P P SAVANI UNIVERSITY

Third Semester of Diploma Examination

November 2022

IDCV2031 Strength of Material

26.11.2022, Saturday **Time: 10:00 a.m. To 12:30 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

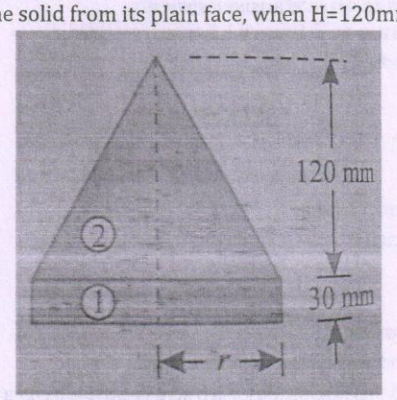
Q - 1	Short Question (**Any Five**)	**[05]**	**CO**	**BTL**
(i)	Define: Creep		**CO4**	**2**
(ii)	Give the definition of Poisson's Ratio		**CO3**	**1**
(iii)	Define Plasticity and Elasticity		**CO4**	**2**
(iv)	What is Factor of safety		**CO4**	**2**
(v)	Define: Stiffness		**CO4**	**1**
(vi)	What is principle of superposition		**CO3**	**2**
(vii)	Give the difference between Toughness and Hardness		**CO4**	**2**
Q - 2 (a)	Explain tensile test of mild steel specimens with stress-strain diagram	**[05]**	**CO3**	**2**
Q - 2 (b)	Write a short note on lateral strain with diagram	**[05]**	**CO3**	**2**
	OR			
Q - 2 (a)	Explain working stress	**[05]**	**CO3**	**2**
Q - 2 (b)	Write a short note on linear strain with diagram	**[05]**	**CO3**	**2**
Q - 3 (a)	Write a short note on Hooke's law	**[05]**	**CO4**	**1**
Q - 3 (b)	A steel bar 1 m long and 20mm ×20mm in cross-section is subjected to an tensile force of 40kN. Find the elongation of the rod. Take E = 200 GPa	**[05]**	**CO2**	**4**
	OR			
Q - 3 (a)	Explain different types of stress.	**[05]**	**CO3**	**2**
Q - 3 (b)	A copper alloy wire 1.5 mm diameter and 30 m long hanging freely from the tower. What will its elongation due to self-weight? Take specific weight of the copper and its modulus of elasticity as 89.2 kN/m3 and 90 GPa respectively	**[05]**	**CO2**	**3**
Q - 4	Attempt **any one.**	**[05]**		
(i)	Derive deformation of a body due to force acting on it with diagram.		**CO3**	**4**
(ii)	What Primary and secondary strain. Explain with diagram.		**CO3**	**2**
Q - 5	Short Question **(Any Five)**	**[05]**		
(i)	Define point load		**CO2**	**2**
(ii)	Define uniformly distributed load		**CO2**	**2**
(iii)	Define fixed beam		**CO2**	**2**
(iv)	Define Cantilever beam		**CO2**	**2**
(v)	Define uniformly varying load		**CO2**	**2**
(vi)	Define Poisson's Ratio.		**CO3**	**1**
(vii)	Define Modulus of rigidity.		**CO3**	**1**
Q - 6 (a)	Define centroid. List out the methods for finding centre of gravity.	**[05]**	**CO2**	**1**
Q - 6 (b)	Explain sign convention for Bending moment with diagram.	**[05]**	**CO2**	**2**

OR

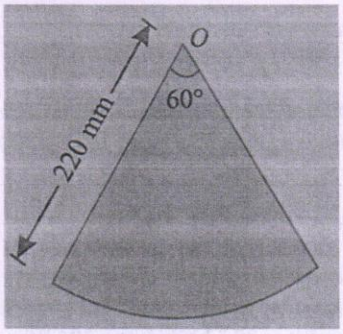
Q - 6 (a)	Explain the types of beam with diagram.	**[05]**	**CO1**	**2**
Q - 6 (b)	Explain sign convention for Shear force with diagram.	**[05]**	**CO2**	**2**
Q - 7 (a)	State and derive Parallel axis theorems.	**[05]**	**CO3**	**1**
Q - 7 (b)	Explain Polar moment of inertia.	**[05]**	**CO3**	**2**

OR

Q - 7 (a)	A solid body formed by joining the base of a right circular cone of height H to the equal base of a right circular cylinder of height h. Calculate the distance of centre of mass of the solid from its plain face, when H=120mm and h=30 mm.	**[05]**	**CO1**	**4**



Q - 7 (b)	A plane lamina 220 mm radius is shown in figure. Find centre of gravity of lamina from the point O.	**[05]**	**CO1**	**4**



Q - 8	Attempt **any one**	**[05]**		
(i)	A hollow circular section has an external diameter of 80 mm and internal diameter of 60 mm. Find its moment of inertia about the horizontal axis passing through its centre.		**CO1**	**5**
(ii)	A hollow semicircular section has its outer and inner diameter of 200 mm and 120 mm respectively. What is its moment of inertia?		**CO1**	**5**

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create