

Q.2 a]

$\Sigma F_x = 145.4 \text{ kN}$
 $\Sigma F_y = -294.94 \text{ kN}$
 $R = 328.83 \text{ N}$
 $\theta = 63.75^\circ$ with horizontal
 $\Sigma M = 0$
 location

3 marks

3 marks

Q.2 b]

FBD — 2 marks
 calⁿ of $\Sigma F_x = 1$, $R_A = 219.50 \text{ kN}$
 calⁿ of $\Sigma F_y = 1$, $R_B = 155.68 \text{ kN}$
 cal. of moment = 1
 Ans = 4.83 m — 1 mark

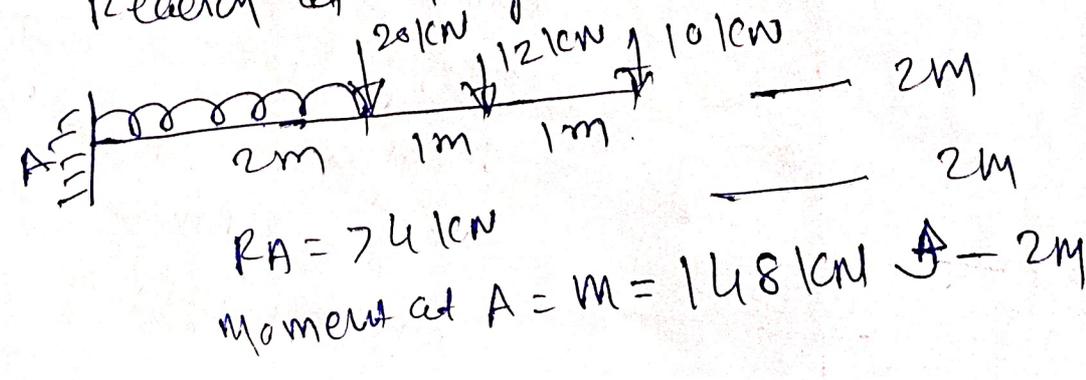
Q.2 c]

FBD — 2 marks
 $\alpha = 29.54^\circ$ — 2 marks
 $\theta = 38.04$ — 2 marks

Q.3 a]

FBD — 2 marks
 Reaction at Roller = 7.75 kN — 2 marks
 Reaction at Hinge = 9.27 kN — 2 marks

Q.3 b]



2M

2M

2M

Q.3 c]

mem	mag	nature	
AB	3 kN	T	FF = 3.4 C
BC	3 kN	T	DF = 0
CD	1.6 kN	T	BF = 0
DE	1.6 kN	T	BD = 0
			AF = 3.4 kN C

each joint carries 1 mark
 All answers are correct = 6 marks

Q.4 a]

Proof - $(b/3, h/3)$ - 6 marks

Q.4 b]

centroid $(\bar{x}, \bar{y}) = (16.5 \text{ mm}, 26.5 \text{ mm})$ - 2 marks
 $I_{xx} = 807757 \text{ mm}^4$ - 2 marks
 $I_{yy} = 387757 \text{ mm}^4$ - 2 marks.

Q.4 c] - Proof - Parallel Axis theorem - 3 marks
 - Perpendicular Axis theorem - 3 marks.

Q.5 a] FBD of block - w2 - 1 mark
 Analysis - 2 marks
 FBD of w1 - 1 mark
 Analysis - 2 marks
 $\alpha = 15.28^\circ$

Q.5 b] FBD of wedge - 1 mark
 Analysis - 2 marks
 FBD of block - 1 mark
 Analysis - $P = 3.2 \text{ kN}$ - 2 marks

Q.5 c] Fig & FBD - 2 marks
 Analysis with Answer = $\theta = 52.64^\circ$ - 4 marks