Code No. : 12032 (B)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) II-Semester Main Examinations, January-2021
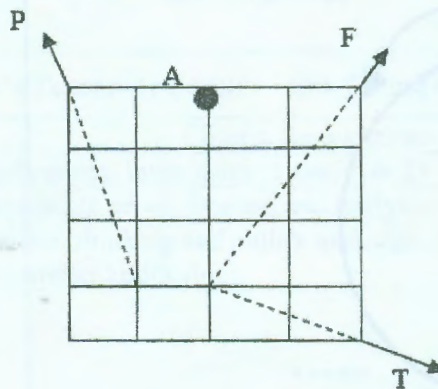## Basic Engineering Mechanics
(Common to CSE & IT)

Time: **2** hours

Max. Marks: **60**

Note: Answer any NINE questions in Part-A and any THREE from Part-B

Part-A (9 × 2 = 18 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Define Coplanar & Concurrent forces.	2	1	1	1
2.	What is unit vector?	2	1	1	1
3.	State the necessary and sufficient conditions for static equilibrium of a particle in two dimensions.	2	1	2	1
4.	State triangle law of forces?	2	1	2	1
5.	Define Deficient frame.	2	1	3	1
6.	What are the assumptions made in the analysis of a perfect frame ?	2	1	3	1
7.	State the Coulomb's laws of dry friction.	2	1	4	1
8.	Explain Wedge friction with an example.	2	2	4	1
9.	Determine centroid of an arc of a circle.	2	2	5	1
10.	State parallel axis theorem	2	1	5	1
11.	State properties of a couple.	2	1	1	1
12.	Can a coplanar non concurrent system with zero resultant force necessarily be in equilibrium?	2	1	2	1

Part-B (3 × 14 = 42 Marks)

13. a)	State the principal of transmissibility of forces with a neat sketch.	4	1	1	1
b)	The three forces shown in figure are required to cause a horizontal resultant acting through point 'A' if T=316-N, determine the values of P and F.	10	2	1	2

				M	L	CO	PO
14.	a)	State Lami's theorem with neat diagram.		2	1	2	1
	b)	Two cylinders A and B weighing 200N and 100N are connected by a bar of negligible weight and are resting on smooth planes as shown in figure find the force 'P' that will hold the system in equilibrium.		12	3	2	2

15.	a)	Differentiate between method of joints and method of sections		2	1	3	1
	b)	Determine the magnitude and nature of all member forces shown in the truss shown below		12	3	3	2

16.	a)	Define limiting friction and cone of friction.		4	1	4	1
	b)	Find the magnitude of moment 'M' required for the roller of Weight '300N' and radius '100mm' starts to motion about centroid in clockwise direction , as shown in figure, if μ=0.28 at all contact surfaces.		10	4	4	2

19.	Answer any *two* of the following:				
a)	Find the forces in all the members of the truss shown below	7	3	3	2

16 kN   D

1.5m

A   θ   θ   B

C

↓24 kN

2m   2m

b)	Find the coefficient of friction between 50N block and horizontal surface so that the 25N block is moving downward	7	2	4	2

50 N

25 N

c)	Find the moment of inertia of the shaded area about base 'X' axis.	7	2	5	2

y

$R_2 = 6$ cm

$R_1 = 2$ cm

R_2

R_1

O   ⟵ 3 ⟶ ⟵ 3 ⟶   x

M: Marks;   L: Bloom's Taxonomy Level;   CO: Course Outcome;   PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	50
2	Knowledge on application and analysis (Level-3 & 4)	50
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	0

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