Determine the thickness of the metal if permissible stress in the metal is 100MPa.
9. Under what circumstances the unsymmetrical bending occurs.
10. What are the reasons for unsymmetrical bending?

**PART-B****Answer ALL questions of the following****5x10 M= 50M**

1. A close coiled helical spring 100 mm mean diameter is made up of 20 turns of 10 mm diameter steel wire. If the maximum shear stress is not to exceed 90MPa, calculate the maximum axial load the spring can take and the stillness of the spring. What is the strain energy stored at maximum load? Take rigidity modulus as  $0.8 \times 10^5$  Mpa.

OR

2. A hollow circular shaft transmits 200kw at 150 rpm. Calculate the minimum diameter of the shaft required, if the shear stress is limited to  $90\text{N/mm}^2$  and angle of twist is not to exceed  $3^\circ$  in a length of 4m.  $C = 0.8 \times 10^5 \text{N/mm}^2$ .
3. From the following data determine the thickness of C.I. column. Length of column = 6m, external diameter = 200mm, load = 500KN, Factor of safety = 6, assume fixed ends and ultimate compressive stress and Rankine's constant for hinged ends as  $570\text{MN/m}^2$  and  $1/1600$  respectively .

OR

4. Derive the expression for Euler's crippling load for a column both ends fixed.
5. Find an expression for the maximum and minimum stresses when a rectangular column is subjected to a load which is eccentric to Y-Y axis.

OR

6. A rectangular footing  $3\text{m} \times 4.5\text{m}$  carries an axial load 2000kN at an eccentricity 0.6m and 0.8m respectively from both axes. Calculate the stresses at all corners.
7. A C.I. pipe of 400mm internal dia and 100mm thick carries a water under pressure of 8Mpa. Determine the maximum minimum intensity of hoop's stress across the section also sketch radial pressure distribution and hoop's stress distribution across the section.

OR

8. Derive the expressions for circumferential stress and longitudinal stress in a thin cylinder subjected to internal fluid pressure.
9. Determine position of the shear centre for channel section of 200mm x 200mm and 20 mm thick.

OR

10. Locate the shear center for T section of flange 150mm X 10mm and web 200mm X 10mm.

Code No.: 40108

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, DECEMBER-2019

Subject: HYDRAULICS AND HYDRAULIC MACHINERY

Branch: CE

Time: 3 hours

Max. Marks: 75

#### PART – A

##### I. Answer ALL questions of the following

5x1Mark=5 Marks

1. Define uniform flow.
2. Define the terms impact of jets and jet propulsion.
3. In a curved vane, when do you get maximum efficiency?
4. How do you control the sudden rise of pressure in penstock pipe?
5. Define a centrifugal pump.

##### II. Answer ALL questions of the following

10x2Marks=20 Marks

1. Differentiate between laminar and turbulent flow.
2. What is back water curve? Where does it occur?
3. What are the selection criteria of repeating variables in Buckingham pi method?
4. What do you mean by dimensionally homogenous equation?
5. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
6. What is draft tube? What is its function?
7. What is the purpose of governors in Hydel stations?
8. Differentiate between radial and axial flow turbines.
9. Explain angular momentum principle. What type of applications it is being used?
10. How does a volute casing differ from a vortex casing for a centrifugal pump?

#### PART-B

##### Answer ALL questions of the following

5x10 Marks= 50Marks

1. a) Derive an expression for the discharge through open channel flow using Chezy's formula.  
b) Find the rate of flow of water through a V shaped channel having total angle between the sides as  $60^\circ$ . Take the value of  $c = 50$  and slope of the bed 1 in 1500. The depth of flow is 6m.

OR

2. a) Define specific energy and draw its diagram. Explain how it is useful for the open channel flows.  
b) A rectangle channel of 8m wide with a bed slope of 1 in 2500 carrying water with a depth of 1m. A dam was placed across the channel increasing the depth of flow at the dam to 1.4m. Find the depth of flow at 150m upstream of the dam.
3. What do you mean by dimensional numbers? Name any four dimensional numbers. Define and explain Reynolds's number, Froude's number and Mach number. Derive expressions for any above two numbers.

OR

4. a) State the Buckingham – Pi theorem and mention the advantages of dimensional analysis.  
b) A model boat, 1 in 10 of prototype of a flying boat is towed in fresh water ( $\rho_m = 1000 \text{ kg/m}^3$ ). The prototype is moving in a sea water ( $\rho_p = 1030 \text{ kg/m}^3$ ) with a speed of 72 km/hr. Find the corresponding speed of the model. Also find out the resistance due to waves on model if the wave resistance experienced by prototype is 750 N.
5. a) Develop a momentum equation for work done when jet of water flows over a radially fixed vane.  
b) The inclination of a jet of water 50mm dia and having a velocity of 30m/s is  $30^\circ$  to the horizontal. It enters a fixed curved vane tangentially and is diverted by  $130^\circ$ . Find the horizontal and tangential pressure forces on the vane.

OR

6. A water jet 20 mm in diameter and having a velocity of 90 m/s strikes series of moving blades in a wheel. The direction of the jet makes  $20^\circ$  with the direction of movement of the blade. The blade angle at inlet is  $35^\circ$ . If the jet should enter the blade without striking, what should be the blade velocity? If the outlet angle of the blade is  $30^\circ$ , determine the force on the blade. Assume that there is no friction involved in the flow over the blade.
7. Design a Francis turbine to develop 400kW under a head of 90m while running at a speed of 750 rpm. Assume any data suitably.

OR

8. What is a turbine? Give the various efficiencies. Also give the classification of turbines.
9. a) A centrifugal pump works against a head of 30 m and discharges  $0.25 \text{ m}^3/\text{s}$  while running at 1000 rpm. The velocity of flow at the outlet is 3 m/s and the vane angle at outlet is  $30^\circ$ . Determine the diameter and width of impeller at outlet if the hydraulic efficiency is 80 per cent. b) Draw and discuss the operating characteristics of a centrifugal pump.

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?

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

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

**III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: PROBABILITY & STATISTICS

Branch: CE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following**

5x1Mark=5 Marks

1. Define binomial distribution.
2. Define correlation coefficients.
3. Write the finite population correction factor.
4. Define Poisson distribution.
5. What is transition probability?

**II. Answer ALL questions of the following**

10x2Marks=20 Marks

1. Derive mean of Binomial distribution.
2. Derive the mean of Normal distribution.
3. What do you mean by Correlation between two random variables?
4. Write the formula for covariance between two continuous random variables.
5. What do you mean by critical region and acceptance region?
6. Assume that  $\sigma=20.0$ , how large a random sample be taken to assert with probability 0.95 that the sample mean will not differ from the true mean by more than 3.0 points.
7. Write the relations between  $L_q$ ,  $L_s$ ,  $W_q$ , and  $W_s$  in  $(M/M/1) : (\infty/FIFO)$  model.
8. If  $\lambda=8/10$  customers/minute and  $\mu=1$  customers/minute. Find  $E(n)$ .
9. Define a Markov Process.

10. Find the periodic and a periodic states in the transition probability matrix  $\begin{bmatrix} \frac{1}{4} & \frac{3}{4} \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ .

**PART-B****Answer ALL questions of the following**

5x10 Marks= 50Marks

1. A continuous random variable X has a probability density function  $f(x)=Kx^2e^{-x}$ ,  $x \geq 0$ . Find K, mean and 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. Find the correlation coefficient between  $x$  and  $y$  from the given data:

$x$	78	89	97	69	59	79	68	57
$y$	125	137	156	112	107	138	123	108

OR

4. Calculate the regression equations of  $Y$  on  $X$  from the data given below, taking deviations from actual means of  $X$  and  $Y$ .

Price(Rs.)	10	12	13	12	16	15
Amt Demanded	40	38	43	45	37	43

Estimate the likely demand when the price is Rs.20.

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. The nine items of a sample had values 45, 47,50,52,48,49,47,53 and 51. Does the mean of nine items differ significantly from the assumed population mean of 47.57.

7. A duplicate machine maintained for office use is operated by an office assistant who earns Rs 5 per hour. The time to complete each job varies according to an exponential distribution with mean 6min. Assume a Poisson input with an average arrival rate of 5jobs per hour. If an 8-h day is used as a base, determine: a) The percentage idle time of the machine (b) the average time a job is in the system and (c) the average earning per day of the assistance.

OR

8. Cars arrive at a petrol pump with exponential interval times having mean half minute. The attendant takes an average of  $\frac{1}{5}$  minute per car to supply petrol, the service time being exponentially distributed. Find (a) The average number of cars waiting to be served. (b) The average number of cars in the system. (c) The proportion of time for which the pump attendant is idle.

9. a) Write classification of stochastic process.  
b) Define irreducible and ergodic matrix.

OR

10. a) Define the types of stochastic process with an example.

- b) The transition probability matrix of a markov chain is given by  $\begin{bmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{bmatrix}$  is this matrix irreducible?

**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, DECEMBER-2019**Subject: **BASIC ELECTRICAL & 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. Define Ohms law.
2. Define magnetic coupling coefficient.
3. Define slip of an induction machine.
4. How to turn on a transistor?
5. Define the cathode ray tube.

**II. Answer ALL questions of the following****10x2Marks=20 Marks**

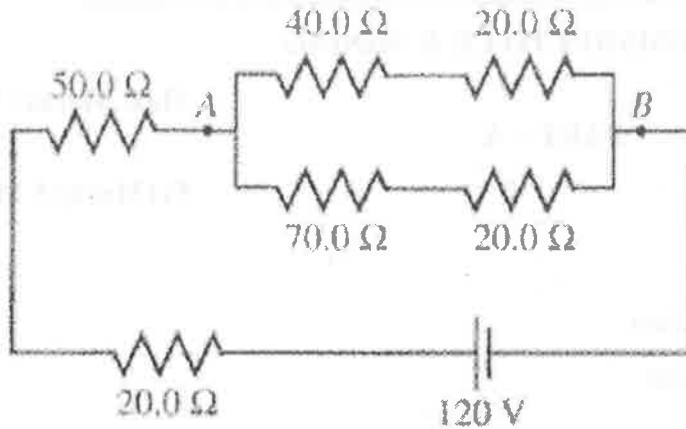
1. State and Explain the Superposition theorem.
2. Define Norton's theorem.
3. Write the operating principle of Transformer.
4. Explain four different uses of transformer.
5. Write down the parts of the DC machine.
6. What is armature reaction?
7. Define Latching and Holding current.
8. Define drift current and diffusion current.
9. What is the Oscillator? And what is the condition for the Oscillations?
10. Write the applications of CRO.

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

1. a) Explain ohms Law with its Applications and Limitations? [3M]  
b) Define and explain the types of sources [4M]  
c) Distinguish between self induced emf and dynamically induced emf. [3M]

**OR**

2. Find current in 50 Ohm resistor and 70 ohm resistor.



3. a) A 230/2300V transformer takes no load current of 5A at 0.25 power factor lagging. Find  
i) Core loss ii) Magnetizing current. [3m]  
b) Derive the EMF equation of a transformer. [7m]

**OR**

4. Explain the analogy between electric and magnetic circuits.  
5. Derive the equations for starting Torque and Torque under running conditions for an induction motor.

**OR**

6. Explain working of an induction motor. How torque is produced?  
7. Explain the V-I characteristics of Diode.

**OR**

8. Explain working of diode and transistor along with VI characteristics.  
9. With neat circuit diagram Explain about COLLPITT's oscillator.

**OR**

10. Describe Hartley and Colpitts oscillators. Give its applications.



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, DECEMBER-2019

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 with their advantage.

II. Answer ALL questions of the following

10x2Marks=20 Marks

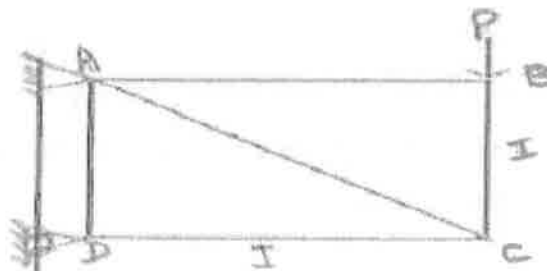
1. What is mean by pin jointed frame? What are the assumption made in analysis of pin jointed frames?
2. Differentiate statically determinate and indeterminate beams?
3. What is castigliano's first theorem?
4. Write down strain energy expressions for axial forces and bending moment.
5. Derive support moments when a fixed beam subjected to a point load at the center of span (L).
6. What is the end moments induced at the end of a fixed beam A and B due to rotation  $\theta_A$ ?
7. What is effect of sinking support of a continuous beam and write down the expressions in term of three moment theorem.
8. Define the term carry over factor and what its value is when the beam is simply supported at both the ends.
9. Define equivalent UDL.
10. What is meant by equivalent uniformly distributed load and how is it determined?

#### PART-B

Answer ALL questions of the following

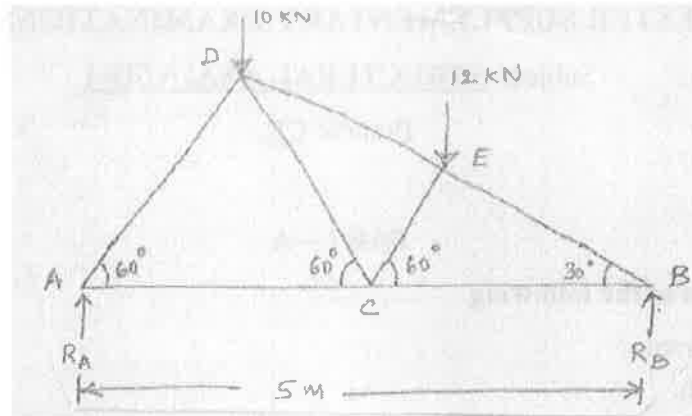
5x10 Marks= 50Marks

1. Analyse the cantilever truss as shown figure below using method of joints:



OR

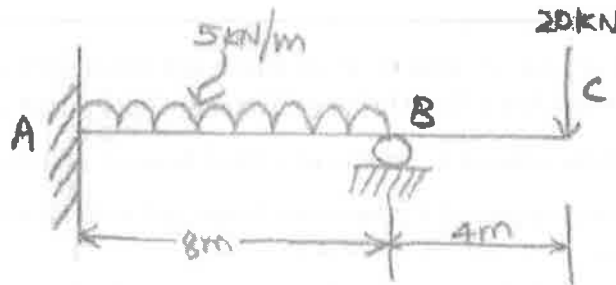
2. A truss of span 5m is loaded as shown in figure. Find the reactions and forces in the members of the truss using method of joints.



3. 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.

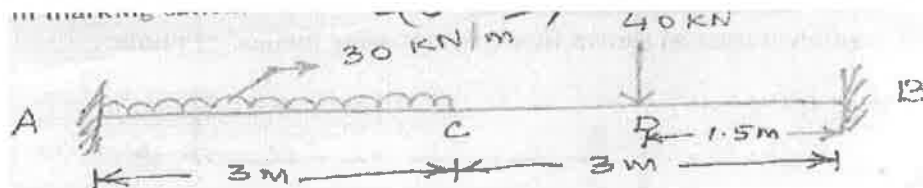
OR

4. Derive the expression for strain energy due to bending moment.  
5. Draw SFD and BMD of the given propped cantilever beam.

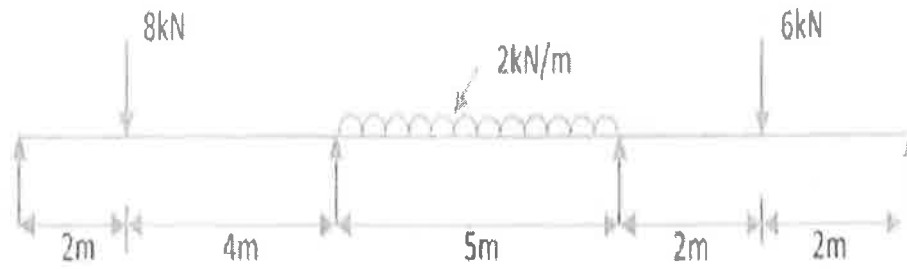


OR

6. A beam AB of uniform section and 6 m span is built at the ends. A u.d.l of 30 kN/m runs over left half of the span and there is an additional concentrated load of 40 kN at right quarter. Determine the fixed end moments at the ends and the reactions. Sketch neatly bending moment diagram and shear force diagram marking salient values.

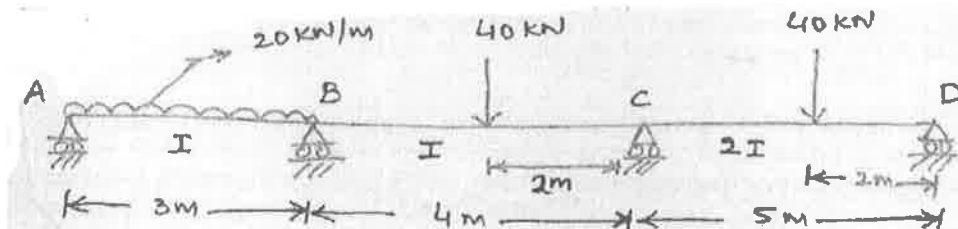


7. Analyze the continuous beam shown in figure by Clapeyron's theorem of three moments. Draw BMD and SFD. Assume EI is constant.



OR

8. Analyse the continuous beam ABCD shown in figure below by moment distribution method.



9. Find out absolute maximum bending moment and maximum shear force for the loading as shown above, if the loadings are moving over a simply supported girder of span 25m.

OR

10. Two wheel loads of 60 kN and 40 kN spaced 6 m apart cross a girder of span 16 m with 40 kN load leading. Draw the maximum S.F.D and B.M.D.

