Total nos. of printed pages: 02

PRANVEER SINGH INSTITUTE OF TECHNOLOGY KANPUR

Odd Semester – Session 2021-22 CT -I

B. Tech. 1st Semester

Fundamental of Mechanical Engineering and Mechatronics (KME-101T)

CO Number	Course Outcome
CO1	Define various laws, theorem and parameters used in mechanical engineering and mechatronics.
CO2	Describe the utility of concept of mechanical engineering and mechatronics.
CO3	Derive the general equations of mechanical engineering and mechatronics
CO4	Illustrate various concepts and working of devices used in mechanical engineering and mechatronics with suitable diagram.
CO5	Calculate the general parameter of mechanical engineering and fluid mechanics.

Time: 1.5 Hrs. M. M. 15

Section A

Q1. Attempt all questions: **(1X3 = 3 Marks)**

a) Define the factor of safety and its importance. CO1

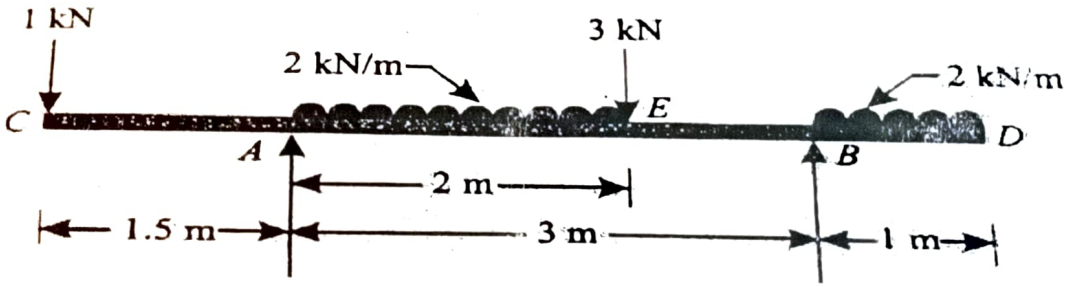
b) Define modulus of elasticity and modulus of rigidity CO1

c) Define the term point of contraflexture in the beam CO1

Section B

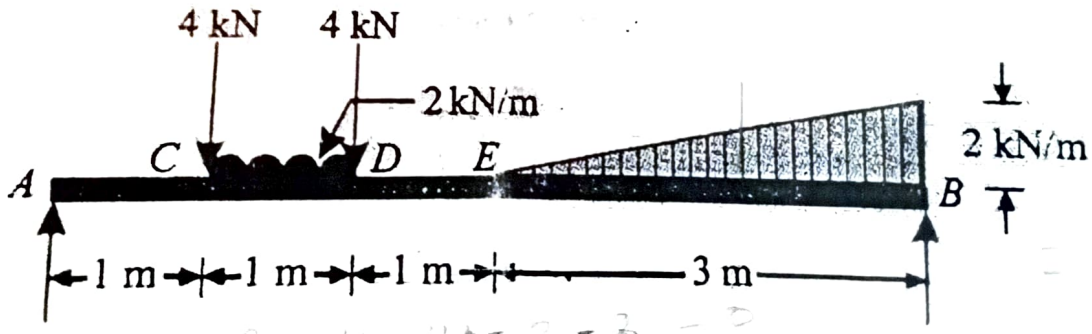
Q2. Attempt all questions: **(2X4 = 8 Marks)**

a i) Calculate the support reactions in the beam as shown in the fig. CO5



Or

ii) Calculate the support reactions in the beam as shown in the fig CO5



b i) Illustrate the types of beam and types of supports with diagrams. CO3

Or

ii) Define Hook's law and Illustrate the Stress-Strain diagram for ductile materials. CO3

c i) Derive the relationship between the elastic constant, Modulus of Elasticity (E) and modulus of rigidity (G). CO4

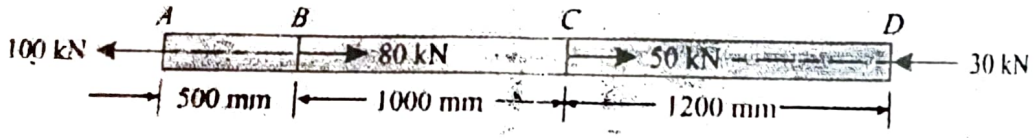
Or

ii) Derive the relationship between the elastic constant, Modulus of Elasticity (E) and Bulk Modulus (K). CO4

d i) A tensile load of 56 KN was applied to a bar of 30 mm diameter with 300 mm gauge length . measurements showed 0.12 mm increase in length and the corresponding 0.0036 mm contraction in diameter. Calculate poisson's ratio and the values of three modulus (elastic constants). CO5

Or

ii) A bar, having cross section area of 500 mm^2 is subjected to axial forces as shown in figure. Find the total elongation of the bar. Take E = 80x10^3 Mpa. CO5

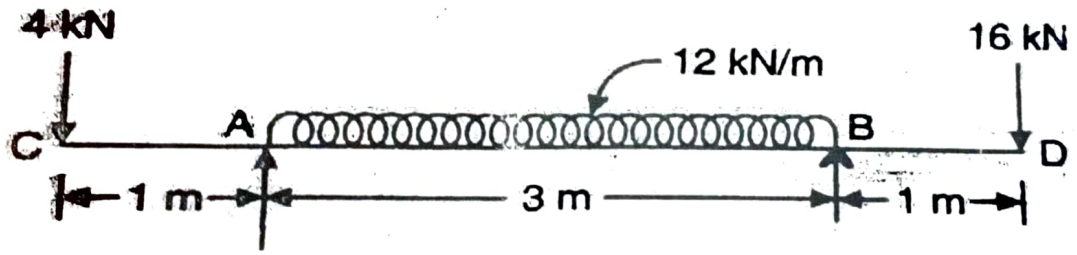


Section C

(4X1 = 4 Marks)

Q3

i) Calculate and Draw shear force and Bending Moment diagram for the beam as shown in fig. CO5



CO5

Or

ii) Calculate and Draw shear force and Bending Moment diagram for the beam as shown in fig. CO5