P P SAVANI UNIVERSITY

First Semester of B. Tech. Examination
May 2019
SECV1030 Engineering Mechanics

17.05.2019, Friday   Time: 12:30 p.m. To 03:00 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

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Q - 1	Answer the following.	
(i)	State principle of transmissibility.	[02]
(ii)	Give a real-life example of law of parallelogram.	[02]
(iii)	What is moment?	[02]
(iv)	Why friction exists?	[02]
(v)	What is friction? Give its importance in daily life by giving one example.	[02]
(vi)	What is angle of repose?	[02]
(vii)	Why is static friction greater than dynamic friction?	[02]
(viii)	What is the static indeterminacy of a propped cantilever beam?	[02]
Q - 2	Prove that a force at one point can be replaced with a force and a couple at other point.	[04]
Q - 3	An electric light fixture of weight Q=178 N is supported as shown in fig. 1 Determine the tensile forces in wires BA and BC.	[04]
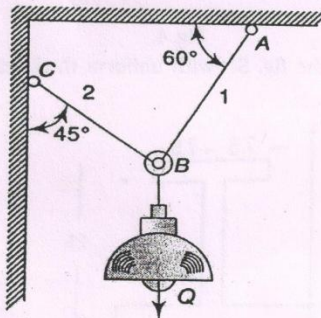
Fig. 1

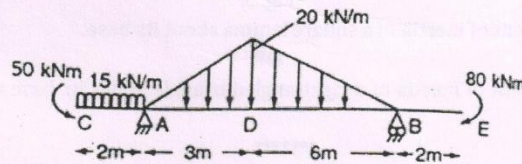Q - 4   Find the reactions at A and B for beam shown in fig. 2.   [06]

Fig. 2.

SECTION – II

Q - 1	Answer the following.	
(i)	What is the physical significance of First Moment of Area?	[02]
(ii)	What is polar Moment of Inertia?	[02]

(iii)	What are Pappus's Guildinus theorems?	[02]
(iv)	What is the difference between centroid and centre of gravity?	[02]
(v)	In which condition, the method of section is preferred over the method of joints?	[03]

OR

(vi)	What is the difference between perfect and imperfect truss? Explain with two separate examples.	[03]

Q - 2 A square hole is removed from a thin circular lamina, the diagonal of the square being equal to radius of the circle as shown in fig. 3 Find the centroid of the remaining lamina. **[04]**
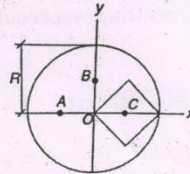

Fig. 3.

Q - 3 Calculate the forces in all the members for the truss given in fig. 4. using method of joints. **[05]**
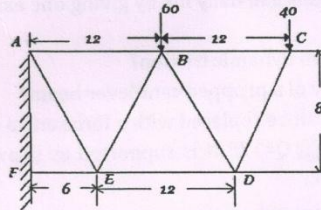

Fig. 4.

Q - 4 Find I_{yy} through centroid of the fig. 5. with uniform thickness of 3cm throughout. (All dimensions are in cm) **[05]**
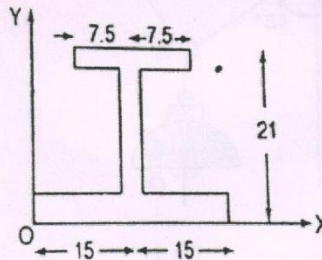

Fig. 5.

Q - 5 Calculate the moment of inertia of a square lamina about its base. **[05]**

OR

Q - 5 Calculate the moment of inertia of a right-angled triangle about its base using parallel axis theorem. **[05]**

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