

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

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

M.TECH I SEMESTER REGULAR END EXAMINATIONS, JANUARY-2020

Subject: Research Methodology and IPR

Branch: **Common to All**

Time: 3 hours

Max. Marks: 70

Answer ALL questions

5x14 = 70M

All Questions carry equal marks

1. Discuss Scope and objectives of research problem.

(OR)

2. Elaborate the Different steps of Research Process.

3. How do you identify research gaps through Effective literature study approaches? Explain.

(OR)

4. What are the various steps in report writing? Discuss.

5. What are the various types of Intellectual Properties? Discuss its nature.

(OR)

6. Explain the Procedure for grants of patents and Patenting under PCT.

7. Explain with examples about the Scope of Patent Rights.

(OR)

8. Discuss with the current issues & developments about Geographical Indications of India.

9. Elucidate the new developments in IPR.

(OR)

10. What are the advantages & disadvantages of Traditional Knowledge?

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M.TECH I SEMESTER REGULAR END EXAMINATIONS, JANUARY-2020

Subject: Theory of Elasticity

Branch: **CIVIL/SE**

Time: 3 hours

Max. Marks: 70

Answer ALL questions

5x14 = 70M

All Questions carries equal marks

1. Derive the differential equation of equilibrium based on equilibrium equations, boundary conditions, compatibility conditions, for a 2-D plane stress problem.

(OR)

2. Explain stress function and its significance. How do you perform stress analysis using a stress function give step by step procedure?

3. Derive the differential equation of equilibrium in polar co-ordinates for two dimensional problem of elasticity. Apply a general solution of it to the bending of a curved bar to get stresses and displacements in the bar.

(OR)

4. Explain saint venants principle. Find the deflection of a cantilever subjected to point load at the free end using above principle.

5. a) Investigate a stress ellipsoid for all possible cases.

b) Explain director surface.

(OR)

6. Derive the expressions for uniqueness of solution and reciprocal theorem.

7. a) Explain membrane analogy. Apply this analogy to the problem of torsion of a bar with narrow rectangular section. **[10M]**

b) Explain soap film method. **[4M]**

(OR)

8. Using the principles of elasticity in 3-D (Three Dimensions) evaluate stresses and displacements for pure bending of prismatic bars.

9. Discuss about different principles and methods used in experimental stress analysis.

(OR)

10. Describe various advantages of experimental stress analysis.

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Gundlapochampally (H). Maisamaguda (V). Medchal (M). Medchal-Malkajgiri (Dist), Hyderabad**M.TECH I SEMESTER REGULAR END EXAMINATIONS, JANUARY-2020****Subject: Matrix Methods of Structural Analysis**

Branch: CIVIL/SE

Time: 3 hours

Max. Marks: 70

Answer ALL questions

5x14 = 70M

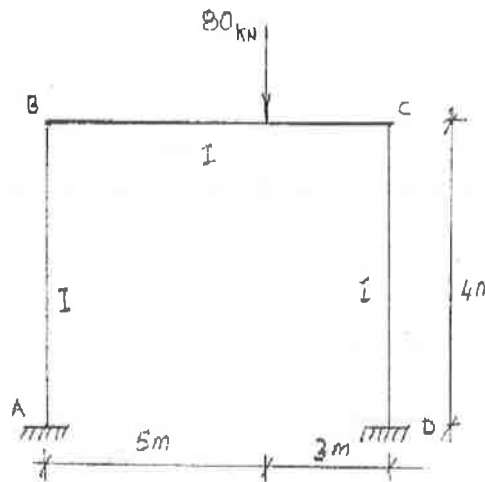
All Questions carries equal marks

1. a) Explain the concept of Stiffness and Flexibility.

b) Explain (i) Local axes. (ii) Global axes.

(OR)

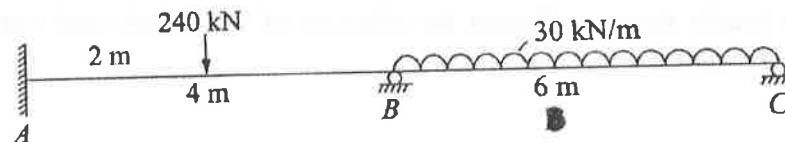
2. Analyze the frame shown in figure by displacement transformation matrix.



3. Explain the direct stiffness method of generating the stiffness matrix of any structure. Give the computer algorithm for assembly.

(OR)

4. Using stiffness method analyze the given beam as shown in figure below.



5. a) Illustrate the analysis of continuous beam by the flexibility method taking a simple example.

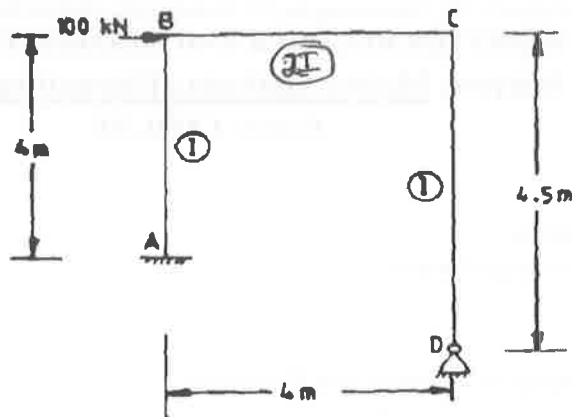
[10M]

b) List the four assumptions made in the Flexibility Matrix method.

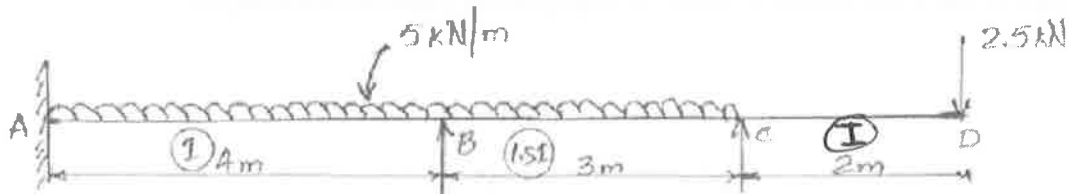
[4M]

(OR)

6. Develop the Flexibility matrix for the given figure.

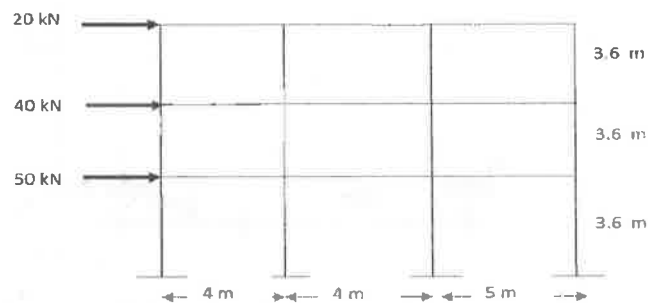


7. Analyze the continuous beam shown in figure by stiffness method. Draw SFD and BMD.



(OR)

8. Illustrate the analysis of given structure by the stiffness method.



9. Explain how the initial and thermal stresses can be accounted for in the Electricity method by taking a simple example.

(OR)

10. Explain briefly factors influence the selection of shear walls and suitability of framed-shear walls and coupled-shear walls.

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M.TECH I SEMESTER REGULAR END EXAMINATIONS, JANUARY-2020

Subject: Advanced Concrete Technology

Branch: CIVIL/SE

Time: 3 hours

Max. Marks: 70

Answer ALL questions

5x14 = 70M

All Questions carries equal marks

1. Explain the various stages in the manufacturing of cement with a neat diagram.

(OR)

2. a) Discuss in detail the Alkali aggregate reaction in aggregates.

b) Explain in detail about any two types of mineral admixtures.

3. a) Explain in detail about the various factors affecting the strength of concrete.

b) Define Gel space ratio.

(OR)

4. List out the various methods of Non-Destructive Testing and explain them.

5. Explain in detail about High Performance Concrete.

(OR)

6. Explain the detailed procedure for making High strength concrete using Erintroy
Shaklok Method.

7. Design a concrete mix using the guide lines of ACI method.

(OR)

8. Discuss about Codal provisions in concrete mix design as per Indian Standards.

9. Explain briefly with specifications of design of Form work.

(OR)

10. Explain Form work materials and its connections.

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M.TECH I SEMESTER REGULAR END EXAMINATIONS, JANUARY-2020**Subject: Bridge Engineering**

Branch: CIVIL/SE

Time: 3 hours

Max. Marks: 70

Answer ALL questions

5x14 = 70M

All Questions carries equal marks

(Note: use of IRC 6, IRC 112, IS1343 are permitted)

1. a) Write short notes on Economical span of the bridge.
b) Explain the forces that are to be considered in the design of bridges.
(OR)
2. Explain the advantages and disadvantages of simply supported bridges, continuous bridges and balanced cantilever bridges.
3. Explain the advantages of Box culvert over slab culvert. State the load conditions for which the Box culvert is designed. Sketch the shape of bending moment diagram and deflection profile for a box culvert.
(OR)
4. Design a slab culvert to carry two lane traffic over an effective span of 5m for IRC class A two lane loading using effective dispersion width method. The wearing coat on the bridge is PCC of thickness 80 mm. Use M25 Concrete and Fe 415 steel.
5. Using Courbon's theory find the maximum bending moment and shear force on intermediate longitudinal girder and End longitudinal girder for the T-beam bridge of the following data, due to IRC Class AA (Wheeled loading). Clear carriage way width = 7.5 m, Kerb = 800 mm wide, Number of Longitudinal Girders = 3, Centre to Centre spacing between the longitudinal girders = 3.2m, Width of the longitudinal girders = 400 mm, Effective span of the bridge = 20m, Number of cross girders = 6, Centre to centre spacing between the cross girders = 4m, Width of the cross girders = 400 mm.
(OR)
6. Discuss the forces acting on the piers and abutments with a neat sketch and also explain the components.
7. A post tensioned prestressed concrete beam of span 12m has a width of 400mm and depth of 900mm. It is prestressed with 10 Nos. 16 mm diameter HTS with $f_{pu} = 2500$ MPa, and initially stressed to 0.7 fpu. The prestressing cable is varying parabolically with eccentricity equal to zero and 200 mm at supports and mid span respectively. If two wires are stressed at a time from one end, determine the loss of prestress due to all the factors. Coefficient of friction = 0.25, Wobble coefficient = 0.0046 per meter length, Anchorage slip = 4 mm, Relative Humidity = 80%, Age at loading = 28 days, Notional creep coefficient and shrinkage strain may be adopted as suggested by IS 1343-2012.

(OR)

8. The following is the data of a T beam bridge made of a composite construction with PSC girder as longitudinal girder and Insitu slab

Span of the bridge = 20 m, Centre to centre spacing of longitudinal girder = 3.2m, Thickness of insitu slab = 200 mm, Grade of concrete for insitu slab M25, Superimposed load on the insitu slab = 20 kN/m^2 , Cross sectional dimensions of PSC girder = $500 \text{ mm} \times 1500 \text{ mm}$, Grade of concrete for PSC girder M70, 13 strands of 20 mm diameter is used for prestressing, Effective stress in strands = 1200 MPa, Eccentricity at supports and at mid span is 0 and 450 mm varying parabolically. If the construction is accomplished by propping the girders while the insitu slab is being placed, analyze the cross section and comment on the safety assuming different moduli of elasticity for insite concrete and PSC beam.

9. A bridge consisting of three bridges, placed at a distance 's' a part, is subjected to a single harmonic loading at a distance of 'es' from left hand girder. Derive the expressions for distribution factors on each girder. Use conventional notation.

(OR)

10. Explain the grillage analogy for the design of bridges with the help of one example.