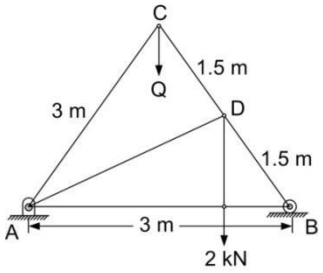
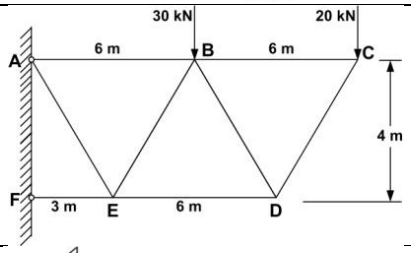
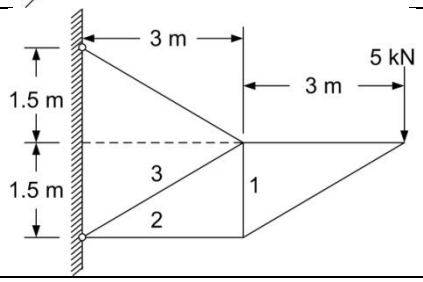
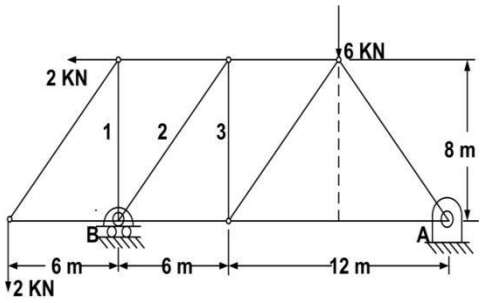
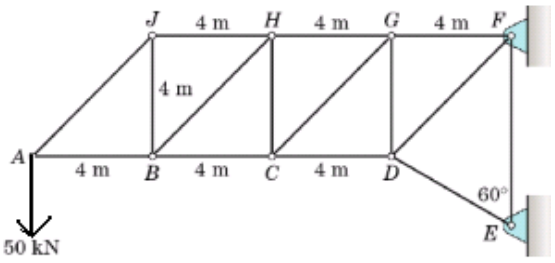
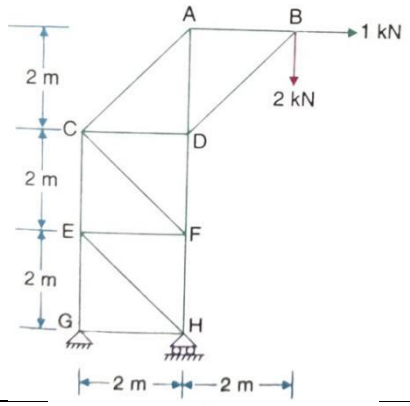
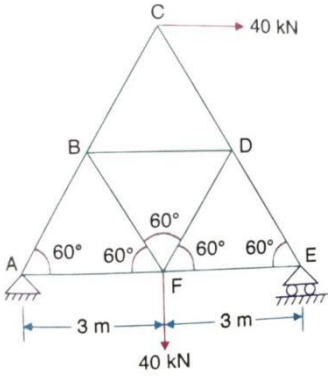
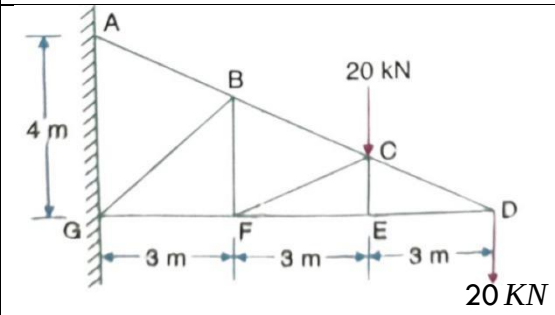
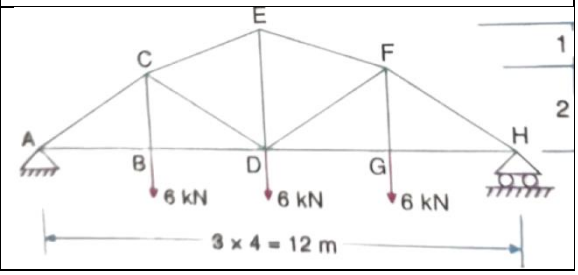
SCHOOL OF MECHANICAL ENGINEERING, KIIT UNIVERSITY

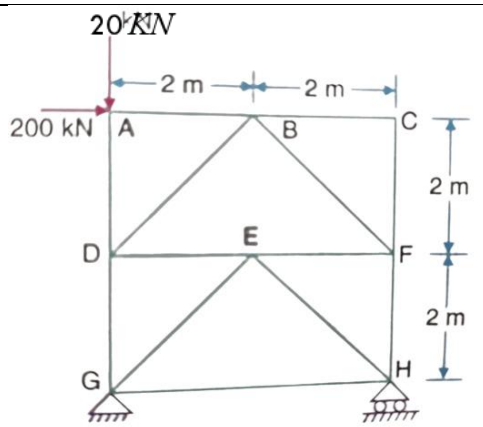
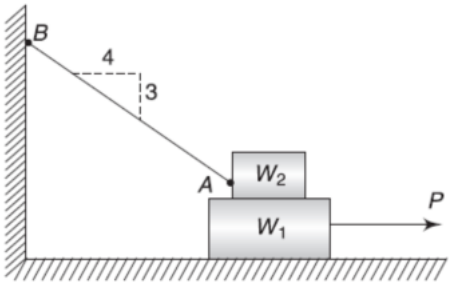
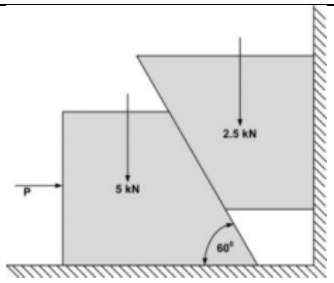
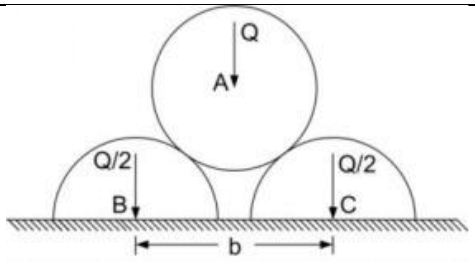
ASSIGNMENT 2

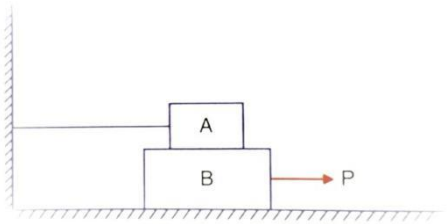
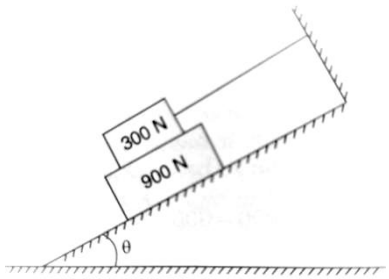
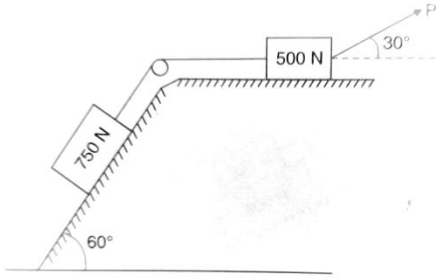
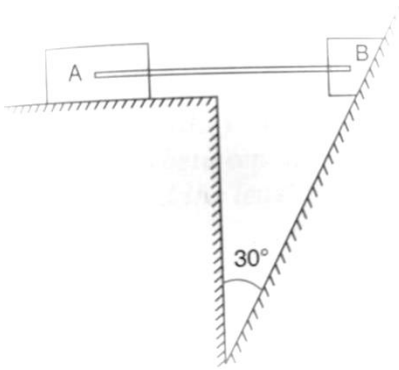
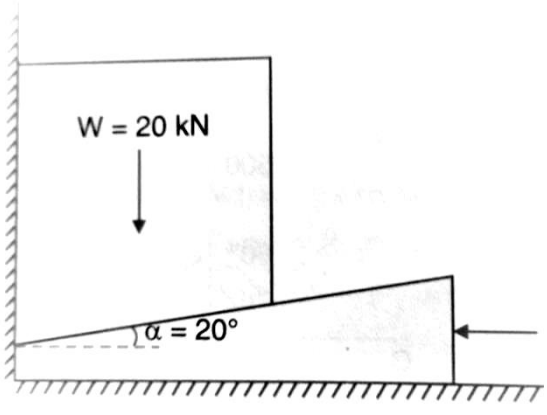
Subject: Engineering Mechanics [ME10001] **DUE ON : 25/04/23**

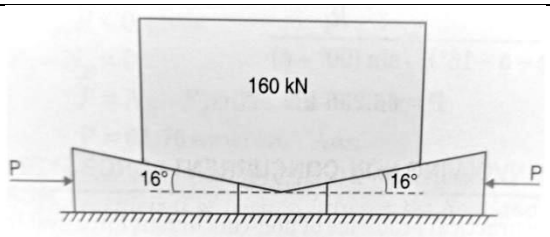
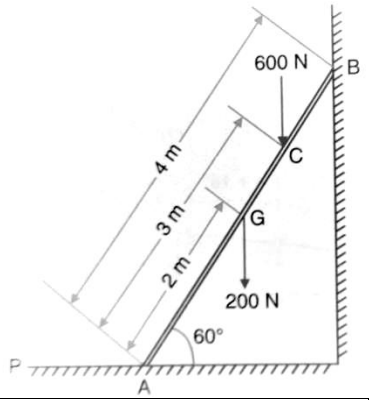
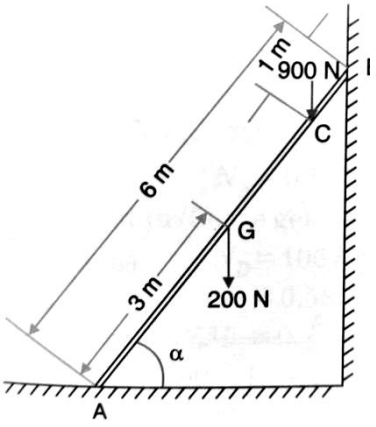
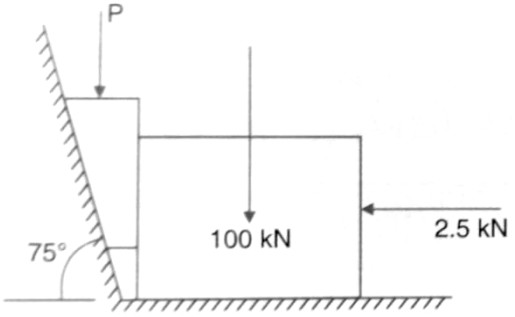
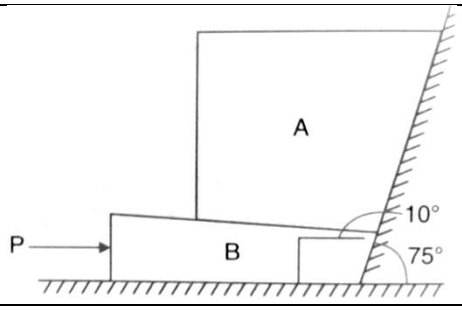
The student are instructed to solve the assigned questions in plain A4 sheets and upload it in the google classroom before submitting the hard copy to the concerned faculty.

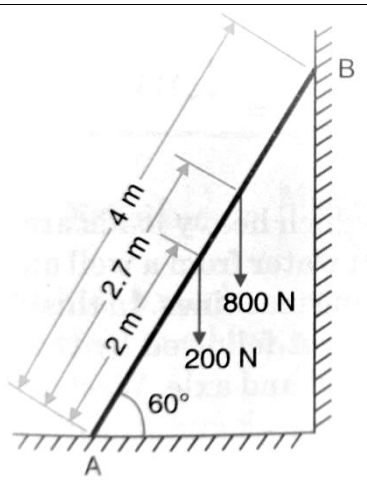
Q1	Find the axial force in the bar *AD* as shown in figure. Triangle *ABC* is equilateral.	
Q2	Determine the forces in the bars *BC*, *BD* and DE of the truss shown in figure.	
Q3	Find out the axial force in the members 1, 2 and 3 of the truss as shown in figure.	
Q4	Determine the axial forces in each of the bars 1, 2 and 3 of the plane truss shown in the figure.	

Q5	Find the axial force in the bars BC, BH and GC as shown in figure.	
Q6	Find the axial forces in bars AC, CD and EF.	
Q7	Find the axial forces in bars BD, DF and BF.	
Q8	Find the axial forces in all the bars.	
Q9	Find the axial forces in bars EF, CD and DG.	

Q10	Find the axial forces in bars BD, CF and DE.	
Q11	A block of weight W_1 = 890N rests on a horizontal surface and supports on top of it another block of weight W_2 = 222.5N as shown in figure. The block W_2 is attached to a vertical wall by the inclined string AB. Find the magnitude of the horizontal force P, applied to the lower block as shown that will be necessary to cause slipping to impend. The coefficient of static friction for all contiguous surfaces is μ = 0.3.	
Q12	As shown in figure , the coefficients of friction are as follows: 0.25 at the floor, 0.30 at the wall, and 0.20 between blocks. Find the minimum value of a horizontal force P applied to the lower block that will hold the system in equilibrium.	
Q13	A smooth circular cylinder of weight *Q* and radius r is supported by two semicircular cylinders each of the same radius r and weight *Q/2* as shown in figure 3. If the co-efficient of friction between the flat faces of the semicircular cylinders and horizontal plane is μ=0.5. Determine the maximum distance b between the centers B and C for which equilibrium will be possible without the middle cylinder touching the horizontal plane.	

Q14	Block A weighing 1000 N rests over block B which weighs 2000 N as shown in figure. Block A is tied to wall with a horizontal string. If the coefficient of friction between blocks A and B is 0.25 and between B and floor is 1/3, what should be the value of P to move the block (B), if (a) P is horizontal? (b) P acts at 30^o upwards to horizontal?	
Q15	What should be the value of θ in figure that will make the motion of 900 N block down the plane to impend? The coefficient of friction for all contact surfaces is 1/3.	
Q16	What is the value of P in the system shown in figure to cause the motion of 500N block to the right side? Assume the pulley is smooth and the coefficient of friction between other contact surfaces is 0.20.	
Q17	Two blocks connected by a horizontal link AB are supported on two rough planes as shown in figure. The coefficient of friction between the block A and horizontal surface is 0.4. The limiting angle of friction between block B and inclined plane is 20°. What is the smallest weight W of the block A for which equilibrium of the system can exist, if the weight of block B is 5 kN?	
Q18	Determine the minimum force required to move the wedge shown in figure. The angle of friction for all contact surfaces is 15°.	

Q19	The block C, weighing 160 kN is to be raised by means of driving wedges A and B as shown in Figure. Find the value of force P for impending motion of the block upwards, if coefficient of friction is 0.25 for all contact surfaces. Self weight of wedges may be neglected.	
Q20	A ladder of length 4 m, weighing 200 N is placed against a vertical wall as shown in Figure. The coefficient friction between the wall and the ladder is 0.2 and that between the floor and the ladder is 0.3. In addition to self weight, the ladder has to support a man weighing 600 N at a distance of 3 m from A. Calculate the minimum horizontal force to be applied at A to prevent slipping.	
Q21	The ladder shown in figure is 6m long and is supported by a horizontal floor and vertical wall. The coefficient of friction between the floor and the ladder is 0.25 and between wall and the ladder is 0.4. The self weight of the ladder is 200 N and may be considered as concentrated at G. The ladder also supports a vertical load of 900 N at C which is at a distance of 1 m from B. Determine the least value of a at which the ladder may be placed without slipping. Determine the reactions developed at that stage.	
Q22	Determine the force P required to start the wedge as shown in figure The angle of friction for all surfaces of contact is 15°.	
Q23	Two blocks A and B weighing 15 kN, and 3 kN respectively, are held in position against an inclined plane by applying a horizontal force P as shown in figure. Find the least value of P which will induce motion of the block A upwards. Angle of friction for all contact surfaces is 12^o.	

Q24	A 4 m ladder weighing 200 N is placed against a vertical wall as shown in figure. As a man weighing 800 N, reaches a point 2.7 m from A, the ladder is about to slip. Assuming that the coefficient of friction between the ladder and the wall is 0.2, determine the coefficient of friction between the ladder and the floor.	

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