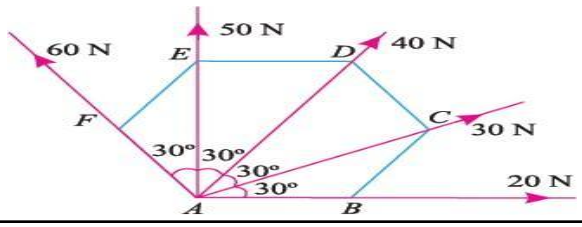
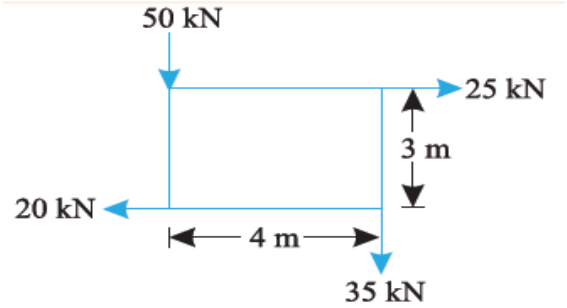
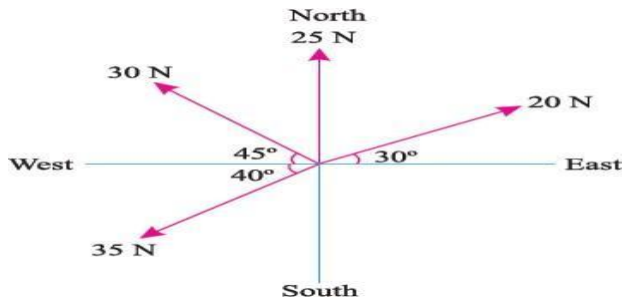
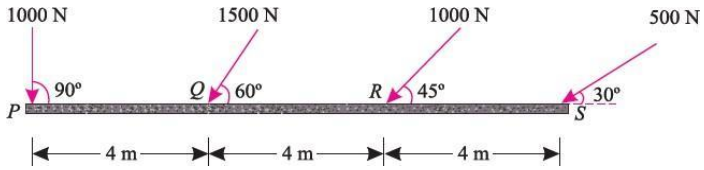
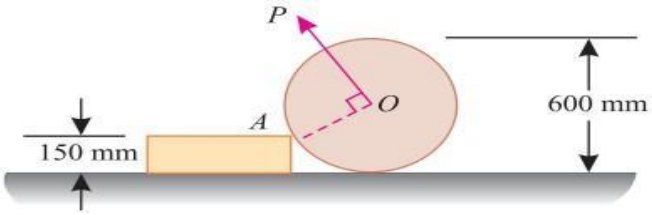
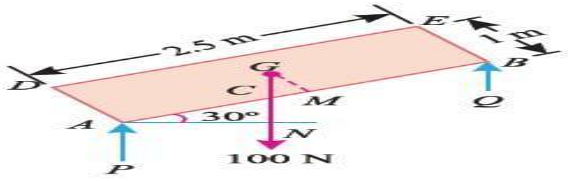
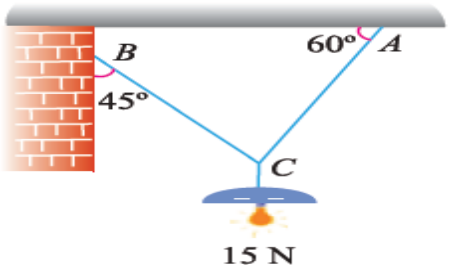
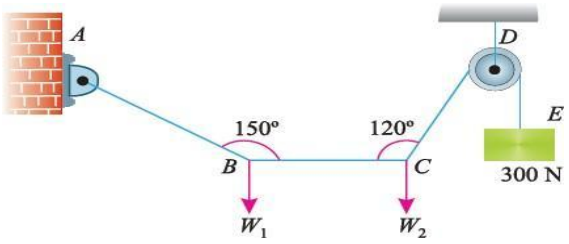
Assignment question

S. No	Part A Each Question Contains 2 Marks	Marks	BTL	CO
1.	State the “law of parallelogram of forces”.	2	BTL-1	CO1
2.	Define the terms: scalars and vectors with examples.	2	BTL-1	CO1
3.	What is resultant of a system of forces? Write the equation as per the method of resolution.	2	BTL-1	CO1
4.	Classify the different types of system of forces.	2	BTL-2	CO1
5.	What is meant by free body diagram? State its use with examples.	2	BTL-2	CO1

UNIT –I				
S.No	**Part B Each Question Contains 12 Marks**	**Marks**	**BTL**	**CO**
1.(a)	Find the magnitude of the two forces, such that if they act at right angles, their resultant is $\sqrt{10}$ N. But if they Act at 60°, their resultant is $\sqrt{13}$ N.	12	BTL-5	CO1
(b)	The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting at one of the angular points of a regular hexagon, towards the other five angular points, taken in order. Determine the magnitude and direction of the resultant force. 		BTL-5	
2.(a)	A System of forces are acting at the corners of a rectangular block as shown in figure below. Estimate the magnitude and direction of the resultant force. 	12	BTL-5	
(b)	The following forces act at a point : (i) 20 N inclined at 30° towards North of East, (ii) 25 N towards North, (iii) 30 N towards North West, and (iv) 35 N inclined at 40° towards South of West. Calculate the magnitude and direction of the resultant force.		BTL-3	CO1

				
3.(a)	A horizontal line PQRS is 12 m long, where PQ = QR = RS = 4 m. Forces of 1000 N, 1500 N, 1000 N and 500 N act at P, Q, R and S respectively with downward direction. The lines of action of these forces make angles of 90°, 60°, 45° and 30° respectively with PS. Find the magnitude, direction and position of the resultant force. 		BTL-5	
(b)	A uniform wheel of 600 mm diameter, weighing 5 kN rests against a rigid rectangular block of 150 mm height as shown in Figure below.  Estimate the least pull, through the centre of the wheel, required just to turn the wheel over the corner A of the block. Also find the reaction on the block. Take all the surfaces to be smooth.	12	BTL-5	CO1
4.(a)	A machine component of length 2.5 meters and height 1 meter is carried upstairs by two men, who hold it by the front and back edges of its lower face. If the machine component is inclined at 30° to the horizontal and weighs 100 N. Determine how much of the weight each man supports? 	12	BTL-5	CO1

5.(a)	An electric light fixture weighting 15 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in Figure below.  Using Lami's theorem, Determine the forces in the strings AC and BC.	**12**	**BTL-5**	**CO1**
(b)	A light string ABCDE whose extremity A is fixed, has weights W1 and W2 attached to it at B and C. It passes round a small smooth peg at D carrying a weight of 300 N at the free end E as shown in Figure below.  If in the equilibrium position, BC is horizontal and AB and CD make 150° and 120° with BC, find (i) Tensions in the portion AB, BC and CD of the string and (ii) Magnitudes of W1 and W2.		**BTL-5**	