Code No: R161216 **R16** SET - 1

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019
ENGINEERING MECHANICS
(Com. to CSE, IT, AGE)

Time: 3 hours Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define couple. (2M)

   b) Write the equations of equilibrium for coplanar concurrent force system. (2M)

   c) What is the distance of centroid of right angled triangle of base 'b' and height 'h', from its base? (2M)

   d) Define the term "product of inertia". (2M)

   e) Illustrate curvilinear motion with an example. (2M)

   f) Write work-energy equation. (2M)

   g) Write kinetic equation of motion for a body rotating with angular acceleration 'α'. (2M)

PART -B

2. a) Define the following. (6M)
   (i) Law of transmissibility (ii) Parallelogram law of forces

   b) Figure-1 shows the coefficient of static friction is 0.25. Compute the value of the horizontal force 'P' necessary to (8M)
   (i) Just start the block up the incline.
   (ii) Just prevent motion down the incline.
   (iii) If P=400N, what is the amount and direction of the friction force?

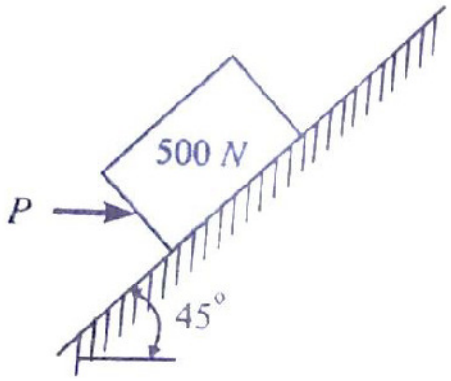

Figure-1
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3. a) Determine the axial forces induced in the members of a truss as shown in figure-2 (10M)

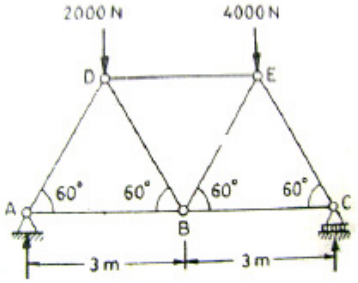

Figure-2

b) Explain the graphical method for finding the resultant of coplanar concurrent force system. (4M)

4. a) Determine the centroid of a rectangle having base b and height h. (6M)

b) Locate the centroid of an I-section about X-X axis as shown in the figure-3. (8M)

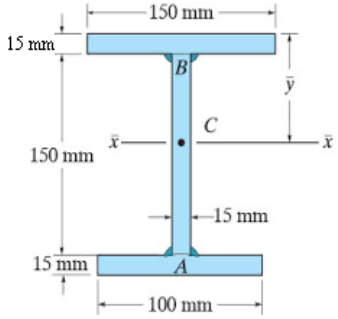

Figure-3

5. a) State and derive transfer theorem for areas. (6M)

b) Find area moment of inertia of L section shown in Figure-4 about X axis. (8M)

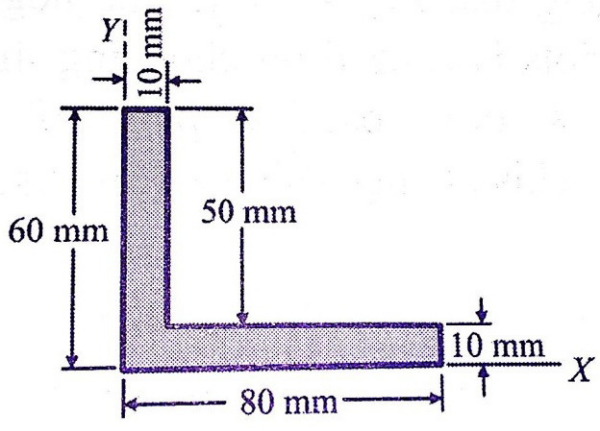

Figure-4

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6. a) A stone is dropped into a well while splash is heard after 2.5 seconds. Then determine depth of water surface assuming the velocity of sound as 330 m/s. (7M)

   b) A motorist takes 10 seconds to cover a distance of 20m and 15 seconds to cover a distance of 40m. Find the uniform acceleration of the car and the velocity at the end of 15 seconds. (7M)

7. Three blocks *A*, *B* and *C* are connected as shown in the Figure-5. Find acceleration of the masses and the tension T_1 and T_2 in the strings. Given μ_1=0.2 and μ_2=0.25. (14M)

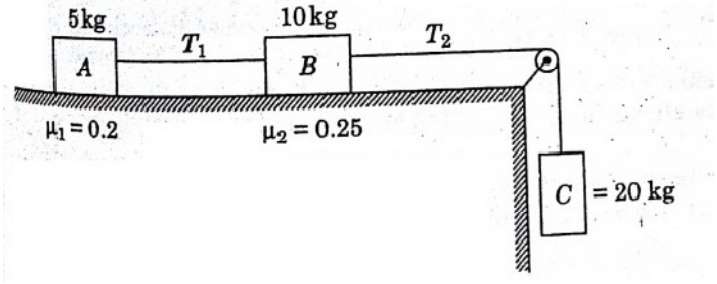

Figure-5