

Seat No: _____

Enrollment No: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
Diploma Engineering, Mid semester Examination

Semester: 4th
Subject Code: 03605211
Subject Name: Strength Of Material

Date:
Time: (1hr: 30min)
Total Marks: 40

Instructions:

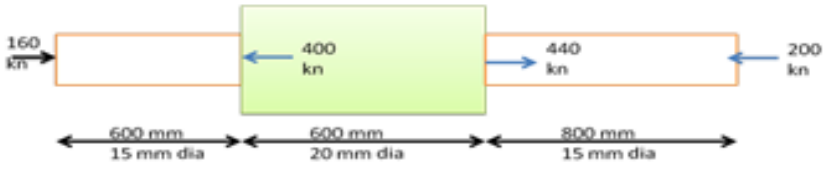
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is considered to be Authentic.

Q.1	Answer any six out of Ten. (2 Marks Each)	(12)	Co/Po Name	Blooms Taxonomy Words
	1. Define Force and Types of Forces		CO1	Knowledge
	2. Define stress.		CO1	Knowledge
	3. State Hook's law		CO1	Understand
	4. Define Bulk Modulus		CO1	Knowledge
	5. Define: Slope		CO1	Knowledge
	6. Define: strain		CO1	Knowledge
	7. Write the unit of slope and deflection.		CO2	Create
	8. Define Linear and Lateral strain..		CO1	Evaluate
	9. What do you mean by strain Energy?		CO2	Create
	10. How many methods are there to apply load?		CO1	Understand
Q.2	A) An axial tension of 50kn is applied to a rod of 4m length and 500mm ² in section area. The increase in length is found to be 2mm Calculate the value of (i) Stress (ii) Strain (iii) Modulus of elasticity	(03)	CO1	Evaluate
	OR			
	A) A steel bar of 20 mm diameter having 3.0 m length is subjected to axial tensile force of 50 KN. The increase in length is 1.75mm. Calculate stress, strain and young's modulus.	(03)	CO1	Evaluate
	B) Simply Supported beam having rectangular cross section of size 150 mm. X 300 mm. and span 6 m. is loaded with UDL of 30 KN/m over entire span. Find and deflection at mid span. Modulus of Elasticity = 2 x10 ⁵ MPa	(03)	CO1	Evaluate
	OR			
	B) A cantilever beam of 4m span is subjected to UDL of 8kN/m over the entire span. Find maximum value of deflection for the beam. Take E=2x10 ⁵ N/mm ² and I=8x10 ⁶ mm ⁴	(03)	CO1	Evaluate
	C) Explain/Draw stress-strain curve for tension test on mild steel.	(04)	CO1	Understand
	OR			
	C) Explain slope and deflection with sketches.	(04)	CO1	Understand
	D) A mild steel rod is 10 mm in diameter and 1.2 m long. It is subjected to tensile force. If increase in length is 5 mm and E = 200 GPa, Calculate tensile force, stress and strain.	(04)	CO1	Evaluate
Q.3	A) If E = 2 x 10 ⁵ N/mm ² Find out change in length	(03)	CO1	Evaluate
	OR			e

A) A steel bar 1.5 m long and 18 mm diameter is acted upon by tensile load of 60 KN. If $E = 2 \times 10^5 \text{ N/mm}^2$, find the stress, strain and elongation in the bar.	(03)	CO1	Evaluate
B) A cantilever beam of span 5 m is subjected to U.D.L. of 30 kN/m over entire span. Calculate slope and deflection at free end of beam. $EI = 2 \times 10^4 \text{ kN.m}^2$	(03)	CO1	Evaluate
OR			
B) An U. D. L. of 20 KN/m is acting on a cantilever beam of length 3 m. Calculate the slope and deflection of the beam at its free end. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 200 \times 10^4 \text{ mm}^4$.	(03)	CO1	Evaluate
C) A simply supported beam 3 m span carries a central point load. If slope at supports due to this load is 1.50, find maximum deflection of the beam.	(04)	CO1	Evaluate
OR			
C) A square R.C.C. column of 450 mm x 450 mm is size is reinforced with 4 bars of 10 mm diameter. Find stress in steel and concrete. The column is subjected to compressive load of 1500 kN. $E_s = 200 \text{ GPa}$ and $E_c = 14 \text{ GPa}$.	(04)	CO1	Evaluate
D) A cantilever beam having cross section 100 mm x 200 mm is 3m long. What UDL should the beam carry to produce a deflection of 10 mm at free end. Take $E = 2 \times 10^5 \text{ N/mm}^2$.	(04)	CO1	Evaluate

ગુજરાતી

પ્રશ્ન.૧	દસમાંથી કોઈપણ છ જવાબ આપો.(દરેકમાટેરગુણ)	(૧૮)
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	૧૦ લોડ લાગુ કરવા માટે કેટલી પદ્ધતિઓ છે?	
પ્રશ્ન.૨	એ) 50kn □□□ □□□□□□ □□□ 4m □□□□□□ □□□□ □□□ 500mm ² □□□□□□ □□□□□□□□ □□□ □□□□□□ □□□ □□. □□□□□□ □□□□□ 2mm □□□□□□ □□□□□ □□ (i) □□□□ (ii) □□□ (iii) □□□□□□□□□□□□□□ □□□□□□□□□□ □□□□□□ □□□□□ □□□□ □□□	(૦૩)
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	બી) 50 mm □□□□ □□□□□□ □□□□□ □□□□□□ □□□□□ □□□ □□□□ □□□□□□ □□□. X 300 mm. □□□ □□□□□ 6 □□. □□□□□ □□□□□□□ 30 KN/m □□ UDL □□□□ □□□ □□□□ □□. □□□□ □□□□□□□ □□□□ □□□ □□□□ □□□. □□□□□□□□□□□□□□□ □□□□□□□□ = 2 x 10 ⁵ MPa	(૦૩)
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	બી) 4m સ્પાનનો કેન્ટીલીવર બીમ સમગ્ર ગાળામાં 8kN/m ના UDL ને આધિન છે. બીમ માટે ડિફ્લેક્શનનું મહત્તમ મૂલ્ય શોધો. $E = 2 \times 10^5 \text{ N/mm}^2$ અને $I = 8 \times 10^6 \text{ mm}^4$ લો.	(૦૩)
	સી) હળવા સ્ટીલ પર તણાવ પરીક્ષણ માટે તણાવ-તાણ વળાંક સમજાવો/ડ્રો કરો.	(૦૪)
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	સી) □□□□□ □□□□ □□□ □□□ □□□□□ □□□□□□.	(૦૪)
	ડી) એક હળવો સ્ટીલનો સળિયો 10 મીમી વ્યાસ અને 1.2 મીટર લાંબો છે. તે તાણ બળને આધિન છે. જો લંબાઈમાં વધારો 5 mm અને $E = 200 \text{ GPa}$ હોય, તો તાણ બળ, તાણ અને તાણની ગણતરી કરો.	(૦૪)

પ્રશ્ન.3	<p>એ) $E = 2 \times 10^5 \text{ N/mm}^2$</p> 	(૦૩)
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	<p>એ) 1.5 $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$.</p>	(૦૩)
	<p>બી) સ્પાન 5 મીટરનો કેન્ટીલીવર બીમ U.D.L ને આધિન છે. સમગ્ર ગાળામાં 30 kN/m. બીમના મુક્ત છેડે ઢાળ અને ડિફ્લેક્શનની ગણતરી કરો. $EI = 2 \times 10^4 \text{ kN.m}^2$</p>	(૦૩)
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	<p>બી) 20 kN/m U.D.L. 3 $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$.</p>	(૦૩)
	<p>સી) 3 $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$.</p>	(૦૪)
અથવા		
	<p>સી) R.C.C. 450 mm x 450 mm $E_s = 200 \text{ GPa}$, $E_c = 14 \text{ GPa}$.</p>	(૦૪)
	<p>ડી) કોસ સેક્શન 100 mm x 200 mm ધરાવતો કેન્ટીલીવર બીમ 3m લાંબો છે. ફ્રી એન્ડમાં 10 મીમીનું ડિફ્લેક્શન ઉત્પન્ન કરવા માટે બીમમાં શું UDL હોવું જોઈએ. $E = 2 \times 10^5 \text{ N/mm}^2$ લો</p>	(૦૪)