| Exam.	New Back (2066 Batch & Later)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BIE, B.Agri., B.Arch.	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

Subject: - Applied Mechanics

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt any **Five** questions.
✓ The figures in the margin indicate **Full Marks**.
✓ Assume suitable data if necessary.

1. a) What are the fundamental concepts and principles of Newtonian mechanics? [4]

   b) Draw bending moment diagram, shear force diagram and axial force diagram for the given figure below. And also indicate the salient points if any. [12]
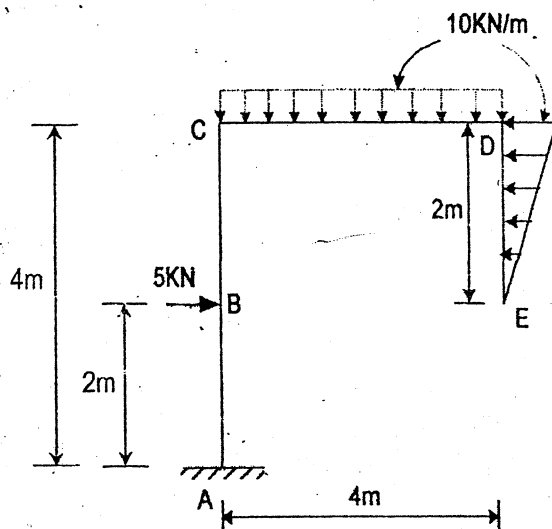
2. a) Explain principles of transmissibility and its limitations. [6]

   b) Determine force couple system about point 'A' for the given system of forces as shown in figure below. [10]
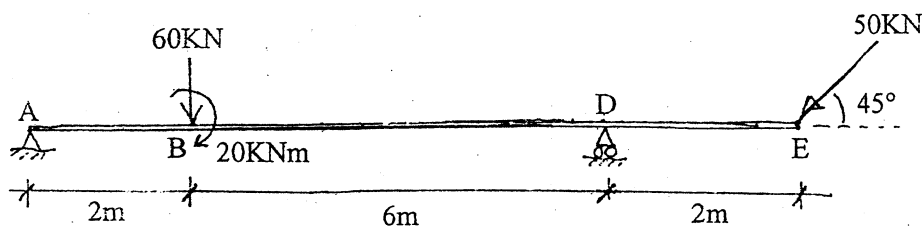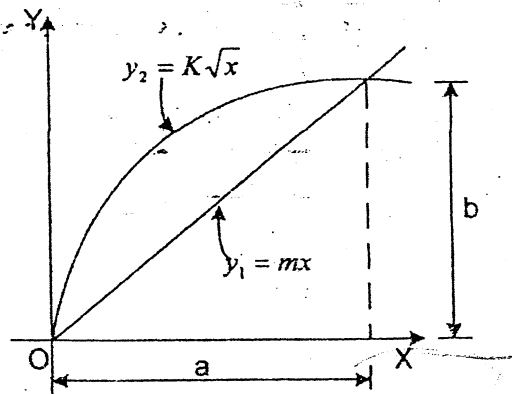
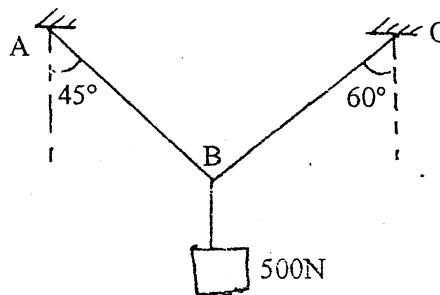3. a) Explain the characteristics of friction with sketch. [4]

   b) Determine the moment of inertia of the common area as shown in figure below about x and y axis. [12]
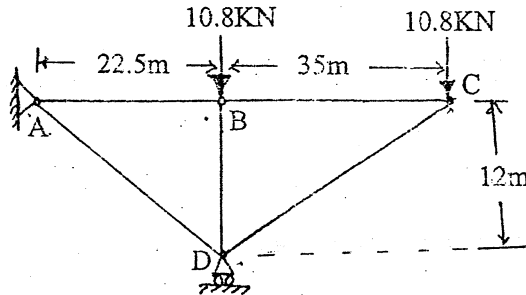

4. a) Determine the forces in cables AB and AC as shown in figure below. [5]

   b) Determine the forces in all members of the truss shown in figure below. [11]

5. a) The position of particle which moves along a straight line is defined by the relation $x = t^3/3 - 6t^2 - 15t$. Where x is in meter and t is in seconds. Determine: [8]

   i) The time at which velocity will be zero
   ii) The position and distance travelled by the particle at that time
   iii) The acceleration of the particle at that time

   b) Define dynamic equilibrium. Also state equation of motion for rectilinear and curvilinear motion of particle. [8]

6. a) How the motion of a particle is found when the acceleration is a given function of time? [6]

   b) A particle projected at an angle of θ to horizontal axis with an initial velocity of 61m/sec hits a target located at 600 meter below the horizontal axis and having the inclined slope of ¾ downward from the axis of to the target. Find the projected angle θ and the maximum height achieved by particle from the target. [10]

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