18-531

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
Course : DPMT
Subject : Applied Mechanics & Strength of Materials

Max. Marks: 60
Date : 09.01.2023
Time : 10.00 a.m. to 01.00 p.m.

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

PART – A

Answer **all** questions 30 x 1 = 30

1. A force is completely defined, when we specify
   a. Magnitude b. Direction c. Point of Application d. All of the above
2. A body in equilibrium _____
   a. Always at rest b. Always in uniform motion
   c. May be at rest or in uniform motion d. May be at rest or in motion
3. The forces which meet at one point, but their lines of action do not lie in a plane, are called
   a. Coplanar non-concurrent Forces b. Non-coplanar concurrent forces
   c. Non-coplanar non-concurrent Forces d. Intersecting Forces
4. The resultant of two forces of equal magnitudes is also equal to the magnitude of the forces. The angle between the forces is _____ deg.
   a. 30 b. 60 c. 90 d. 120
5. A force acting on a body may
   a. Introduce internal Stresses b. Balance the other forces acting on it
   c. Retard its motion d. All of the above
6. In case of three co-planar and con-current forces, if the magnitude of the all the three forces are same then the angle between each force is equal as
   a. 90 b. 180 c. 120 d. 0
7. SI unit of Moment of Force is _____
   a .N m b. Nm^2 c. N/m d. N/m^2
8. The body will move when
   a. Force of Friction = Applied Force b. Force of Friction < Applied force
   c. Force of Friction > Applied Force d. All of the above
9. The types of threads used in screw jacks are _____
   a. Metric Thread b. Square c. ACME d. Buttress
10. The ratio of the limiting force of friction (F) to the normal reaction (R) is known as
    a. Co-efficient of Friction b. Force of Friction c. Angle of Friction d. None of Above
11. The co-efficient of friction is depends upon the _____
    a. Area of Contact b.Shape of Surfaces c. Strength of Surfaces d.Nature of Surfaces
12. Which of the following is not a type of lifting machine?
    a. Simple Wheel and Axle b. Differential Wheel and Axle
    c. Geared Pulley Block d. Bull engine
13. The force of friction is maximum when the surface_____
    a. Is on the point of motion b. Is at rest
    c. Is moving d. The friction remains same at all points
14. What is force required to move a block having dimensions 3 m X 3 m and having weight of 80 kg. The co-efficient of friction between the block and ground is 0.27. (Assume g= 10 m/s2).
    a. 216 N b. 320 N c. 106 N d. 126 N
15. What is a type of friction a body will experience when one body rolls over another
    a. Static friction b. Rolling Friction c. Sliding Friction d. None of above
16. The product of the effort and the distance travelled by the machine is known as
    a. Stress b Efficiency c. Input of a machine d. Velocity Ratio
17. Hook's Law holds good up to
    a. Yield point b. Limit of Proportionality c. Breaking point d. Elastic Limit
18. The unit of Young's Modulus is
    a. Unit less b .kg / cm c. kg d. kg / cm^2
19. If Equal and opposite forces are applied to a body tends to elongate it, the stress produced is known as
    a. Tensile Stress b. Shear Stress c. Compressive Stress d. None of Above

20. If Length of the wire is increased by some value to its original value then Young's Modulus of the wire will be
    a. Increased b. Decreased c. Same d. Can't be predicted
21. Which of the following has no unit?
    a. Strain b. Stress c. Modulus of Elasticity d. Moment of Inertia
22. The value of Poisson's ratio for steel is between
    a. 0.01 to 0.1 b. 0.1 to 0.2 c. 0.25 to 0.33 d. 0.4 to 6
23. The ratio of lateral strain to linear strain is known as
    a. Poisson's Ratio b. Bulk Modulus c. Young's Modulus d. Modulus of Rigidity
24. For a homogeneous and isotropic material, a body is under application of an external force having magnitude 'F', a reduction in area will cause
    a. Increase in stress b. Reduction in stress
    c. No change in stress d. Cannot be predicted
25. Up to the proportional limit, a body will regain its original shape and size after removal of the load due to
    a. Plasticity b. Elasticity c. Rigidity d. Reactivity
26. In the Context of Applied Mechanics an abbreviation M,o.I will represent:_____
27. What is a full form of CG?
28. Write down full form of SFD.
29. Write down full form of BMD.
30. A Yield point can also be observed in the case of the brittle material. (True/ False)

PART – B

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

1. State the parallelogram law of forces.
2. What is the converse of the law of triangle of Forces?
3. What is limiting friction?
4. Define Strain.

PART – C

Answer any **four** questions (Max. 100 words) 4 x 3 = 12

1. Derive an equation for Moment of Inertia of a circular section about centroidal axis.
2. Explain Static Friction with examples.
3. If the co-efficient of sliding friction between a 35kg crate and the floor is 0.45, then how much force is required to move the crate at a constant velocity across the floor?
4. A Steel rod of 2 m long and having 10 mm x 10 mm in cross-section is subjected to a tensile force of 60 KN. Determine the strain induced in the rod if modulus of rigidity for the rod material is 200GPa
5. Explain the different types of Equilibrium.

PART – D

Answer any **two** questions (Max. 300 words) 2 x 5 = 10

1. Explain the different types of beams with neat sketch.
2. State and Prove the Lami's Theorem with a sketch.
3. A cantilever beam of 8 m long carries two point loads each 4 KN, one placed at free end and the other at 3 m from fixed end. Draw SF and BM Diagrams.

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CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
Course : DPMT
Subject : Engineering Metrology

Max. Marks: 60
Date : 10.01.2023
Time : 10.00 a.m. to 01.00 p.m.

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

PART – A

Answer **all** questions 30 x 1 = 30

1. The distance from a point on one thread to a corresponding point on the next thread is called
   a) Lead b) Pitch c) Travel d) Gap.
2. Sensitivity and range of measuring instruments have
   a) Direct relationship b) Linear relationship c) Inverse relationship d) Indirect relationship
3. Surface plate is made up of
   a) Granite b) Cast iron c) Glass d) All of these
4. The instrument used to measure external and internal diameter of shafts, thickness of parts and depth of holes, is
   a) Outside Micrometer b) Outside Micrometer c) depth gauge micrometer d) vernier caliper
5. The following is used to check the diameters of holes
   a) Plug gauge b) ring gauge c) Slip gauge d) Standard screw pitch gauge
6. Surface roughness on a drawing is represented by
   a) Triangle b) Circles c) Squares d) rectangle
7. The term traceability in engineering metrology is concerned with
   a) Measuring Machines b) Optical Instruments c) Standards d) Limits and fits
8. A surface is truly ..... if all the lines are straight and they lies in the same plane .
   a) Round b) Flat c) Parallel d) None of these
8. When a measurement is made between two flat parallel surfaces, it is called
   (a) line measurement (b) direct measurement (c) standard measurement (d) end measurement
10. The following instrument is not used to measure angles
    a) Bevel Protractor b) Calibrated levels c) Clinometers d) Optical flats
11. When Tolerance is given on one side of the basic dimension, it is called
    (a) Tolerance system (b) Allowance system (c) Unilateral tolerance (d) Bilateral tolerance
12. External taper can be accurately measured with the help of
    a) Sine bar and slip gauges b) Dividing head c) Combination set d) Clinometer
13. _____ Gauge is used to check the Pitch of the screw thread.
    a) Screw pitch gauge b) Plug gauge c) Planer gauge d) Wire gauge
14. Positive allowance will always result in a
    a) Clearance b) Interference c) Allowance d) None of the above
15. 5 micron is equal to
    a) 0.05 mm b) 0.5mm c) 0.0005mm d) 0.005mm
16. All the operations for the purpose of determining the values of the errors of a measuring instrument are called _____
17. Least count of Vernier caliper _____
18. _____is the repeatability of a measuring process
19. Interferometer are optical instruments used for measuring _____
20 "GO" and "NO GO" gauges must fulfill _____Principle.
21. Feeler gauges are used to measure the width of the gap between two parallel flat faces say True or false
22. V-block is used in the workshop to check the dimension of oval job – say True or False
23. Error is the difference between the indicated and actual value of the measured say True or false
24. Solex Pneumatic Comparator has very high magnification capacity - say True of False
25. The various roughness grade number N1 to N24 in 5 groups are specified as under by BIS – Say True or False
26. Expand RMS
27. ISO means _____
28. Expand CMM
29. BIS_____
30. ASME_____

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PART – B

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

1. What is meant by calibration and environmental error?
2. What is accuracy and precision?
3. What is meant by clearance and interference fit?
4. Define limit gauges?

PART – C

Answer any **four** questions (Max. 100 words) 4 x 3 = 12

1. Write shorts on any two types of linear measurements.
2. What is meant by surface roughness, explain the few terminologies with a neat sketch?
3. Write shorts note on (a) Abbes law (b) Optical Bevel Protractor
4. Write advantages and applications of CMM
5. Explain the working principle of Optical Profile Projector?

PART – D

Answer any **two** questions (Max. 300 words) 2 x 5 = 10

1. Describe the Taylors principle for gauging
2. Classify comparator. Explain the mechanical type comparator with a neat sketch.
3. Write the principle of microscope, construction and working of Tool Makers Microscope

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CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
Course : DPMT
Subject : Machine Shop Technology-I

Max. Marks: 60
Date : 11.01.2023
Time : 10.00 a.m. to 01.00 p.m.

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

PART – A

Answer **all** questions 30 x 1 = 30

1. The relation of the cutting speed to the tool life is expressed by the
   a) VT=C b) $VT^n = C$ c) $V^n T = C$ d) None of the above
2. _____ is used to break the continuous chip into sections so that the chips cannot tangle around the cutting tool
   a) Drill bit b) Reamer c) Chip breaker d) Hammer
3. _____ is the time a tool can be reliably be used for cutting before it must be discarded/ repaired
   a) Tool life b) Tool time c) Tool loss d) None
4. The cutting speed of high speed steels is _____ times faster than carbon steel
   a) 2 b) 4 c) 6 d) 8
5. Which of the following cutting conditions greatly affects the tool wear
   a) Cutting speed b) Feed c) Depth of cut d) None of the above
6. _____ control, both direction of chip flow and the strength of the tool lip
   a) Side rake angle b) Relief angle c) Rake angle d) All of the above
7. _____ acts downwards on the tool lip
   a) Cutting force b) Radial force c) Thrust force d) None of the above
8. For turning small taper on long work piece the suitable method is
   a) By a form tool b) By setting over the tail stock
   c) By a taper turning attachment d) None of the above
9. If depth of cut increases during machining, the quality of surface finish will reduce. Say True or False
10. The cutting fluids mostly used for machining alloy steel is
    a) Water b) Soluble oil c) Dry d) Sulphurised mineral oil
11. The cutting fluids mostly used for machining steel is
    a) Water b) Soluble oil c) Dry d) Heavy oil
12. Which of the following cutting tool has highest hot hardness?
    a) Ceramics b) Cast alloy c) High speed steel d) Carbon tool steel
13. Discontinuous chips is also called as segmental chips. Say True or False
14. Engine lathe is also called as _____
    a) Centre lathe b) bench lathe c) Speed lathe d) Automatic Lathe
15. The Unit of Cutting Speed is _____
    a) Metre/min b) Metre seconds c) RPM d) All of the above
16. In Lathe the height of the centres measured from the _____
    a) Lathe bed b) Lathe Gear box c) Lathe chuck d) All of the above
17. The following is also known as tool rest
    a) Saddle b) Cross slide c) Compound rest d) Tool post
18. A desired speed of _____ can be obtained by selecting the suitable change gears having proper number of teeth
    a) Lead screw b) Counter shaft c)Spindle d) all of the above
19. The following is used for holding bored parts for machining their outside surface on lathe
    a) Mandrel b)Dogs c) Driving plate d) Angle plate
20. Which of the following options best describes the centre lathe
    a) Welding machine b) Shaping machines c) Turning machines d) None of the above
21. The operation mainly done on a shaping machine is
    a) Turning b) Machining a flat surface c) Drilling d)Grinding
22. In geared shaper, reciprocating motion of the ram is obtained by___
    a. Hydraulic power b. Rack and Pinion c. Pneumatic d. All

23. The ratio of forward stroke time to return stroke time is
    a). 3 : 1 b). 5 : 3 c). 1 : 2 d) 3 : 2
24. Quick Return mechanism is used in
    a) Shaper b) Lathe c) Drilling d) Grinding
25. Compared to forward stroke the return stroke in shaper is
    a) Slower b) Faster c) Equal d) None
26. Goose neck tool is used in _____ machines.
    a. Shaper b.Planer c. Both a & b d. None
27. _____ is an operation of making a circular hole by removing a volume of metal from the job by a cutting tool.
    a. Reaming b. Boring c. Drilling d. Turning
28. The flutes in drill
    a. Allow the chips to escape from the hole b. Admit cutting fluid
    c. Form the cutting edges d. All of the above
29. Another name for helical grooves is
    a.Standard drill b. Flutes c. Twist drills d. All of the above
30. _____machine, where the tool is used to move to the desired position instead of moving the work to bring the latter in position for drilling
    a.Radial Drilling Machine b. Slotter Machine c. Power press d. Shaper

PART – B

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

1. What do you meant by Oblique cutting?
2. Mention the different operations performed in lathe machine?
3. Which operation of enlarging a hole through certain distance from one end instead of enlarging the whole drilled surface?
4. Name the formula expressed for cutting speed in a Shaper?

PART – C

Answer any **four** questions (Max. 100 words) 4 x 3 = 12

1. Explain about the different types of Chip formations?
2. Define the Working principle thread cutting in lathe with a neat diagram sketch?
3. Define the specifications of lathe with neat figure?
4. Define about Planner & its operations with a neat diagram?
5. Define about drill bits with its full specifications?

PART – D

Answer any **two** questions (Max. 300 words) 2 x 5 = 10

1. Draw and explain with a neat sketch of lathe machine accessories and attachments?
2. Describe about the different types of mechanisms in performed in shaping machine and explain any one of the mechanism with suitable figure?
3. Describe about the different types of Drilling operations performed in drilling machines with suitable figure?

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18-534

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
Course : DPMT
Subject : Engineering Drawing

Max. Marks: 60
Date : 12.01.2023
Time : 10.00 a.m. to 01.00 p.m.

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

PART – A

Answer **all** questions 30 x 1 = 30

1. The mini drafter serves the purpose of everything except
   a) Scales b) Set square c) Protractor d) Compass
2. The designation of sheet of size 594 x 841 is
   a) A0 b) A1 c) A2 d) A3
3. Which of the following is the lightest pencil?
   a) 2B b) 1B c) HB d) H
4. Construction lines are continuous thick lines. (Say True or False)
5. Dimensioning doesn't represent _____
   a) Height b) Length c) Depth d) Material
6. The main ingredients of pencil leads are
   a) Graphite and Clay b) Lead and Graphite c) Clay and Lead d) None of these
7. In the Oblique projection an object is represented by how many views?
   a) One view b) Two views c) Three views d) Four views
8. For what is pan head rivet used?
   a) General Work b) Structural Work c) Heavy Work d) Light Work
9. Projection of a point in the first quadrant will be
   (a) Front view in VP b) Front View in HP c) Front View in PP d) None
10. How is tapped hole of diameter 10mm with 20mm dimensioned?
    a) M10 b) M10, 20 c) M10, DEEP 20 d) M10 20 mm deep
11. When the line is parallel to HP and VP, its top view is in the form of ?
    a) Point b) True Length c) Reduced Length d) None
12. When the axis of solid is perpendicular to H.P, the _____view should be drawn first and ____ view then projected from it.
    a) Front , Top b) Top, Side c) Side, Front d) Top, Front
13. Two types of dimensions needed on a drawing are: i) size or functional dimensions and ii) location or datum dimensions. (Say True or False)
14. In orthographic projection, each projection view represents how many dimensions of an object?
    a) 1 b) 2 c) 3 d) 0
15. The leader should be used to dimension the circle. (Say True or False)
16. The bolt which is used where the head of a bolt must not project above the surface of the connected piece is _____
17. In perspective projection, all lines of sight start at a _____ point.
18. Dimensions can be placed anywhere irrespective of the features visible. (Say True or False)
19. A coupling is a mechanical device that temporarily joins two rotating shafts to each other. (Say True or False)
20. The front view of an object is shown on which plane?
    a) Profile plane b) Vertical plane c) Horizontal plane d) Parallel plane
21. If an isometric drawing is made use of isometric scale then the drawings are called _____
22. The straight lines which are drawn from various points on the contour of an object to meet a plane are called as _____
23. The type of couplings used to join two shaft whose axes are neither in same straight line nor parallel, but intersect is _____
24. 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
25. Which of the following is not the method to prevent rotation of a bolt while screwing a nut on or off it?
    a) By keeping a square neck b) By providing a snug
    c) By keeping a lock nut d) By inserting a pin in shank

26. Draw the Symbol of First angle and Third Angle Projection.
27. Name the different drawing instruments?
28. What do you mean by Convention/ Code?
29. Name The Principal Planes of Projection.
30. What is sectional View Drawing?

PART – B

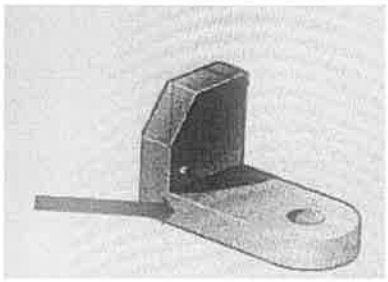
Answer **all** questions (Max. 40 words) 4 x 2 = 8

1. What is Projection and types of it?
2. What are the two systems of placing dimensions on a drawing?
3. A point A is 20 mm above HP and 30 mm in front of VP. Draw its projection.
4. Explain clearly the difference between the first-angle projection method and the third-angle projection method.

PART – C

Answer any **four** questions (Max. 100 words) 4 x 3 = 12

1. Draw the six principals view of given object.



2. Explain the types of Sectional View with neat sketch?
3. What is the Principal of Oblique Projection. Explain the difference b/w Oblique and Isometric Projection?
4. Show by means of neat, dimensioned sketches the shapes of the following rivets: Cup head; pan head; conical head; countersunk head.
5. Draw the isometric view of a square-headed bolt 24 mm diameter and 70 mm long, with a square neck 18 mm thick and a head, 40 mm square and 18 mm thick.

PART – D

Answer any **two** questions (Max. 300 words) 2 x 5 = 10

1. 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.
2. Explain the types of lines with neat sketch.
3. What is projections of solids. Explain the types of solids with neat diagrams.

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CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
Course : DPMT
Subject : Plastics Materials & Testing

Max. Marks: 60
Date : 13.01.2023
Time : 10.00 a.m. to 01.00 p.m.

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

PART – A

Answer **all** questions 30 x 1 = 30

1. ASTM method for brittleness temperature test is
   A) ASTM D746 B) ASTM D648 C) ASTM D1525 D) ASTM D 3418
2. As the temperature increases, tensile strength of material_____
   A) Increase B) Decrease C) Remain same D) Increase first and then decrease
3. Overhead water storage tanks are made using
   A) POM B) ABS C) HDPE D) None
4. The UV stabilizer used in unsaturated polyester is
   A) Phthalic anhydride B) Styrene C) Benzophenone D) Methyl methacrylate
5. Which of the following is chlorine containing polymer?
   A) LDPE B) PP C) PVC D) ABS
6. Which of the following test is related to toughness of material?
   A) Impact strength B) Flexural Strength C) Tensile Strength D) Hardness test
7. Which is the hard & tough material out of the following?
   A) PS B) PP C) PC D) PTFE
8. Polyamides burns with _____ smell.
   A) Waxy B) Marigold C) Burnt hair D) Lubricating oil
9. A test perform to confirm PVC is
   A) Copper wire test B) Aluminum wire test C) Thin wire test D) None of these
10. As temperature increases, the viscosity of polymer solution is
    A) Decreases B) Remains same C) Increases D) None of these
11. Elastic modulus is also known as
    A) Young's modulus B) MFI C) Stiffness D) Storage modulus
12. The unit of coefficient of viscosity is
    A) Pa.s B) N.sec C) Pa D) None of these
13. The unit of modulus of elasticity is
    A) Kg/cm^2 B) Pa C) Psi D) All
14. PMMA is manufactured by which of the following process
    A) Emulsion polymerization B) Solution polymerization
    C) Suspension polymerization D) None of these
15. Which is the versatile out of the following?
    A) PS B) PP C) PC D) PTFE
16. Casein, shellac are the examples of _____ Polymers.
17. UTM stands for _____
18. DSC Stands for _____
19. _____ method used to determine the level of moisture in plastics material.
20. Unit of HDT is_____
21. The branching in HDPE is always more than LLDPE- Say True or False
22. The density of crystalline component is higher than that of the amorphous component. Say True or False
23. PVC is a commodity plastic. Say True or False
24. Preheating of materials reduces the defects in the product. Say True or False
25. PP is a self-extinguishing material. Say True or False
26. PMMA full form _____
27. ANSI full form_____
28. PPO stands for _____
29. LLDPE Stands for _____
30. Expand PAI_____

18-535

PART – B

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

1. Define plastics.
2. What is glass transition (Tg) temperature?
3. Name the material having hinge property.
4. Name any 4 plastics material having self-extinguishing property.

PART – C

Answer any **four** questions (Max. 100 words) 4 x 3 = 12

1. Distinguish between HIPS and GPPS.
2. What are the applications of phenol formaldehyde?
3. How engineering plastics is different from specialty plastics?
4. Write a short note on ISO.
5. What is the flammability test of plastics?

PART – D

Answer any **two** questions (Max. 300 words) 2 x 5 = 10

1. What is the importance of testing? Why we need testing?
2. What are the thermal properties of testing? Explain heat deflection temperature?
3. Explain in details about properties and applications of PTFE?

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