

FACULTY OF ENGINEERING

B.E. I - Semester (CBCS) (Backlog) Examination, March/April 2022

Subject: Engineering Chemistry - I

(Common for All Branches)

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A**Note: Answer all questions****(10 x 2 = 20 Marks)**

- 1 How can you differentiate state function and path function?
- 2 According to thermodynamics 'What is spontaneous process'?
- 3 Define the terms 'Phase' and 'Component' with suitable example.
- 4 Calculate the degrees of freedom in the following system.
(i) a gaseous mixture of N_2 , H_2 and NH_3 in equilibrium
- 5 What are the salts caused for temporary hardness and permanent hardness of water?
- 6 Distinguish between 'scale' and 'sludge' regarding water.
- 7 State condensation polymerization. Give one example.
- 8 Explain vulcanization of rubber.
- 9 Write principle of saponification number and acid value.
- 10 What are requirements of good refractory material?

PART – B**Note: Answer any five questions****(5 x 10 = 50 Marks)**

- 11 (a) Explain principle of work done in reversible isothermal process.
(b) Describe variation of free energy with temperature and pressure.
- 12 (a) Write the concept of Pattinson's process of desilverisation of lead.
(b) Discuss the application of phase rule to water system (one component system).
- 13 (a) How do you determine the permanent hardness of water by EDTA method?
(b) Explain the concept of break point chlorination during water treatment.
- 14 (a) List out the differences between thermoplastic and thermosetting polymers.
(b) What is conducting polymer? Discuss the mechanism of conduction of polymers with respect to poly acetylene.
- 15 (a) Explain classification and properties of lubricants.
(b) Write a note on : (i) Refractoriness (ii) Thermal spalling
- 16 (a) Explain Carnot cycle and efficiency of reversible heat engine.
(b) What is osmosis? Discuss softening of hard water by reverse osmosis method.
- 17 (a) Discuss the manufacture of white wares and their uses.
(b) Explain preparation, properties and engineering applications of Bakelite.

FACULTY OF ENGINEERING

B.E. I - Year (NON-CBCS) (Backlog) Examination, March / April 2022

**Subject: Engineering Mechanics
(Common for All Branches)**

Time: 3 hours

Max. Marks: 75

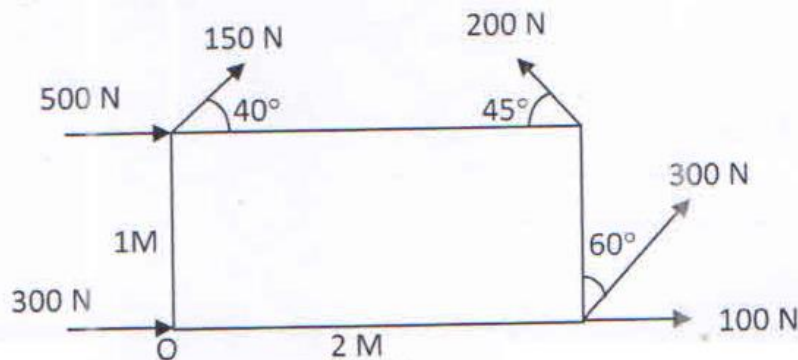
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PART – A**Note: Answer all questions.****(25 Marks)**

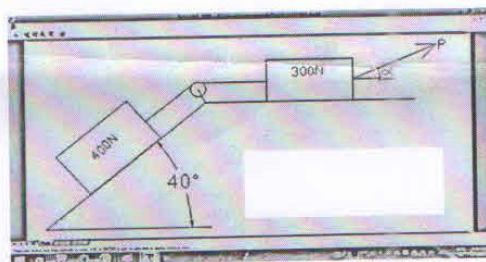
- 1 What are the characteristics of a force? Explain with an example.
- 2 Find the angle between the force, if two forces of equal magnitude and their resultant is the same as that of the forces.
- 3 Explain briefly about cross product.
- 4 Define the terms angle to friction and cone of friction.
- 5 State pappus theorems.
- 6 Calculate the radius of gyration if the radius circular section is 300 mm?
- 7 A projectile is fired horizontally from a point 300m above the ground with initial velocity of 108m/sec. Find the range.
- 8 State D'Alembert's principle for a particle and explain the same with a figure.
- 9 State work energy principle for translation.
- 10 State and explain law of conservation of linear momentum.

PART – B**Note: Answer any five questions.****(5 x 10 = 50 Marks)**

- 11 Determine the position and magnitude of the resultant force acting on the framework shown in figure. What is the moment of the force system about the point O?

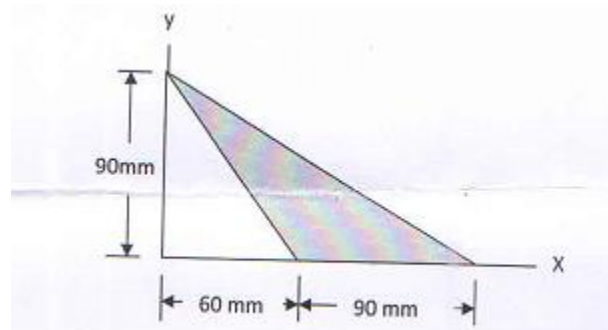


- 12 Determine the least value of the force 'P' to cause motion to impend rightwards. Assume the coefficient of friction under each block to be 0.3 and the pulley to be friction less.



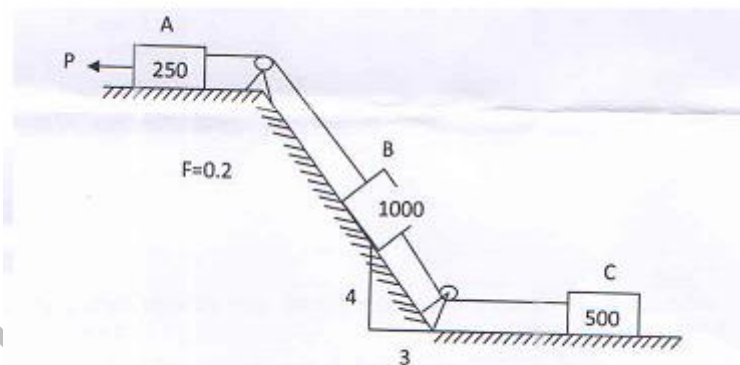
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- 13 Determine area moment of inertia for the shaded portion with respect to given x and y axes shown in figure.



- 14 The velocity of a particle moving in a straight line is given by the expression $V = 2t^3 - t^2 - 2t + 4$. The particle is found to be at a distance of 10m from station A after 2 seconds. Determine (a) acceleration (b) displacement after 6 seconds.

- 15 Determine the constant force P that will give the system of bodies show in fig, velocity of 3 m/s after moving by 4.5 m from rest.



- 16 Find the shortest distance from the origin to the line passing through the point A(-5, 3, 7) and B(9, 11, 10).

- 17 Determine the centroid coordinates of shaded area shown in figure.

