PAPER ID-312066

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2024-25
ENGG. MECHANICS

TIME: 3 HRS **M.MARKS: 100**

Note: Attempt all Sections. In case of any missing data; choose suitably.

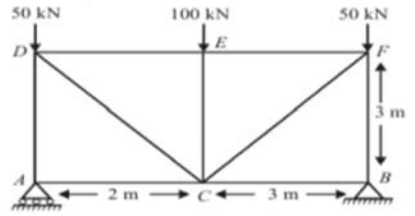
SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	CO	Level
a.	Explain free body diagram with example.	1	K1
b.	Define moment and moment of force.	1	K2
c.	What is the difference between center of gravity and centroid?	2	K1
d.	Define area moment of inertia in brief.	2	K1
e.	Explain cantilever beam with an example.	3	K2
f.	What are the assumption made in the analysis of a simpletruss?	3	K1
g.	What is Rectilinear motion?	4	K1
h.	Define potential energy.	4	K1
i.	What are the general principles in dynamics?	5	K1
j.	Explain in short about Stability of equilibrium.	5	K2

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

Q no.	Question	CO	Level
a.	Discuss Resultant- Moment of Forces and its Applications	1	K6
b.	Find mass moment of inertia of the solid cone ofheight ‘h’ and base radius ‘R’ about its axis rotation.	2	K5
c.	Determine the magnitude and nature of forces in members EF, FC and CB ofthe truss shown in figure. 	3	K5
d.	Explain rectilinear motion with the help of examples.	4	K5
e.	Give D’Alembert’s principle. Also write its applications.	5	K1

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	A body resting on a rough horizontal plane required apull of 24N inclined at 30º to the plane just to move it.It was also found that a push of 30N at 30º to the planewas just enough to cause motion to impend.Makecalculation for the weight of body and coefficient offriction.	1	K5
b.	Define friction. Also state the laws of friction in detail.	1	K2

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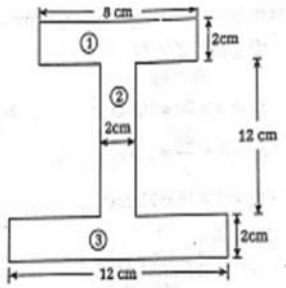
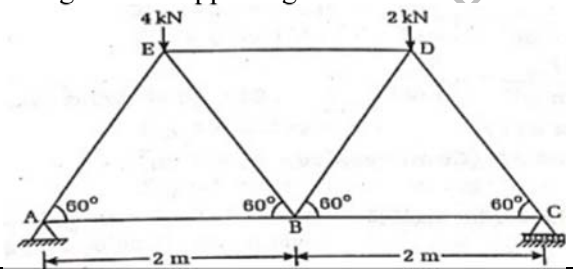
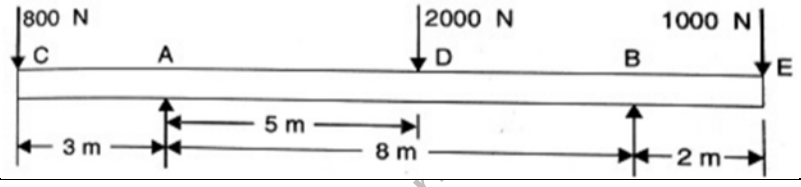
4. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	An I-section is made up of three rectangles as shown in Fig. Find the moment ofinertia of the section about the horizontal axis passing through the centre ofgravity of the section. 	2	K5
b.	Determine the centre of gravity of a solid right circular cone of height h and base circle radius R.	2	K5

5. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Determine the reaction and the forces in eachmember of a simple triangle truss supporting twoloads as shown in figure. 	3	K5
b.	Determine the reaction force for the beam which is loaded as shown in figure. 	3	K5

6. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Define the plane curvilinear motion with the help of examples.	4	K1
b.	Define momentum. Also give the impulse momentum relationship with the help of examples.	4	K1

7. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Discuss the work energy principle and its applications in plane motion of connected bodies.	5	K6
b.	Explain the principle of virtual work for particle and ideal system for rigid bodies.	5	K5

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