BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BTECH
BRANCH: ALL

SEMESTER: BACKLOG
SESSION: SP/2019

SUBJECT: ME101 BASICS OF MECHANICAL ENGINEERING

TIME: 2 HOURS

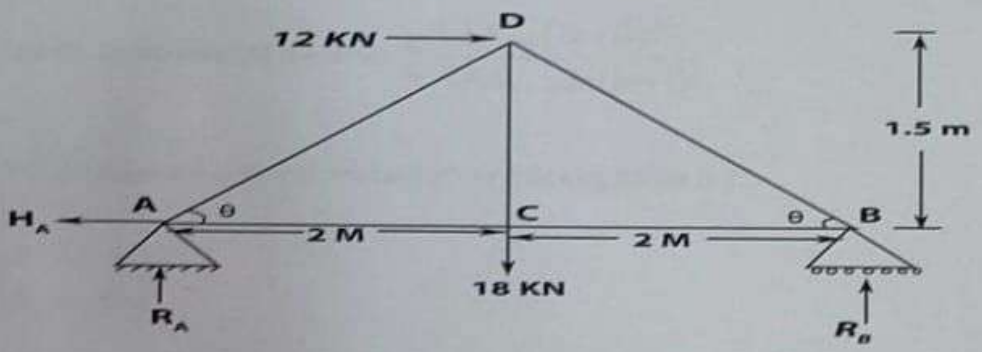
FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

Q1 (a) Define term resultant of force system. Prove Lami 's theorem. [2]
Q1 (b) A force of 200N is resolved into two components is equal to 120N and makes an angle of 30^0 with the 200N force, find the other components and the angle between the components. [3]

Q2 (a) State and prove Varignon's theorem. [2]
Q2 (b) Find the magnitude of two like parallel forces acting at a distance of 24cm whose resultant is 200N and its line of action is at a distance of 6cm from one of the forces. [3]

Q3 (a) State the assumptions made while making and analysis of truss. [2]
Q3 (b) Determine the forces in truss which carries horizontal load of 12kN and vertical load of 18kN. [3]



Q4 (a) What is difference between particle and rigid body mechanics. [2]
Q4 (b) A disk is originally rotating at ω_0=8rad/sec. it is subjected to a constant angular acceleration of α=6rad/sec^2 determine the magnitudes of the velocity and the n and t components of the acceleration of point A at the instant t=0.5 sec. [3]

Q5 (a) Define the following terms : Co-efficient of friction, Angle of repose and angle of friction. [2]
Q5 (b) A body of weight 200N is placed on a rough surface on a rough horizontal plane. Determine the co-efficient of friction if horizontal force of 130N is just sufficient to cause the body slide over the plane also calculate the resultant reaction. [3]

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