18-541

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FOURTH SEMESTER EXAMINATION – JULY 2022

Duration : 3 Hours
Course : DPMT
Subject : Engineering Materials & Heat Treatment

Max. Marks: 60
Date : 05.07.2022
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. Steel is produced in_____
   (a) Pudding Furnace (b) Cupola Furnace (c) Blast Furnace (d) Electric Furnace
2. Gray Cast Iron possesses_____.
   (a) High Fluidity (b) High resistance to wear (c) High vibration damping (d) All of these
3. The percentage of Cu and Zn in Cartridge Brass is normally _____
   (a) 70 % & 30% (b) 60% & 40% (c) 85% & 15% (d) 80% & 20%
4. Amorphous solids have _____ structure.
   (a) Regular (b) Linear (c) Irregular (d) Dendritic
5. The smallest portion of the lattice is known as _____
   (a) Lattice structure (b) Lattice point (c) Bravais crystal (d) Unit cell
6. The cooling rate must be _____ the critical cooling rate for hardening of steel by quenching.
   (a) Higher than (b) Lower than (c) Equal to (d) Half of
7. Nitriding involves the addition of _____ for the hardening of surface.
   (a) Nitrogen (b) Nichrome (c) Neon (d) Niobium
8. What are the applications of nitriding?
   (a) Gears, camshafts (b) Valve guides and seatings
   (c) Chain links, nuts, bolts, and screws (d) Gears, nuts, bolts
9. Tensile test can be performed on
   (a) Impact testing machine (b) Universal testing machine
   (c) Rockwell tester (d) Brinell tester
10. During hardness test the indenter is usually a
    (a) Ball (b) Pyramid (c) Cone (d) All of the above
11. In Izod test, the specimen is kept as
    (a) Simply supported beam (b) Cantilever beam
    (c) Overhanging beam (d) Fixed ended beam
12. Which of the following is the hardest constituent of steel?
    (a) Ledeburite (b) Austenite (c) Bainite (d) Martensite
13. Carbon contain in steel affects
    (a) Hardness (b) Tensile strength (c) Melting point (d) All of these
14. Percentage of Carbon in low carbon steel is
    (a) 0.05 % (b) 0.75% (c) 0.3% (d) 0.5 %
15. Admiralty gun metal contains
    (a) 63 to 67 % Nickel & 30% Copper (b) 88% Copper,10%Tin and rest Zinc
    (c) Alloy of Tin, Lead and Cadmium (d) Iron scrap and Zinc
16. The temperature at which ferromagnetic alpha Iron transform to paramagnetic alpha iron is _____.
17. The compressive strength of cast iron is_____ that of its tensile strength.
18. Chromium when added to steel _____ the tensile strength.
19. A material is said to be allotropic, if it has _____.
20. Tungsten when added to steel _____ the critical temperature.
21. White Cast iron has a high tensile strength and a low compressive strength. True/False
22. The quenching of steel from the upper critical point results in a fine grained structure. True/False
23. The lower critical temperature of steel is 723 ^{0}C True/False

24. Cupola is used in manufacturing of Cast iron. True/False
25. A small percentage of Boron is added to steel in order increase wear resistance. True/False.
26. Expand BCC
27. Expand ISO
28. Expand AISI
29. Expand HSS
30. Expand MS

PART – B

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

1. Define the annealing.
2. Define the co-ordination number and unit cell.
3. Define the Austenite and Ferrite.
4. Define toughness and hardness.

PART – C

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

1. Write a short note on steel and its types.
2. Draw and explain the Stress-Strain diagram for ductile materials.
3. What are the various hardness test? Write a short note on Brinell hardness testing.
4. Write the properties of Copper and explain about any of its alloy.
5. Write the differences between Cyaniding and Nitriding.

PART – D

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

1. Define the Wrought Iron with its composition, properties and applications.
2. Draw and explain about TTT diagram.
3. Explain about SC, BCC, FCC structures with diagram and write the number of atoms per unit cell, co-ordination number and atomic radius for each structure.

****

18-542

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FOURTH SEMESTER EXAMINATION – JULY 2022

Duration : 3 Hours
Course : DPMT
Subject : Plastics Product & Mould Design

Max. Marks: 60
Date : 06.07.2022
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. _____ is defined as the geometry and topology of a feature.
   (a) Shape (b) Size (c) Aesthetics (d) Appearance
2. The most suitable plastic material for hinged products is _____.
   (a) HDPE (b) Polypropylene (c) ABS (d) All of these
3. Another name of interference fit is _____.
   (a) Snap-in fit (b) Snap-on fit (c) Press fit (d) None of these
4. The opening sequence of three-plate mould is _____.
   (a) Runner, Product, Sprue Cut (b) Product, Runner, Sprue Cut
   (c) Sprue Cut, Runner, Product (d) Sprue Cut, Product, Runner
5. _____ mould is used for moulding shallow and small parts in large quantity.
   (a) 2-plate (b) 3-plate (c) Stack (d) Hot runner
6. A mark on a moulded part made by the meeting of two fronts is _____.
   (a) Meld line (b) Weld line (c) Knit line (d) Flow line
7. Which of the following method is recommended for delayed opening in split cavities?
   (a) Dogleg cam (b) Finger cam (c) Angle lift (d) Hydraulic
8. Clamping force in blow mould is calculated as _____.
   (a) 1.25 x Projected area x Blow pressure (b) 1.25 x Blow ratio x Cavity area
   (c) Average Blow pressure x Cavity area (d) 0.5 x Blow pressure x Cavity area
9. _____ mould is used to manufacture large deep draw parts.
   (a) Flash type (b) Landed positive type
   (c) Semi positive type (d) Fully positive type
10. The circular form of the leftover material in the base of the well in transfer moulding is called as _____.
    (a) Chamber (b) Box (c) Cull (d) Sprue
11. The textile bobbin is an example of _____ undercut product.
    (a) Internal (b) External (c) Local (d) None of these
12. The preferred material for the compression mould construction is _____.
    (a) SS (b) HCHCR (c) HSLA (d) HSS
13. Rheological and _____ properties of polymer melt play a vital role for design of extrusion die.
    (a) Mechanical (b) Optical (c) Thermal (d) None of these
14. As soon as melt emerges out of the extrusion die, it swells due to its _____ property.
    (a) Electrical (b) Elastic (c) Plastic (d) Optical
15. The blown film die gap is usually between ____ to _____.
    (a) 0.5 mm to 2 mm (b) 1 mm to 2 mm (c) 2 mm to 3 mm (d) 0.1 mm to 1 mm
16. The corners of a square boss should have a radius of at least _____.
17. The fit used for mould guide pillar and guide bush is _____.
18. The period required to harden thermosetting material to partial or complete polymerisation is called as _____.
19. Collapsible cores are widely used for _____ undercuts.
20. _____ die is used for manufacturing rod.
21. Larger gates will cause lower shrinkage. - State True or False.
22. The amount of wattage needed to heat a transfer mould is generally 1 kW for every kg of mould steel. - State True or False.
23. Automotive fuel tanks are blow moulded.- State True or False.
24. Injection blow moulding is used for mass production of plastic containers with less volume. - State True or False.
25. Flat back extrusion dies are used for high volume or long runs. - State True or False.
26. ETP is the abbreviation of _____.

27. GRP is the abbreviation of _____.
28. DFMA is the abbreviation of _____.
29. RTM is the abbreviation of _____.
30. CAE is the abbreviation of _____.

PART – B

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

1. Name few key design areas for plastic products.
2. How will you decide the number of impressions for an injection mould?
3. What are the types of register ring?
4. What are the important structural and mechanical considerations in a bottle design?

PART – C

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

1. Differentiate snap-in and snap-on fittings with neat sketches.
2. Specify a screw type injection moulding machine with one example.
3. What are the advantages and limitations of standard mould base?
4. Write short notes on blow ratio and parison programming.
5. Explain top plunger transfer mould with a neat sketch.

PART – D

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

1. Derive and explain the calculation for Finger CAM actuation with a neat sketch.
2. Classify various types of extrusion dies and explain any two with neat sketches.
3. Explain semi-automatic fully positive compression mould with a neat sketch.

* * * * * * *

18-543

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FOURTH SEMESTER EXAMINATION – JULY 2022

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

Max. Marks: 60
Date : 07.07.2022
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. During Milling, the Cutter Usually Moves
   (A) Perpendicular to its axis (B) Parallel to its axis (C) Inclined to its axis (D) any of the above
2. Peripheral milling is well suited to the cutting of
   (A) Deep Slots (B) Threads (C) Gear teeth (D) All of the above
3. A Milling Cutter made up of
   (A) High speed steel (B) Cemented carbide (C) Aluminium oxide (D) Both (A) and (B)
4. The use of coating on milling cutter will increase the _____of the tool
   (A) Surface Hardness (B) Corrosion Resistance (C) Surface Finish (D) Melting Point
5. Which milling machine is used to cut gears
   (A) Horizontal Milling Machine (B) Vertical Milling Machine
   (C) Both (A) and (B) (D) None of the above
6. In end mill cutter, chips are pulled up the
   (A)Flute (B) Tooth (C) Tip (D) Shank
7. Cutting T-slots can be performed more effectively by _____ Milling machine
   (A)Horizontal (B) Vertical (C) Both A and B (D) None of the above
8. A dense structure of a grinding wheel is used for
   (A) Hard Materials (B) Brittle materials (C) Finished cuts (D) all of the these
9. The grade of a grinding wheel depends upon
   (A) The hardness of the material being ground (B) Speed of wheel and work
   (C) Condition of grinding machine (D) All of the these
10. The abrasive recommended for grinding material of low tensile strength is
    (A) Silicon Carbide (B) Aluminum Oxide (C) Sandstone (D) Diamond
11. Surface grinding is done to produce
    (A) Tapered surface (B) Flat surface (C) Internal cylinder holes (D) All of these
12. The process of improving the cutting action of the grinding wheel is called
    (A) Truing (B) Dressing (C) Facing (D) Clearing
13. A fine-grained grinding wheel is used to grind
    (A) Hard and brittle materials (B) soft and ductile materials
    (C) Hard and ductile materials (D) Soft and brittle materials
14. Resin bond is also known
    (A) Vitrified bond (B) Rubber bond (C) Silicate bond (D) Bakelite bond
15. Removing dull grains in order to make grinding wheel sharp is known as
    (A) Loading (B) Glazing (C) Dressing (D) Truing
16. Slab milling can be performed more effectively by _____ milling machine
17. Cutting T-slots can be performed more effectively by _____ milling machine
18. ____ bond is used in grinding wheels for very high-class surface finish with close dimensional accuracy
19. The manufacturer has marking on a grinding wheel as "A 36 L 5 V". The code V represents_____
20. _____grinding processes is used for high production run
21. Milling machine is to removes the metal as the work is fed against a rotating single point cutter- say true or false
22. Milling machines find wide application in production work – say true or false
23. In face milling cutters, maximum cutting Is done by the teeth on periphery – say true or false
24. In centreless grinding work piece is supported by chuck – say true or false
25. Stainless steel is very difficult to grind due to its toughness – say true or false
26. RPM stands for
27. MRR stands for
28. CBN stands for
29. HSS stands for
30. DOC stands for

PART – B

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

1. How do you specify the Milling machine?
2. What is traced controlled milling machine
3. What is centreless grinding?
4. What is wheel mounting?

PART – C

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

1. Explain arbor assembly with neat sketch
2. Describe convex and concave milling cutter with next sketch
3. Distinguished between wet grinding and dry grinding processes
4. Describe Grit, Grade and Structure of a grinding wheel
5. Why a grinding wheel is to be balanced? Explain

PART – D

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

1. Explain types of milling Machine and describe about column and knee type with neat sketch
2. How a grinding wheel is marked (coded)? Describe Indian standard marking system
3. Describe cylindrical grinding working principal with neat sketch

* * * * * * *

18-544

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FOURTH SEMESTER EXAMINATION – JULY 2022

Duration : 3 Hours
Course : DPMT
Subject : Plastics Processing Techniques

Max. Marks: 60
Date : 08.07.2022
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. Rehology is study about
   a) Mechanical behavior b) Flow behavior c) Thermal behavior d) All the above
2. As the screw rotate which force will be applied for melt the plastics
   a) Tensile force b) Compressive force c) Shear force d) All the above
3. Multilayer pipes are extrruded by using
   a) Single screw extruder b) Twin screw extruder c) Multi screw extruder d) Co-extruder
4. Which material is used for drainage pipe manufacturing
   a) PC b) PVC c) HDPE d) Both b and c
5. Mold release agent for injection molding
   a) Zinc Stearate b) Silicon Spray c) Both a and b d) None of above
6. During transfer moulding, plastic material is transferred into a chamber called _____.
   a) Sprue b) Pot c) Mould cavity d) bNone
7. Which one of the following is the most common polymer type in fiber-reinforced polymer composites _____?
   a) Elastomers b) Thermoplastics c) Thermosets d) Both Elastomers & Thermoplastics
8. Small pharmaceutical bottles with accurate neck finish is formed by
   a) Calendaring b) Injection blow molding c) Extrusion blow molding d) Rotational molding
9. Which of the plastics cannot be extrusion blown
   a) HDPE b) PP c) PVC d) PET
10. Two stage stretch blow molding is also known as
    a) Extrusion b) Reheat and blow molding c) Thermoforming d) Injection blow molding
11. PS foams are produced by
    a) Injection molding and extrusion molding
    b) Extrusion molding only
    c) Injection molding only
    d) Stretch blow molding only
12. Production rate of Injection Blow Moulding method is ___ of Extrusion Blow Moulding
    a) Lower than that b) Higher than that c) Equal d) Depends upon machine
13. Speed of rotation ratio between major and minor axis in rotational molding is
    a) 1:4 b) 4:1 c) 1:6 d) 6:1
14. In thermoforming plastic sheet heated to the
    a) Melting point b) Sag point c) Tg point d) None of these
15. Which of the following materials is not usally used for thermoforming process
    a) HIPES & ABS b) PMMA c) PVC d) POM & Nylon
16. The thickness of coating is directly proportional to dwell time (True/ false)
17. In injection blow molding, pinch off is required (True/ false)
18. Secondary operation is necessary in extrusion blow molding.(True/ false)
19. Co-rotating twin screw extruder is preferred for compounding for PVC compounding (True/ false)
20. In injection molding open moldes are used (True/ false)
21. Thermal diffusivity = ... / (density X Specific Heat)
22. .....materials are used in compression molding.
23. Usually rock and roll machine is used ..... tank
24. Crosshead extrusion process is widely used for to .....
25. Size of extrtuder is measured by .....

Write the aberration

26. TQPP
27. DOP
28. DSC
29. Tg
30. MWD

PART – B

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

1. What do you mean by FLH?
2. Define rotational molding cycle?
3. What do you mean by shrinkage?
4. Define rotational molding cycle.

PART – C

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

1. Write down the advantages of rotational molding process.
2. Explain Helix angle also discuss important of it.
3. Compare & contrast injection blow molding and extrusion blow molding.
4. Differentiate between pot type transfer and plunger type transfer molding process.
5. Discuss parison programming .

PART – D

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

1. Describe injection stretch blow molding with the help of sketch diagrams. Discuss its application.
2. What is rotational molding process? Explain the process with neat sketch with one product example
3. Write short notes on any two
    a) Molding Cycle
    b) Processing parameter in injection molding
    c) Compression molding

* * * * * * *