VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
MECHANICAL ENGINEERING

MANUFACTURING ENGINEERING FOR PHARMACEUTICAL ENGINEERS

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   Define casting.
2   Interpret the purpose of vent in casting.
3   Name types of welding.
4   Discuss the color of cylinders and type of threads used in gas welding.
5   Recall the expanded form of USM.
6   Differentiate between grooving and reaming.
7   Relate the advantage of plastics in our daily life.
8   Explain the commencement of use of plastics and adopted by America in 1869..
9   Define rolling.
10   Differentiate between forming and powder metallurgy.

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.   Interpret in detail the advantages of casting process.
                                OR
   b.   Demonstrate the difference between lost wax casting and sand casting.

12 a.   The sand used in casting process is not green in color. Illustrate with percentage of constituents
        in greeen sand.
                                OR
   b.   Generalize in detail any five main components used in gas welding.

13 a.   Interpret in detail the advantages and disadvantages of Sheet Metal Arc Welding (SMAW).
                                OR
   b.   Applying the concept, explain the advantages of Gas Tungsten Arc Welding (GTAW).

14 a.   Generalize in detail about cutting tools and types of chips formed during machining process.
                                OR
   b.   Applying the concept, explain the working of a CNC plasma cutter.

15 a. Interpret in detail the working of abrasive jet machining.

OR

   b. Generalize in detail about injection moulding and blow moulding process for production of plastics.

16 a. Demonstrate the the difference between fillers and plasticizers used as additives in plastics.

OR

   b. Applying the concept, explain natural, semi-synthetic and synthetic plastics.

17 a. Illustrate the classification of basic sheet forming processes.

OR

   b. Generalize in detail about forging die with a neat labelled diagram and explain the terms.

18 a. Interpret in detail about the process of swaging and use of mandrel.

OR

   b. Applying the concept, explain the advantages and limitations of powder metallurgy.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Operationalize in detail the general as well as specific precautions to be observed in casting process.

OR

   b. Illustrate the importance of charcoal in producing flammable gas in gas welding process and generalize the safety precautions to be observed in welding process.

20 a. Employ the principle in explaining working of laser beam machining.

OR

   b. Apply the principle to explain plastic anisotropy and the importance of plastic strain ratio in forming sheets using stretch forming.

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SL.NO:2011

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
MECHANICAL ENGINEERING
FIRST SEMESTER
MECHANICAL BEHAVIOUR OF MATERIALS AND METALLURGY

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   The tempering process usually follows hardening process. Justify.
2   List out the different types of tool steel.
3   Define the terms brittleness.
4   Define the term of rust.
5   List the types of polymers.
6   Discuss why ferrous alloys are used extensively.
7   Differentiate between normalizing and full annealing.
8   Determine when caustic embrittlement occurred in boiler plate.
9   Discuss why powder metallurgy is preferred over other manufacturing methods.
10   List the advantages of silicon di oxide.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain with neat the allotropic forms of iron.
OR
   b.   Determine and detail about the effect of alloying elements adding to steel.

12 a.   Illustrate with neat diagram and explain how to conduct fatigue test for the engineering
         materials.
OR
   b.   Illustrate and explain how to conduct vickers hardness test.

13 a.
         Illustrate and explain in detail about hardening and tempering process of heat treatment.
OR
   b.   Illustrate corrosion and discuss various types of corrosion usually encountered.

14 a. Discuss about the properties and typical application of the following (i). PVC (ii). PEEK (iii).Polyethylene

OR

b.

Describe the process of powder metallurgy method that used to produce automobile parts.

15 a. Discuss the composition, properties and applications of aluminium based alloys.

OR

b. Explain the following materials in terms of composition, properties and applications. (i) Ferritic stainless steel (ii) Austenitic stainless steel.

16 a. Discuss the micro-constituents of iron-carbon alloys? Explain the general characteristics of each in detail.

OR

b. Describe the mechanisms of plastic deformation of metals by slip and twinning.

17 a. List the advantages , disadvantages and application of flame hardening

OR

b. Explain about austempering heat treatment processes

18 a. Describe any one manufacturing methods of metal matrix composites.

OR

b. Explain any one manufacturing methods of ceramic matrix composites.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Compare slip and twinning mechanism of plastic deformation in deatil

OR

b. How to conduct toughness test explain any one in detail with neat sketch.

20 a. List the hardness test end explain any two with neat sketch.

OR

b. Describe the following heat treatment of steel.(i) Cyaniding(ii) Carbo nitriding (iii) Induction hardening

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VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./B.TECH DEGREE EXAMINATIONS- APRIL- 2022
COMMON TO CIVIL , EEE AND MECT
BASICS OF CIVIL AND MECHANICAL ENGINEERING
(Candidates admitted under 2021 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks
BASIC CIVIL ENGINEERING

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   What are the essential constituents of a good brick earth?
2   What is curing?
3   Define Strain
4   What is mean by leveling?
5   Write short notes on Shell roof.

Answer **ALL** questions
Part-B (2 x12 =24 Marks)

6 a.   Explain different types of cement.

OR

   b.   Describe in detail about Various ingredients of cement and their functions.

7 a.   Explain in detail different types of Bridges.

OR

   b.   Explain in detail about the forces acting on the dam.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   Describe briefly with a neat sketch and explain the manufacture of Portland cement by wet
        process.
OR
   b.   Explain briefly the various components of a building.

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BASIC MECHANICAL ENGINEERING

(Candidates admitted under 2021 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   Define friction.

2   Define degrees of freedom.

3   What is mean by Absolute pressure?

4   Define the term Turbulent flow.

5   What is rolling?

Answer **ALL** questions
Part-B (2 x12 =24 Marks)

6 a.   Explain the working principle of four stroke SI engine.

OR

b.   Draw a neat sketch of a simple vapour compression refrigeration system and explain its principle of operation.

7 a.   Explain with neat sketches any 5 safety equipments and its applications.

OR

b.   Explain various selection criteria of a hydraulic fluid in detail.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   3 A 30 cm x15 cm venturimeter is provided in a vertical pipe line carrying oil of specific gravity of 0.9 floe being up wards .the difference elevation of the throat and entrance of the venturimeter is 25 cm.
Calculate: 1) the discharge of oil and 2)the pressure difference between the throat and entrance section. Cd = 0.98.

OR

b.   Compare and contrast Hot Rolling and Cold Rolling.

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S.No.2009

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
MECHANICAL ENGIENERING
FIRST SEMESTER
MANUFACTURING PROCESSES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   How do you classify manufacturing processes?
2   List any two differences between cold-chamber die-casting and hot-chamber die casting.
3   Why cleaning of the joint is important before welding?
4   Why is the tungsten inert-gas welding preferred for welding aluminum plates?
5   List the assumptions made in Merchant Circle diagram.
6   List any four principle parts of a shaper.
7   What is G-code in CNC programing?
8   What is drawing down operation in forging?
9   Define the term spring back.
10 What are the limitations of additive manufacturing?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   List the factors to be considered for designing a good pattern.
OR
   b.   Explain the different characteristics of molding sand.

12 a.   Explain the various zone in cupola furnace with neat sketch.
OR
   b.   Explain the different types of flame obtained with its characteristics and applications.

13 a.   Illustrate about welding torch with neat sketch.
OR
   b.   Illustrate the process of seam welding and list the applications.

14 a.   Outline the parameters that influence the life of tool.
OR
   b.   Illustrate orthogonal cutting and oplique cutting with necessary diagrams and compare.

15 a.   Explain the properties of good cutting fluid.
OR

(P.T.O)

b. Examine the factors affecting tool life in detail.

16 a. Explain the various types of chucks with neat sketch.

OR

b. Explain the different types of cutting tools used in lathe.

17 a. Explain any four milling operations with neat sketch.

OR

b. Explain the operational steps of Rolling of square sections, rounds, plate, sheet and strip from a stock. Draw sketches wherever necessary.

18 a. Illustrate the impact extrusion process with neat sketch.

OR

b. List the applications of Additive Manufacturing Technology.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Illustrate the various casting defects and suggest suitable remedies.

OR

b. Explain the forehand and backhand gas welding methods. State its advantages and disadvantages.

20 a. Explain the working principle of radial drilling machine with neat sketch.

OR

b. Illustrate the Electromagnetic forming with a neat sketch.

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SL.NO:2212

VINAYAKA MISSION'S RESEARCH FOUNDATION
(Deemed to be University)
B.E.DEGREE EXAMINATIONS- APRIL - 2022
COMMON TO ALL BRANCHES
PHYSICAL SCIENCES
(Candidates admitted under 2021 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks

PART A - ENGINEERING PHYSICS

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   Recognize the characteristics of laser.
2   Schedule any two applications of holography.
3   Tell about the characteristics of graded index multimode fiber.
4   Express about piezo-electric effect.
5   Schedule the Industrial applications of ultrasonic waves

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

6 a.   Predict the applications of laser in communication, military and chemical fields.

OR

  b.   Express the various types of fibers based on refractive index profile.

7 a.   Practice obtaining the expression for velocity of SONAR.

OR

  b.   Interpret the biological and chemical applications of ultrasonics.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   Tell about holography. Illustrate the construction and working of holography with neat diagram.

OR

  b.   Demonstrate piezo- electric effect? Explain with a neat circuit, the generation of ultrasonic using a piezo- electric oscillator.

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PART B - ENGINEERING CHEMISTRY
(Candidates admitted under 2021 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   What is EDTA? Write its structure?
2   How calgon conditioning is superior than other methods?
3   Define electrochemical series.
4   State pilling bed worth rule.
5   Recall cetane number.

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

6 a.   How is exhausted resin regenerated in an ion-exchanger? What are merits and demerits of ion-exchange method?

OR

b.   List out the various water quality parameters for the drinking water.

7 a.   Discuss about electrochemical series and their applications.

OR

b.   What is power alcohol? Explain its manufacture, properties of power alcohol.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   How is internal treatment of boiler water carried out using phosphate, Carbonate, Sodium aluminate and calgon conditioning?

OR

b.   Explain Otto-Hoffman's by product oven method for manufacture of metallurgical coal.

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S.No.2005

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
CIVIL ENGINEERING
FIRST SEMESTER
ENGINEERING MECHANICS
(Candidates admitted under 2021 Regulations-SCBCS)

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define the Resolution of aforce.
2   Define Motion
3   List out the types of beams.
4   Definehinged supported beams.
5   Define parallel axis theorem.
6   Define the principal moment of inertia.
7   What is Coulomb's law of friction?
8   Define velocity ratio.
9   Define Impulsive force.
10   List out the types of collisions.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   A system of forces is acting at the corners of a rectangular block as shown in Fig. Determine the magnitude and direction of the resultant force.
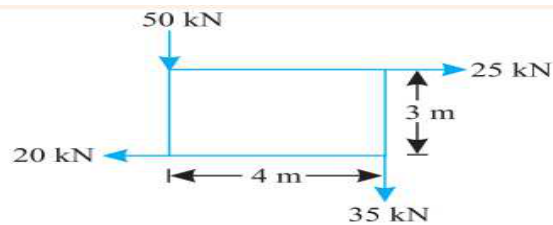
OR

b.   The following forces are acting at a point:
      (i) 20 N inclined at 30° towards North of East,
      (ii) 25 N towards North,
      (iii) 30 N towards North West, and
      (iv) 35 N inclined at 40° towards South of West.
      Calculate the magnitude and the direction of the resultant force.

12 a. An electric light fixture weighing 15 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in Fig. Using Lami's theorem, or otherwise, determine the forces in the strings AC and BC.
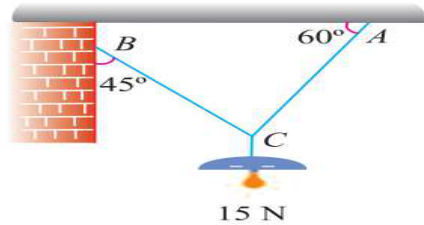
OR

b. The three parallel forces +20N, −10N, and +30N are acting in a plane as shown in the figure. Calculate a) The magnitude of the resultant force, b) The location of the resultant. All dimensions are in centimetre

13 a. A beam AB of span 3m, overhanging on both sides is loaded as shown in Fig. Determine the reactions at the supports A and B.
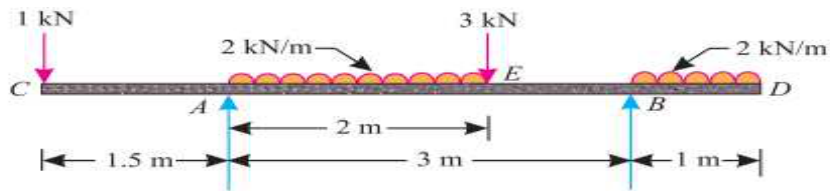
(P.T.O)

SL.NO:2221-A

OR

b. The two halves of a round homogeneous cylinder are held together by a thread wrapped around the cylinder with two weights each equal to P attached to its ends as shown in Fig. The complete cylinder weighs W newton. The plane of contact, of both of its halves, is vertical. Determine the minimum value of P, for which both halves of the cylinder will be in equilibrium on a horizontal plane.
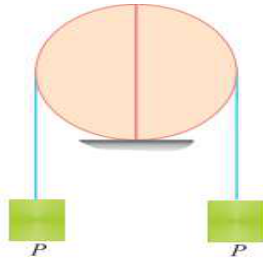
14 a. A body consists of a right circular solid cone of height 40 mm and radius 30 mm placed on a solid hemisphere of radius 30 mm of the same material. Determine the position of the centre of gravity of the body.
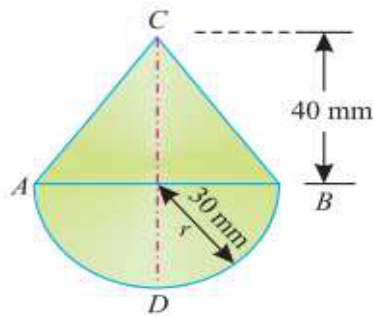
OR

b. An ABCD is a weightless rod under the action of four forces P, Q, S, and T as shown in fig. If P=10N, Q=4N, S=8N, and T=12N, calculate the resultant and mark the same in direction with respect to the end A of the rod.
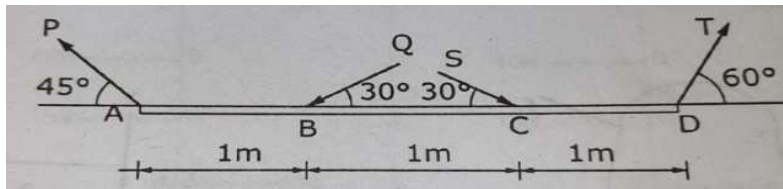
15 a. A block 'A' weighing 350N resting on a rough horizontal floor supports a block B weighing 150N. The two blocks are connected to a string passing over round a smooth pulley as shown in the figure. Find what horizontal force P has to be applied and block A so as to just move it towards the right. Take μ = 0.25 at all contact surfaces. Determine the tension in the string.

OR

b. In a flat belt, the maximum tension is 1160N, and the angle of the lap is170°. The coefficient of friction between the belt and pulley is 0.25. The diameter of the pulley is 90cm and it runs at 540 rpm. Calculate the power transmitted at the above speed. Neglect the effect of centrifugal tension.

16 a. A body is thrown vertically upwards with a velocity of 28 m/s. Determine the distance it will cover in 2 seconds.

OR

b. Determine the centroid of the shaded area shown in the fig. (All dimensions are in mm.

17 a. If a particle is projected inside a horizontal tunnel which is 5 meters high with a velocity of 60 m/s, Determine the angle of projection and the greatest possible range.

OR

b. A car is moving at 72 k.m.p.h., If the wheels are 75 cm diameter, find the angular velocity of the tyre about its axis. If the car comes to rest in a distance of 20 meters, under a uniform retardation, Determine angular retardation of the wheels

(P.T.O)
SL.NO:2221-A

18 a. A truss of 8 m span and 4 m height is loaded as shown in Fig . Determine the reactions at A and E.


OR

b.

Calculate the moment of inertia about the centroidal X-X and Y-Y axis of the angle section shown in the fig. All dimensions are in mm

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. The two identical rollers each weighing 200N are placed in a trough as shown in fig. assuming all the surfaces of contact are smooth, determine the reactions developed at the point of contact surfaces.
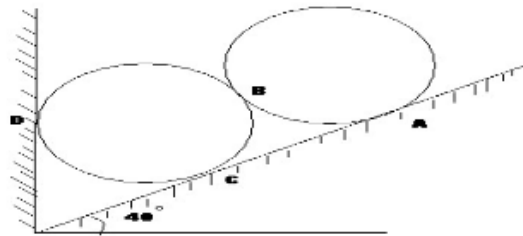
(P.T.O)

OR

b. The three forces and a couple of magnitudes, M =18 Nm are applied to an angled bracket as shown in fig. Determine a) the resultant of this system of forces b) Locate the points where the line of action of the resultant intersects line AB and line BC.

20 a. Determine the moment of inertia of a T-section shown in the fig about the X-X and Y-Y axis passing through C.G of the section. All dimensions are in mm.
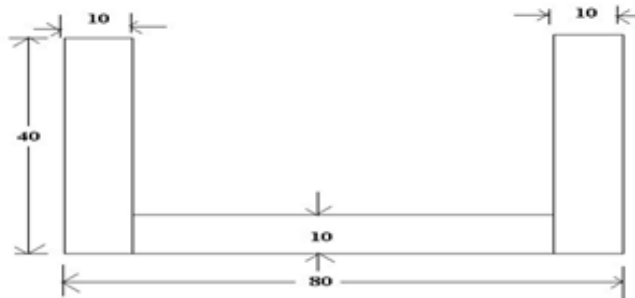
OR

b. A beam AB of span 1.7 m is hinged at A and supported on rollers at end B and carries the load as shown in fig. Determine the reaction at A and B.
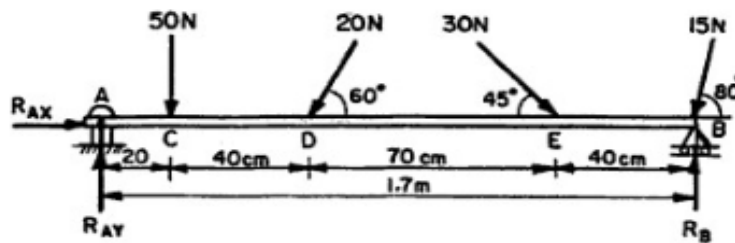
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VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- APRIL -2022
MECHANICAL ENGINEERING/CIVIL ENGINEERING
FIRST SEMESTER
ENGINEERING MECHANICS (Statics and Dynamics)
(Candidates admitted under 2021 Regulations-SCBCS)

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define Concurrent forces.
2   Define the Resolution of aforce.
3   Define Knife-edge support.
4   Define Roller supports.
5   Define the moment of inertia.
6   Define principal axes.
7   Define sliding friction.
8   Define Potential energy
9   Define Impulsive force.
10   Define relative motion.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   A machine component 1.5 m long and weight 1000 N is supported by two ropes AB and CD as shown in Fig. Calculate the tensions T1 and T2 in the ropes AB and CD.
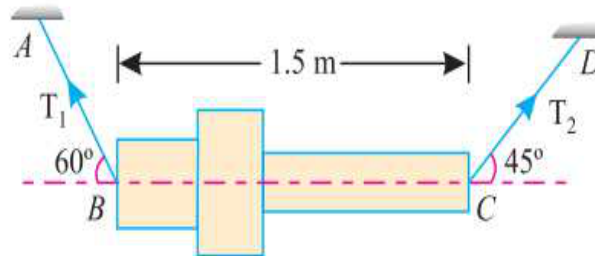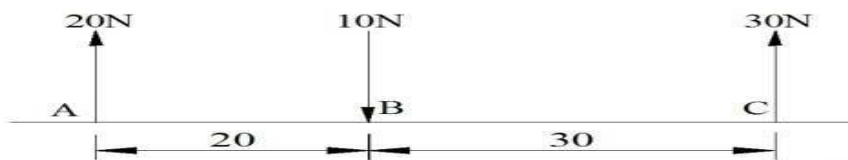

(P.T.O)

OR

b.   The following forces are acting at a point:
(i) 20 N inclined at 30° towards North of East,
(ii) 25 N towards North,
(iii) 30 N towards North West, and
(iv) 35 N inclined at 40° towards South of West.
Calculate the magnitude and the direction of the resultant force.

12 a.   The five forces F1, F2, F3, F4, and F5   are acting at a point on a body as shown in fig. and the body is in equilibrium, If F1 = 18 N, F2 = 22.5 N, F3 = 15 N and F4 = 30 N, determine the force F5 in magnitude and direction.
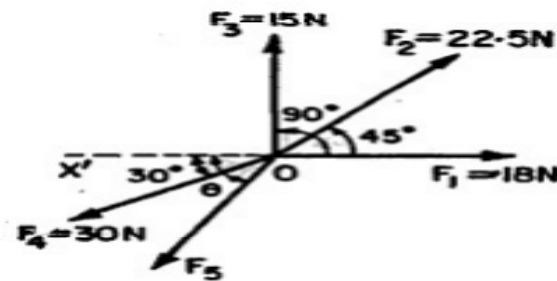
OR

b.   The three parallel forces +20N, –10N, and +30N are acting in a plane as shown in the figure. Calculate a) The magnitude of the resultant force, b) The location of the resultant. All dimensions are in centimetre

13 a.   A beam AB of span 3m, overhanging on both sides is loaded as shown in Fig. Determine the reactions at the supports A and B.
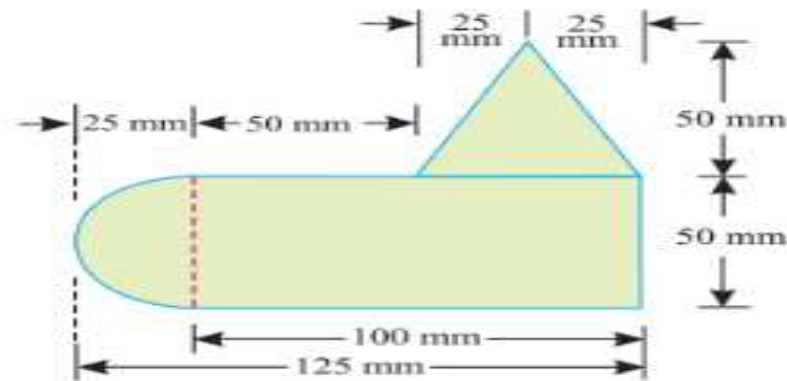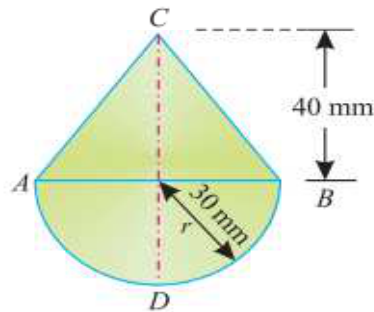

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OR
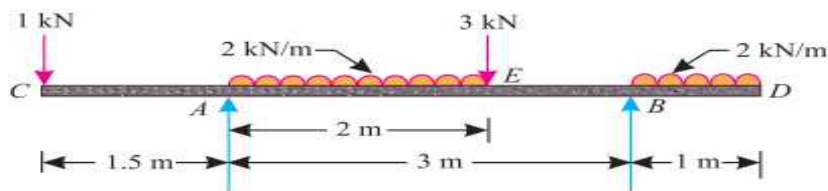
b.   Determine the centre of gravity of the given lamina shown in fig. All dimensions are in mm.
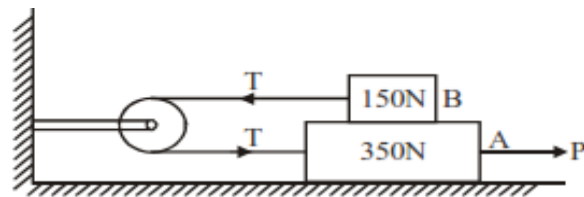

14 a.   A body consists of a right circular solid cone of height 40 mm and radius 30 mm placed on a solid hemisphere of radius 30 mm of the same material. Determine the position of the centre of gravity of the body.

OR

b.

A screw jack has a thread of 10 mm pitch. Calculate the effort applied at the end of a handle 400 mm long will be required to lift a load of 2 kN if the efficiency at this load is 45%.

15 a.   A block 'A' weighing 350N resting on a rough horizontal floor supports a block B weighing 150N. The two blocks are connected to a string passing over round a smooth pulley as shown in the figure. Find what horizontal force P has to be applied and block A so as to just move it towards the right. Take μ = 0.25 at all contact surfaces. Determine the tension in the string.

(P.T.O)

OR

b.   In a flat belt, the maximum tension is 1160N, and the angle of the lap is170°. The coefficient of friction between the belt and pulley is 0.25. The diameter of the pulley is 90cm and it runs at 540 rpm. Calculate the power transmitted at the above speed. Neglect the effect of centrifugal tension.

16 a.   A body is thrown vertically upwards with a velocity of 28 m/s. Determine the distance it will cover in 2 seconds.
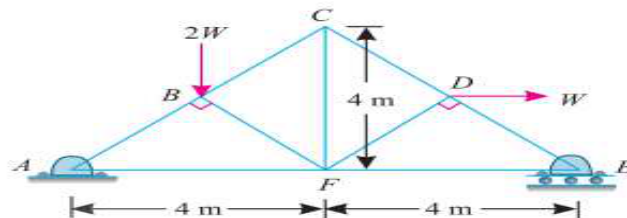
OR

b.

 A stone was thrown vertically upwards from the ground with a velocity of 49 m/sec. After 2 seconds, another stone was thrown vertically upwards from the same place. If both the stones strike the ground at the same time, Determine the velocity with which the second stone was thrown. Take $g = 9.8$ m/sec².

17 a.   If a particle is projected inside a horizontal tunnel which is 5 meters high with a velocity of 60 m/s, Determine the angle of projection and the greatest possible range.

OR

b.
A car is moving at 72 k.m.p.h., If the wheels are 75 cm diameter, find the angular velocity of the tyre about its axis. If the car comes to rest in a distance of 20 meters, under a uniform retardation, Determine angular retardation of the wheels

18 a.   A truss of 8 m span and 4 m height is loaded as shown in Fig . Determine the reactions at A and E.

OR

b.
Calculate the moment of inertia about the centroidal X-X and Y-Y axis of the angle section shown in the fig. All dimensions are in mm
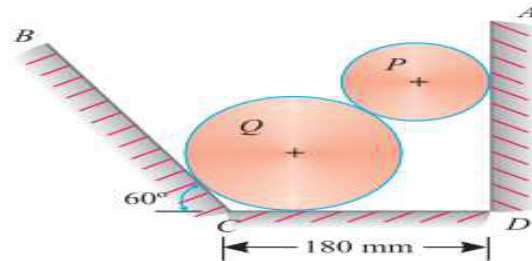

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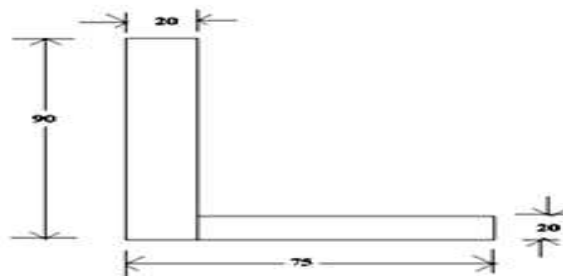
Answer ALL questions
PART-C (2 x 15 = 30)

19 a. The two cylinders P and Q rest in a channel as shown in Fig. The cylinder P has a diameter of 100 mm and weighs 200 N, whereas the cylinder Q has a diameter of 180 mm and weighs 500 N. If the bottom width of the box is 180 mm, with one side vertical and the other inclined at 60°, determine the pressures at all the four points of contact.

OR

b. The three forces and a couple of magnitudes, M =18 Nm are applied to an angled bracket as shown in fig. Determine a) the resultant of this system of forces b) Locate the points where the line of action of the resultant intersects line AB and line BC.

20 a. Determine the moment of inertia of a T-section shown in the fig about the X-X and Y-Y axis passing through C.G of the section. All dimensions are in mm.

(P.T.O)
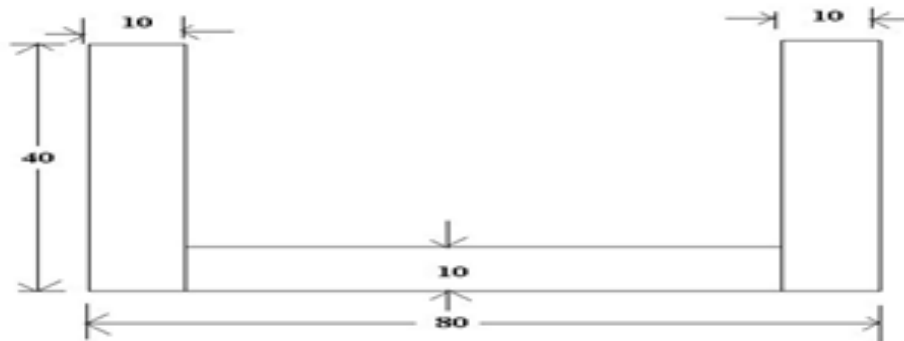
OR

b.

A ladder 5 meters long rests on horizontal ground and leans against a smooth vertical wall at an angle of 70° with the horizontal. The weight of the ladder is 900 N and acts at its middle. The ladder is at the point of sliding when a man weighing 750N stands on a rung 1.5 meters from the bottom of the ladder. Calculate the coefficient of friction between the ladder and the floor.

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SL.NO:2221