JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-III Semester (CE)

COURSE CODE (CREDITS): 18B11CE315 (3) MAX. MARKS: 25

COURSE NAME: ENGINEERING MECHANICS

COURSE INSTRUCTORS: DR. SAURAV MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required

for solving problems

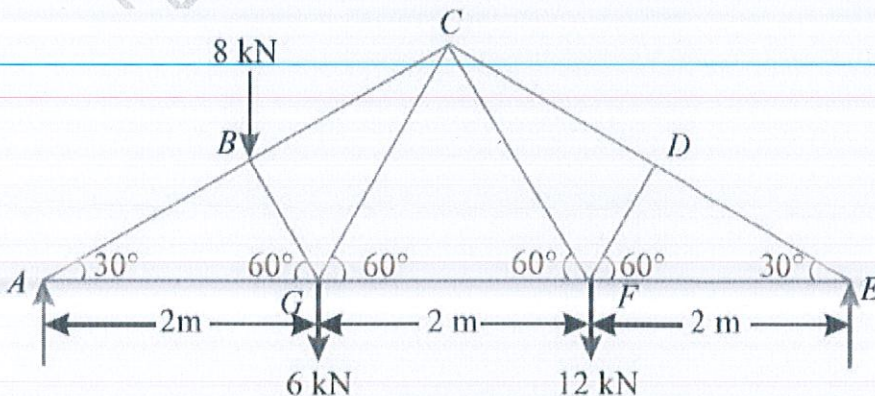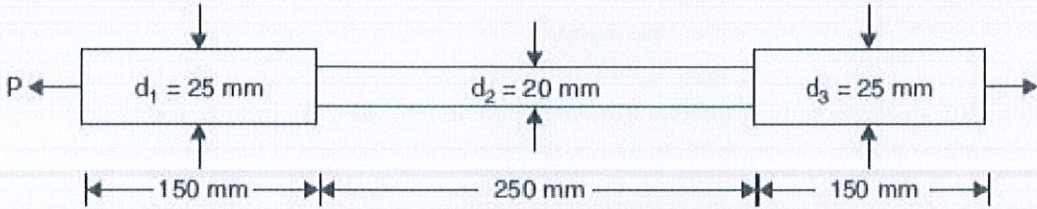| Q.No	Question	CO	Marks
Q1	A specimen of steel 20 mm diameter with a gauge length of 200 mm is tested to destruction. It has an extension of 0.25 mm under a load of 80 kN and the load at elastic limit is 102 kN. The maximum load is 130 kN. The total extension at fracture is 56 mm and diameter at neck is 15 mm. Evaluate (i) The stress at elastic limit. (ii) Young's modulus. (iii) Percentage elongation. (iv) Percentage reduction in area. (v) Ultimate tensile stress.	CO-4	5
Q2	Deduce the equations to find the temperature stress in a composite bar made of Copper and steel fixed at one end and free at the other end. The temperature of the assembly is lowered by $T^{o}C$	CO-4	3
Q3.	An inclined truss shown in Fig 1 is loaded as shown. Solve and Analyse the truss to determine the nature and magnitude of the forces in the members BC, GC and GF of the truss.	CO-2	5

Fig. 1

Q4.	Deduce an equation to find the elongation of a prismatic bar of specific weight γ and length L due to its self weight. If the length of the bar is doubled and area of cross section is halved then find the percentage change in the elongation. E= Young's modulus of Elasticity of bar.	CO-4	5
Q5.	The bar shown in Fig.2 is tested in universal testing machine. It is observed that at a load of 40 kN the total extension of the bar is 0.280 mm. Compute the Young's modulus of the material.	CO-4	4
	  Fig. 2		
Q6.	A steel bar of tapers uniformly from 60 mm diameter at one end to 40 mm diameter at other end in a length of 600 mm. If the bar is subjected to a load of 80 kN, find its extension. Take $E = 2 \times 10^5$ MPa. Evaluate the percentage error if average area is used for calculating extension?	CO-4	3