Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

Year and Program: 2021, UG	**School of Technology**	**Department: Aeronautical**
Course Code: AET208	**Course Title: Mechanics of Materials**	**Semester :IV**
Day and Date: 24/06/2021, Thursday	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Answer/Solve the following (any Two)**–			
a)	Draw stress-strain diagram of ductile material subjected to axial loading and explain the important points of diagram.	8	L_2	CO1
b)	A member ABC is formed by connecting a steel bar of 20 mm diameter to an aluminium bar of 30 mm diameter and is subjected to forces as shown in Fig 1(b), Determine the total deformation of the bar, taking E for aluminium as $0.7*10^5$ N/mm^2 and that for steel as $2*10^5$ N/mm^2.	8	L_3	CO2

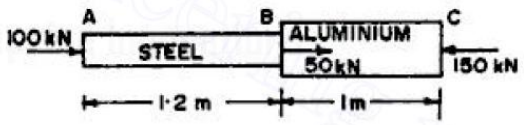


Fig 1(b)

c)	A simply supported beam of 6 m span is loaded as shown in Fig 1(c). Draw the B.M. and S.F. diagrams, indicating principal values.	8	L_3	CO2

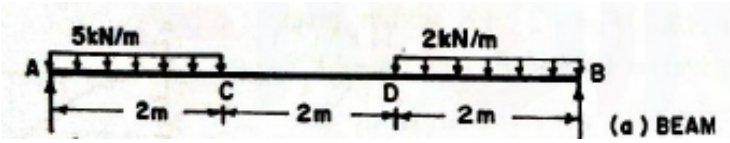


Fig. 1(c)

Q.2	**Answer/Solve the following (any two)** –			
a)	Explain the theory of simple bending and the assumptions are made in the theory of simple bending.	8	L_1	CO3
b)	A beam 500 mm deep of a symmetrical section has $I=1*10^8$ mm^4 and is simply supported over a span of 10 meters. Calculate the uniformly distributed load it may carry if the maximum bending stress is not to exceed 150 N/mm^2.	8	L_3	CO3
c)	A piece of material is subjected to tensile stress of 70 N/mm^2 and 50 N/mm^2 at right angles to each other. Find fully the stresses on a plane the normal of which makes an angle of 35^0 with the 70 N/mm^2 stress.	8	L_3	CO3

Q.3 Answer/Solve the following (any two) –

a)	A cast iron hollow column, having 100 mm external diameter and 80 mm internal diameter, is used as a column of 2.4 m length. Using Rankine's formula, determine the crippling load, when both ends are fixed. Take f_c=600 N/mm^2 and a=1/1600.	9	L3	CO5
b)	A solid shaft is required to transmit 120 kW power at 200 rpm. Find the suitable diameter of the shaft if the maximum torque transmitted in each revolution exceeds the mean by 20%. Take allowable shear stress as 70 N/mm^2 for the material of the shaft.	9	L3	CO5
c)	A beam 3 m long, simply supported at its ends, is carrying a point load W at its mid-span. If the slope at the ends of the beam is not to exceed 1^0, find the deflection at the mid-span.	9	L_3	CO4

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