Code No.: **10306/20306** **MR11/ MR12**

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 I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Mechanics of Solids**

Branch: **ME**

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

Answer any FIVE Questions of the following **5x15M=75M**

1. a) Explain the concept of factor of safety and its significance in the design of machine components? What is working stress of a material? **[7M]**

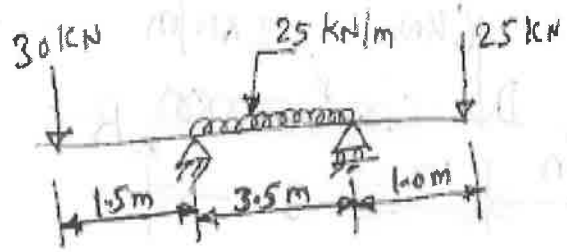
   b) A steel rod length 20m is at a temperature of 20°C. Find the free expansion of the rod when the temperature is raised to 65°C. Find the temperature stress produced

   i) When the expansion of the rod is prevented

   ii) When the rod is permitted to expand by 5.8mm

   Take $\alpha = 12x10^{-6}$/°C and $E = 2x10^5 N/mm^2$. **[8M]**

2. Draw the S.F and B.M diagrams for a beam supported and loaded as shown below. Mention salient points. **[15M]**



3. a) What is section modulus? Determine the section modulus of a beam of rectangular cross section.

   b) A cantilever beam 3m long is subjected to a uniformly distributed load of 30KN/m. The allowable working stress in either tension or compression is 150MPa. If the cross section is to be rectangular, determine the dimensions if the height is to be twice the width.

4. a) Prove that for a rectangular sectioned beam, the ratio of maximum shear stress to mean shear stress is 3/2. **[7M]**

   b) A simply supported beam of span 6m has I-section 350mm deep and 165mm wide has flange 9.8mm thick and web 7mm thick. If the maximum permissible shear stress is 165 N/mm^2, find the safe UDL that the beam can carry. **[8M]**

5. Compute the force in each member of the truss shown in figure 4. If the loads at B and D are shifted vertically downward to add to the loads at C and E, which members, if any, would undergo change in internal force? **[15]**

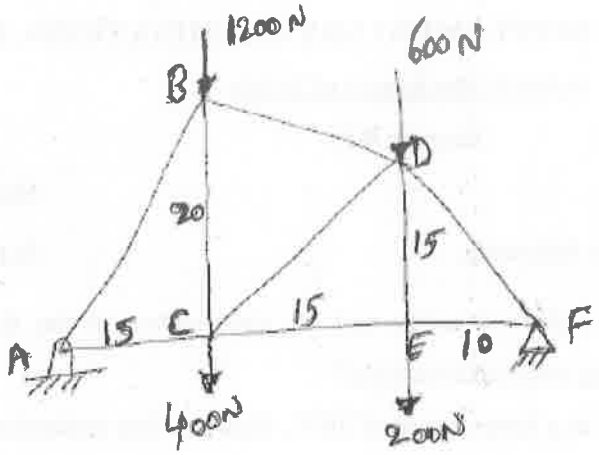
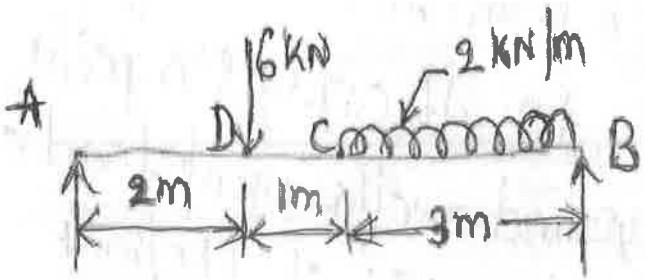


Figure 4.

6. A beam AB of 6m span is simply supported at the ends and is loaded as shown in figure below. Determine (i) Deflection at C (ii) Maximum deflection and (iii) Slope at end A. Take $E=2X10^5$ N/mm^2 and $I = 2000cm^4$. **[15 M]**



7. A shell 30.25m long and 1.0m diameter is subjected to an internal pressure of $1.2N/mm^2$. If the thickness of the shell is 10.0mm find the hoop and longitudinal streses. Find also the maximum shear stress and changes in dimensions of the shell. Take $E=200KN/mm^2$ and Poisson's ratio = 0.3 **[15M]**

8. A thick cylindrical pipe of outside diameter 300mm and internal diameter of 200mm is subjected to an internal fluid pressure of $20N/mm^2$ and external fluid pressure of $5N/mm^2$. Determine the maximum hoop stress developed and Also sketch the variation of hoop and radial stress across the thickness. **[15M]**

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

Subject: **Machine Drawing**

Branch: **ME**

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

PART – A

Answer any TWO Questions of the following **2x15M=30M**

1. Draw the sectional front view and top view of Knuckle joint to join two rods of 50 mm diameter each.
2. Draw the view from the front (half sectional with TOP half) and the view from the side of cotter joint with sleeve used to connect two rods of 50 mm diameter each.
3. Sketch the sectional views of the following
   (i) Single row ball bearing (ii) Taper roller bearing

PART – B

Answer the following of the question **1x45M=45M**

4. Details of the Petro-engine connecting rod are shown in Figure :
   Draw the assembly of all parts to show
   a) Front view. Sectional Top view.