MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

DEPARTMENT OF CIVIL ENGINEERING

Subject (Name and code) : EMSB CIE - 1073 Semester : I

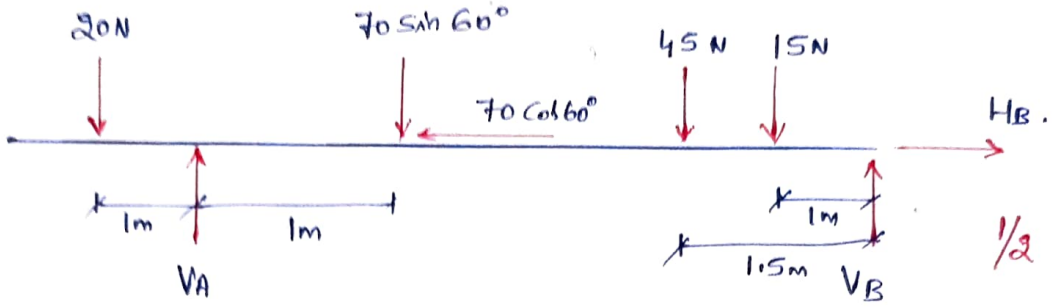
Date of the Examination : 26/09/2024 Month/Year September - 2024.

Name of the Faculty Member : Dr. Raghavendra Holla & Dr. Arun Kumar Y.M Head of the department

SCHEME OF EVALUATION (~~Sessional~~ Midterm.)

Q.No.		Marks
1.	Collinear forces	0.5
2.	Location of the resultant	0.5
3.	Non- Coplanar parallel	0.5
4.	pure rotation	0.5
5.	3	0.5
6.	0 KN	0.5
7.	13.33 N	0.5
8.	60 KN	0.5
9.	50 N	0.5
10.	6	0.5

11.



1/2

$\Sigma F_x = 0 = -70 \cos 60° + H_B$ — 1/2

$H_B = 35\ N$ — 1/2

$\Sigma F_y = 0 = -20 - 70 \sin 60° - 45 - 15 + V_A + V_B$ — 1/2

$V_A + V_B = 140.62\ N$ — 1/2

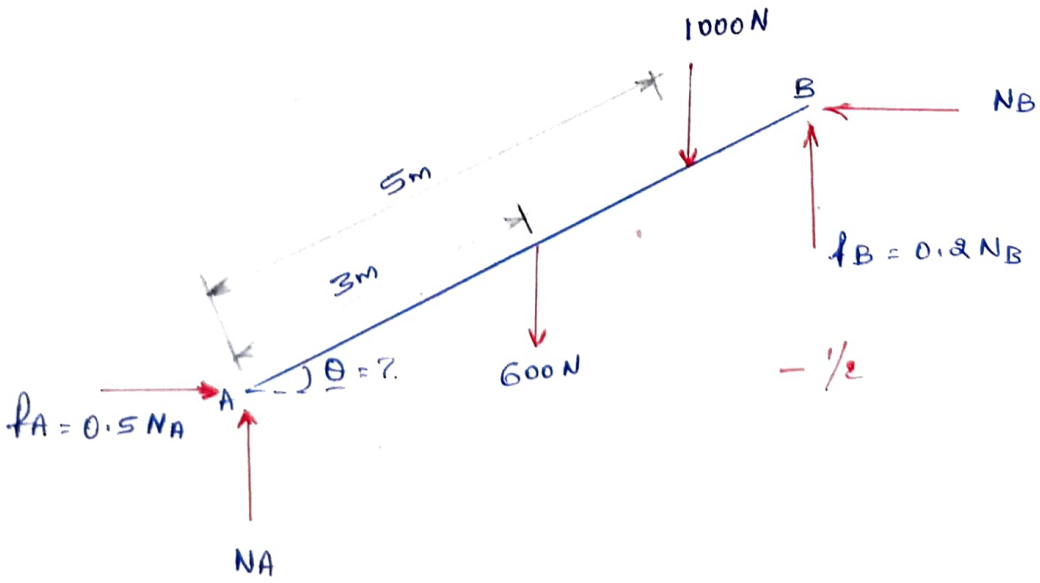
$\Sigma M_A = 0 = 20 \times 1 - 70 \sin 60° \times 1 - 45 \times 4.5 - 15 \times 5 + V_B \times 6$ — 1/2

$V_B = 53.02\ N$ 1/2

$V_A = 87.60\ N$ — 1/2

4 marks

12.



— 1/2

$\Sigma F_x = 0 = 0.5 N_A - N_B$

$N_B = 0.5 N_A$ $-\frac{1}{2}$

$\Sigma F_y = 0 = N_A - 600 - 1000 + 0.2 N_B$

$N_A = 1454.54\ N$ $-\frac{1}{2}$

$N_B = 727.27\ N$

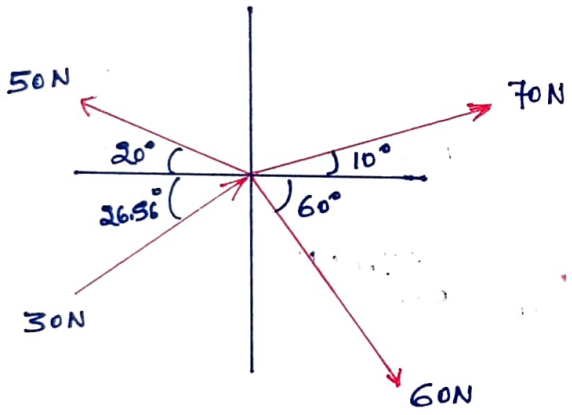
$\Sigma M_A = 0 = -600 \times 3 \cos\theta - 1000 \times 5 \cos\theta + 727.27 \times 6 \sin\theta$

$+ 0.2 \times 727.27 \times 6 \cos\theta$. -1

$\theta = 53.64^\circ$ $-\frac{1}{2}$

3 marks

13.



$\Sigma F_x = 70 \cos 10^\circ + 60 \cos 60^\circ + 30 \cos 26.56^\circ - 50 \cos 20^\circ$ $-\frac{1}{2}$

$\Sigma F_x = 78.78\ N$ $-\frac{1}{2}$

$\Sigma F_y = 70 \sin 10^\circ - 60 \sin 60^\circ + 30 \sin 26.56^\circ + 50 \sin 20^\circ$ $-\frac{1}{2}$

$\Sigma F_y = -9.29\ N$ $-\frac{1}{2}$

$R = \sqrt{78.78^2 + (-9.29)^2}$

$R = 79.32\ N$ $-\frac{1}{2}$

$\theta = \tan^{-1} \frac{9.29}{78.78}$

$\theta = 6.72^\circ$ $-\frac{1}{2}$

3 marks

14. * Drawing neat labelled diagram - ½ mark
* Describing the function of AHU - 1½ marks
* Importance of AHU in HVAC - 1 mark.

3 marks

15. Explaining the contribution of
a) occupancy Sensors - 1 mark
b) Scheduling - 1 mark
c) Daylight harvesting - 1 mark.
in energy Saving

3 marks

16. Comparing the Conventional ACS with reference to a) Cost saving b) Flexible installation and c) Easy and Safe management With POE application.

Each Component Carry 1 mark, 3X1 = 3 marks.

17. *Explaining the functions of fire detection System - 1 mark
* Types of Systems - ½ mark
* Importance. - ½ mark.

2 marks

18. Explaining 'Broadcast' and 'multicast' in terms of
a) Transmission b) management c) Traffic d) Security.

Each Component Carry ½ mark, 4X½ = 2 marks.

19. Explaining a) VAV b) CAV to Compensate thermal loads.

Each Component Carry 1 mark, 2X1 = 2 marks