Code No. 07

FACULTY OF ENGINEERING & INFORMATICS

B.E. I-Year (Backlog) Examination, May/June 2018

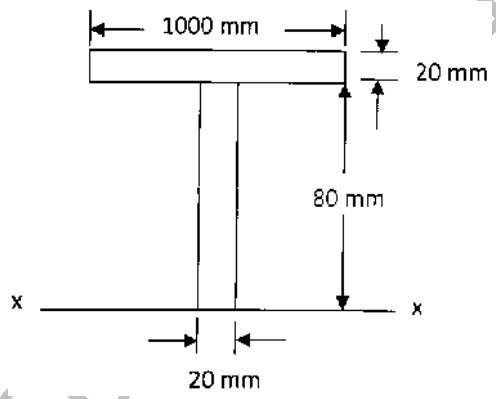
Subject: Engineering Mechanics

Time: 3 hours **Max. Marks: 75**

Note: Answer all questions from Part-A & Any five questions from Part-B.

Part-A (25 Marks)

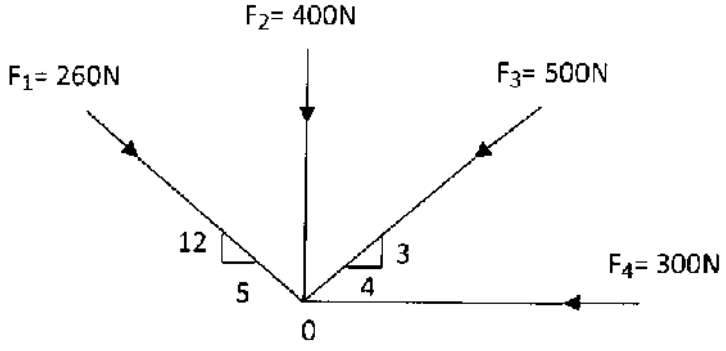
1. Explain the term "Force" and list its characteristics. (2)
2. Explain the concept of "Free body diagram" with example. (3)
3. Define the terms "Angle of friction and cone of friction". (2)
4. A block weighing 500N is resting on a horizontal plane. If the coefficient of friction is 0.40, determine the force "P" to cause motion to impend if "P" is applied horizontally. (3)
5. Write any two differences between centroid and centre of gravity. (2)
6. Locate the centroid coordinates "T" section shown in fig. (3)



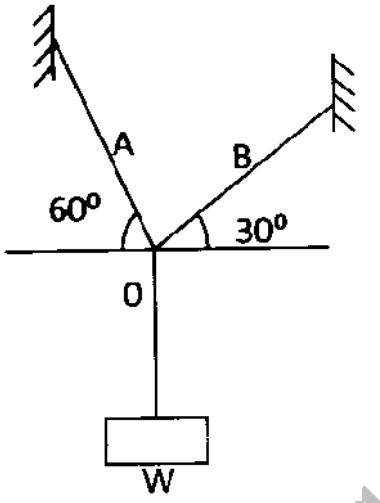
7. A particle moves along a straight line. Its motion is represented by the equation $S= 16t + 4t^2- 3t^3$, Where, is meters and t, in seconds. Determine displacement, velocity and acceleration 2 sec after start. (3)
8. Name the different types of motion. Explain about them briefly. (2)
9. State and explain D Alembert's principle. (2)
10. Explain in detail about coefficient of restitution. (3)

PART-B (50 Marks)

11. (a) A gusset plate is subjected to four forces concurrent at point O. Find the magnitude and direction of the resultant (5)

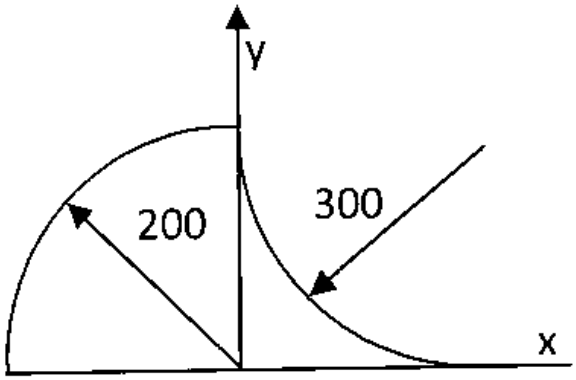


(b) A crate is held in equilibrium by two cables as shown. If the tension in cable B is 300 N, what is the weight of crate? (5)

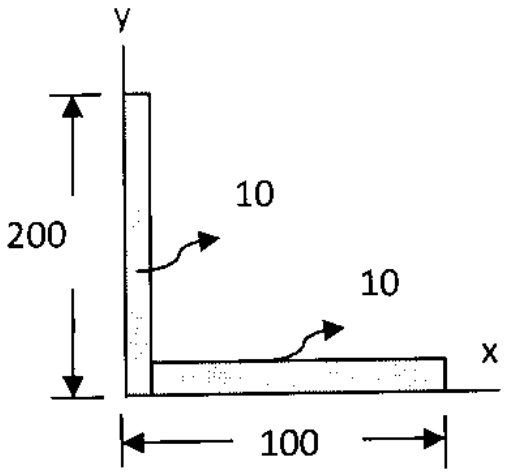


12. Determine the smallest angle Θ for equilibrium of ladder of length L and weight W resting against vertical wall and floor at B and A. The coefficient of static function is "f" on all surfaces of contact. (10)

13. (a) Locate centroid with respect to given X and Y axes. 5



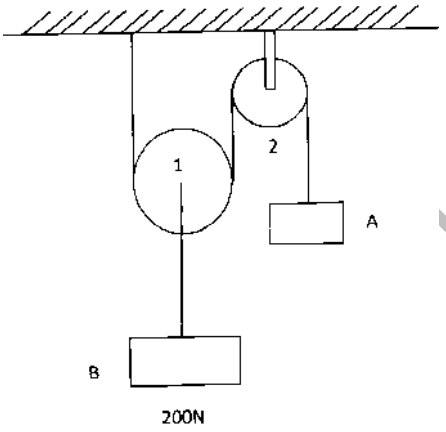
(b) Locate centroid of the following structural section. (5)



14. (a) A projectile is fired from the top of a tower 100m high with a velocity of 100 m/sec, at 60º to horizontal. Find horizontal range through base of the tower. (5)

    (b) A 600mm diameter flywheel is brought uniformly from rest to a speed of 350 rpm in 20 seconds. Determine the velocity and acceleration of a point on the rim 2 seconds after starting from rest. (5)

15. In the system of connected bodies shown in fig. Determine the weight of A to give a downward acceleration of 0.6g to A. (10)

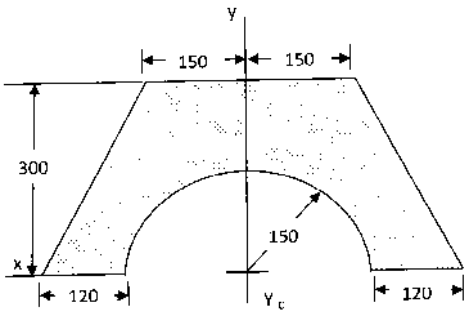


16. Ball A of mass 1 kg moving with a velocity of 2m/s stikes directly on a ball of mass 2 kg at rest. The ball A after striking comes to rest. Find the velocity of B after striking and coefficient of restitution. (10)

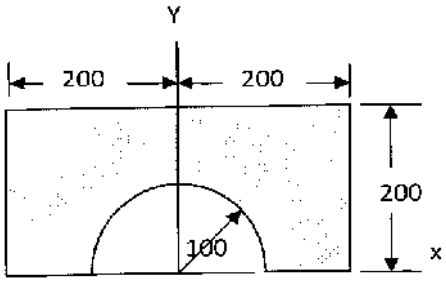
17. Answer any two of the following:

    (a) Parallel axis theorem for mass moment of inertia. (5)

    (b) Determine area moment of inertia about the centroidal x and y axes. (5)



    (c) Find y ordinate of the centroid of shaded area shown. (5)



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FACULTY OF ENGINEERING

BE I-Semester (Supplementary) Examination, May / June 2018

Subject: Engineering Chemistry-I

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A, & any FIVE Questions from Part-B.

PART-A (20 Marks)

1. Explain the term State function. Give Examples. [2]
2. Give the Physical Significance of Entropy. [2]
3. What is safety Fuse? What is its purpose? [2]
4. Explain Pattinson's process of Desilverization of Lead. [2]
5. Define the terms (i) Priming (ii) Foaming. [2]
6. Write the specifications of potable water. [2]
7. Give the reaction for the preparation of Nylon 6.6 from its Monomers. [2]
8. What are conducting Polymers? Give examples. [2]
9. Write about Viscosity Index. [2]
10. Explain the property of Thermal Spalling in Refractories. [2]

PART-B (50 Marks)

11. (a) State First Law of Thermodynamics in its various forms. Derive the expression for maximum work done in an Isothermal reversible expansion of an ideal gas. [5]

    (b) A Carnot cycle working between 0^0C and 100^0C takes up 840 Joules from the high temperature reservoir. Calculate the work done, the heat rejected and efficiency? [5]

12. (a) State Phase rule and explain the terms involved in it [5]
    (b) Explain the Phase diagram of water system. [5]

13. (a) Write the preparation, properties and uses of (i) Bakelite (ii) Buna-S. [5]
    (b) Distinguish between Addition and Condensation Polymerization. [5]

14. (a) What is Reverse Osmosis? How is sea water purified by using this technique? [5]

    (b) 100ml of raw water sample on titration with $\frac{N}{50} H_2So_4$ required 12.4ml of acid to Phenolphthalein end point, 15.2ml of acid to methyl orange end point. Describe the type and extent of alkalinity present in the water sample. [5]

15. (a) What are Solid Lubricants? Write short note on Graphite and Molybdenum disulphide. [5]
    (b) What is refractory material? What are the requirements of good refractory material? [5]

16. (a) Explain the terms free Energy & Work function. Discuss their significance. [5]
    (b) Illustrate Break Point Chlorination. [5]

17. (a) Write a note extrinsic conducting Polymers. [5]
    (b) Explain the terms (i) Refractoriness (ii) Hydrodynamic lubrication. [5]

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