CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE: GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPMT   Date : 08.01.2024
Subject : Applied Mechanics & Strength of Materials   Time : 10.00 a.m. to 01.00 p.m.

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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. The Lami's Theorem is applicable only for
   a) Coplanar forces   b) Concurrent forces   c) coplanar and concurrent forces   d) any type of forces
2. Theorem of perpendicular axis is used in obtaining the moment of inertia of a
   a) Triangular lamina   b) circular lamina   c) square lamina   d) semicircular lamina
3. The term deformation per unit length is applied for
   a) Stress   b) strain   c) modulus of elasticity   d) Young's modulus
4. The efficiency of a screw jack may be increased by ……………………
5. The centre of gravity of hemisphere lies at a distance of ………………. from its base measured along the vertical radius (r).
6. The moment of inertia of a triangular section of base (b) and height (h) about an axis through its c.g and parallel to the base is given by the relation _____
7. A body is said to be in equilibrium , if it has no linear motion. (Say True or False)
8. The force of friction does not depend upon the area of contact. (Say True of False)
9. The shear force at the cross-section of a beam may be defined as the unbalanced vertical force to the right or left of the section. (Say True or False)
10. Write the full form of UDL
11. Expand the term SFD
12. C.G stands for_____

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. Define Centre of Gravity ?
2. What is two force principle of equilibrium ?
3. Define Velocity ratio of a machine?
4. State clearly the Hooke's law?

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. Explain the conditions of equilibrium ?
2. Discuss the various types of equilibrium?.
3. Find the centre of gravity of a 100mm x 150mm x 30mm T-section?.
4. What is Routh's rule for finding out the moment of inertia of an area?
5. Define force of friction & its types ?
6. Derive relationship between efficiency , Mechanical Advantage and Velocity ratio of a lifting machine?
7. Define stress , strain and explain the types of stress?

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. State and prove Lami's Theorem ?
2. Define Moment of Inertia & Derive an equation for moment of inertia of a rectangular section by integration method with neat sketch?.
3. A certain weight lifting machine of velocity ratio 30 can lift a load of 1.5KN with the help of 125N effort . Determine if the machine is reversible or non-reversible ?

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ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPMT   Date : 09.01.2024
Subject   : Engineering Metrology   Time : 10.00 a.m. to 01.00 p.m.

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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)

PART – A
Answer **all** questions   12 x 1 = 12

1. The two slip gauges in precision measurements are joined by _____.
2. Least count of Vernier caliper _____.
3. "GO" and "NO GO" gauges must fulfill _____Principle.
4. CMM Stands for
5. RMS Stands for
6. OPP stands for
7. One micron is equal to
    a) 1mm   b) 0.1mm   c) 0.01mm   d) 0.001mm
8. Bevel protractor is used for
    a) Angular measurements   b) Linear measurements   c) height measurements   d) Flatness measurement
9. The following is used to check the diameters of holes
    a) Plug gauge   b) ring gauge   c) Slip gauge   d) Standard screw pitch gauge
10. Feeler gauges are used to measure the width of the gap between two parallel flat faces say True of false
11. A spirit level consists of a sealed glass tube say True or False
12. CMM is used for checking and measuring various gauges and fixtures- say True of False

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. Define Accuracy.
2. What is sine bar?
3. Write about the clearance fit.
4. What is interchangeability?

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. What is Error and types of error?
2. What are the different grades of slip gauges?
3. Write the difference between tolerance and allowance.
4. List the advantages and disadvantages of limit gauges.
5. What is Fit? What are the different types of fits?
6. Explain Hole basis system & Shaft basis system?
7. What is the difference between Gauges and Instruments?

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. What is comparator? What are the applications of comparators?
2. List the various LASER techniques used in metrology for measurements?
3. Explain CMM with neat sketch.

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ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPMT   Date : 10.01.2024
Subject : Machine Shop Technology-I   Time : 10.00 a.m. to 01.00 p.m.

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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. Why metal removal process is costly?
    a) more energy is required
    b) some of the material is wasted
    c) both more energy is required and some of the material is wasted
    d) none of the mentioned
2. Which of the following machine is useful for machining surfaces if size of the job is large?
    a) Slotting machine   b) Shaping machine   c) Planning machine   d) None of the options
3. The lip angle used in a drill for common drilling applications is
    a) 125 degrees   b) 118 degrees   c) 136 degrees   d) 128 degrees
4. Internal keyway in gears can be cut by using _____
5. The _____ operation to be used for obtaining smooth and close tolerance hole.
6. N stands for _____
7. Dimension accuracy is not affected in metal removal process? True or False
8. Too Slow a speed will cause the countersink to chatter? True or False
9. If the grinding wheel becomes loaded, it is not necessary to dress it? True or False
10. Expand H.S.S
11. Expand RPM
12. Expand BUE

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. Explain 'Rough' and 'Finish' machining.
2. How do they differ Drilling, Reaming & Boring.
3. What are the principal parts of a Shaper?
4. What is a Radial Drilling Machine?

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. State the differences between a vertical shaper and Slotter.
2. Explain pedestal grinding machine.
3. Write the difference between work holding and tool holding Devices.
4. Describe drill geometry.
5. Describe various Drilling operations.
6. Describe the types of Chips in metal cutting operation.
7. Describe difference between planer and shaper.

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Write description of lathe machine with neat diagram and its working principle & its components.
2. How are the cutting Tools classified? Name a few tools of each type ? What are the Tool Designation systems, Explain briefly.
3. What are the common sources of heat generation in metal cutting and how that takes place? Classify the cutting fluids and describe the quality of good cutting fluids?

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ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPMT   Date : 11.01.2024
Subject : Engineering Drawing   Time : 10.00 a.m. to 01.00 p.m.
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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. The length to height ratio of a closed filled arrow head is?
   (a) 1:3   (b) 3:1   (c) 1:2   (d) 2:1
2. Two types of dimensions needed on a drawing are:
   i) size or functional dimensions and   ii) location or datum dimensions.(True/False)
3. In order to create an accurate assembly drawing the drafter should create the …………..drawings first.
4. The line along which a plane meets the reference plane is known as ……………..
5. The additional planes of projection which are set up to obtain the true sizes are called -
          (a) Auxiliary Planes   (b) Section Planes   (c) True Planes   (d) None of the above
6. The development of the curved surface of a cone is a sector of circle. (Say true or false)
7. Dimensions can be placed anywhere irrespective of the features visible. (Say True or False)
8. The ratio of the shortest distance of the tracing point from the focus to its perpendicular distance from the directrix is called …………………….
9. Which type of washer is used for locking the nut by bending the washer against the side of nut ?
   a) Tab Washer   b) Locking Plates   c) Spring Washer   d) Locking Washer with lug
10. Write the Full form of ISO…………..
11. ASME stands for………….
12. What does BSW stand for……………?

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. What are the two systems of placing dimensions on a drawing?
2. What is Representative Fraction?
3. Define true shape of a Plane surface.
4. What is coupling?
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PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. Differentiate between first and third angle projection with symbols.
2. Draw an involute of a circle of diameter 30 mm.
3. Briefly explain Isometric Projection.
4. Explain the types of Sectional View with neat sketch?
5. Explain the types of nut with neat sketch.
6. What do you understand by bill of materials and parts list?
7. Explain the need of assembly drawing and its importance.

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Construct an ellipse when the distance of the focus from the directrix is equal to 30 mm and eccentricity is equal to 7/9.
2. Draw the projections of the following points on the same ground line, keeping the projectors 25 mm apart.
          A, in the H.P. and 20 mm behind the V.P.
          B, 40 mm above the H.P. and 25 mm in front of the V.P.
          C, in the V.P. and 40 mm above the H.P.
          D, 25 mm below the H.P. and 25 mm behind the V.P.
          E, 15 mm above the H.P. and 50 mm behind the V.P.
          F, 40 mm below the H.P. and 25 mm in front of the V.P.
          G, in both the H.P. and the V.P.
3. Write the methods of development of surfaces.

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18-535

Duration : 3 Hours   Max. Marks: 60
Course : DPMT   Date : 12.01.2024
Subject : Plastics Materials & Testing   Time : 10.00 a.m. to 01.00 p.m.

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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. Which of the following is a commodity plastic?
   (a) POM   (b) Nylon   (c) PE   (d) PC
2. What is the unit of MFI?
   (a) gm/cc   (b) gm/min   (c) gm/10 mins   (d) None of these
3. Which of the following is prepared by condensation polymerization?
   (a) PP   (b) HDPE   (c) PVC   (d) PET
4. As molecular weight increases MFI_____
5. The heating rate followed in HDT test is _____.
6. The hardness test used for reinforced plastics _____.
7. PET bottles are transparent as PET can be made amorphous by controlling processing parameters –Say True or False.
8. PTFE is self extinguishing in nature – Say True or False
9. As temperature increases, Tensile strength of plastics materials decreases – Say True or False
10. ASTM stands for ………….
11. Expand NABL ……………
12. The full form of HIPS is ………....

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. Write four application of Polyethylene .
2. Write the difference between Thermoplastic & Thermoset material
3. What is the significance and test method of Spiral Flow test?
4. Define Degree of polymerization .

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. What are the type of polymerization techniques and describe any one of them
2. Differentiate Izod Imact with Charpy Impact test.
3. Write down few characteristic of Polypropylene.
4. What is glass transition temperature .
5. What is MFI? Explain the significance of MFI.
6. Explain VSP .
7. What are different types of Mechanical properties?

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Describe stress & strain curve for plastics material. Explain the different term associated with it.
2. What are the preparation techniques of polystyrene. Explain Tower process with suitable diagram.
3. Write short notes on any two the following :
   a) Rheological property of plastic   b) Dielectric strength of plastic   c) ESCR

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