

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

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

Max. Marks: 60
 Date : 04.07.2023
 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. Which of the following processes will one use on hardened steel to reduce brittleness
 (a) Annealing (b) Normalizing (c) Spheroidizing (d) Tempering
2. Which of the following material in the final structure of steel increases the strength of steel?
 (a) Martensite (b) Pearlite (c) Ledeburite (d) Austenite
3. While normalizing the steel should be cooled
 (a) In still air to room temperature (b) In oil (c) By forced air (d) In water
4. The external surface of the part made of mild steel can be hardened by
 (a) Tempering (b) Normalising (c) Case hardening (d) Hardening
5. 'Cyaniding' and 'Nitriding' are two methods of
 (a) Tempering (b) Normalising (c) Case hardening (d) Hardening
6. Which one of the following structures of steel is obtained due to the drastic cooling from the austenite structure?
 (a) Pearlite (b) Cementite (c) Martensite (d) Ferrite
7. What is the name of the structure formed, if a steel is heated for about 723°C?
 (a) Pearlite (b) Cementite (c) Austenite (d) Ferrite
8. What is the name of heat treatment process done to relieve strain and stress?
 (a) Normalizing (b) Annealing (c) Hardening (d) Tempering
9. Heat Treatment of metal is necessary
 (a) To make it shiny and look good (b) To produced desired physical properties
 (c) To make it ductile (d) To produced desired chemical properties
10. The atomic packing factor for face-centered cubic (FCC) structure is
 (a) 0.75 (b) 6.3 (c) 0.74 (d) 12
11. The number of atoms per unit cell in face-centered cubic (FCC) structure is
 (a) 6 (b) 4 (c) 12 (d) 8
12. What is the coordination number of a body-centered unit cell?
 (a) 6 (b) 12 (c) 8 (d) 4
13. What is the range of carbon content in steel
 (a) 0-0.8 (b) 0-2.0 (c) 0-4.4 (d) 0-6.6
14. What is the defining property of Wrought Irons?
 (a) No carbon (b) Low carbon (c) High carbon (d) Completely carbon-filled
15. Lower critical temperature of high carbon steel while hardening is
 (a) 747 °C (b) 723 °C (c) 1147 °C (d) 1000 °C
16. Eutectic Reaction of Iron -Carbon occurs at 1147 degree centigrade (True/False).
17. Alpha iron has FCC structure (True/False).
18. The crystal structure of Austenite is FCC. (True/False)
19. Solid solution of carbon in alpha iron is ferrite (True/False).
20. Presence of chromium make an alloy ferrous (True/False).
21. Cast Iron is an alloy of _____ and _____.
22. _____ is an alloy of Copper and Zinc.
23. _____ is an alloy of Copper and Tin.
24. _____ is a non-ferrous metal used in chrome plating of steel alloy.
25. Percentage with of Carbon in Cast Iron is from _____ to _____.
26. The full form of APF is _____.
27. The chemical symbol for lead is _____.
28. The Chemical formula of Cementite is _____.
29. The full of BCC is _____.
30. Rockwell Hardness is represented as _____.

PART – B

Answer **all** questions (Max. 40 words)

4 x 2 = 8

1. Define a Unit cell with a suitable example?
2. What is meant by Atomic Packing factor?
3. What is meant by nonferrous alloys? Give a suitable example?
4. Name the pure form of iron at room temperature.

PART – C

Answer any **four** questions (Max. 100 words)

4 x 3 = 12

1. What is Eutectic reaction?
2. Write different types of Cast irons
3. What are the three classifications of ferrous alloys?
4. What is an alloy? Name any two non-ferrous alloy and mention its properties.
5. Explain how Austenite is transformed into Pearlite, Bainite and Martensite.

PART – D

Answer any **two** questions (Max. 300 words)

2 x 5 = 10

1. Draw TTT diagram explain the transformation.
2. What is heat treatment? Explain Annealing and Normalizing process and its applications
3. Draw Fe-C Phase Transformation diagram and explain Eutectoid reaction from the diagram.



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

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

Max. Marks: 60
Date : 05.07.2023
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. Uneven wall thickness in the product results in _____
(a) Sink mark (b) Warpage (c) Voids (d) Surface blemishes
2. Draft and taper angle for plastic product range between _____
(a) ½ -3 degree (b) 3-5 degree (c) 10-15 degree (d) 15-20 degree
3. _____ are easily produced in molded parts by core pins.
(a) Undercut (b) Holes (c) Taper (d) Thread
4. When the mould is constructed with bolster and insert ? It is called as _____
(a) Insert mould (b) integer mould (c) Hand mould (d) None of these
5. Why are plastics used for making products ?
(a). Low cost (b) Easy manufacturing (c) Less weight (d) All of these
6. _____ is defined as the force required to keep the mold in closed condition during injection.
(a) Shot capacity (b) Clamping force (c) Plasticizing capacity (d) Daylight
7. _____ material is recommended for mould base.
(a) P-20 Steel (b) C-45 Steel (c) HSS (d) Carbide
8. Heel block is mainly used in split mould for _____
(a) Guiding the split (b) Moving the split (c) Final closing of split (d) All of these
9. Eye bolt is used for _____
(a). Clamping plates together (b). Clamping mould with the machine
(c) Lifting the mould with the machine (d) None of the above
10. Which of the following product(s) is (are) made by Compression moulding?
(a) Electric plugs (b) Pot handles (c) Dinnerware plates (d) All of the above
11. Which of the following is a type of Transfer Moulding?
(a) Pot transfer moulding (b) Plunger transfer moulding (c) Both (A) and (B) (d) None of the above
12. Plastic bottles are manufactured by _____
(a) Compression moulding (b) Transfer moulding (c) Blow moulding (d) All of the above
13. A starting tube in blow moulding is known as _____
(a) harison (b) parison (c) garrison (d) none of the above
14. Draft is provided for: _____
(a) Improving strength of component (b) Easy removal of component
(c) Increase stiffness (d) Proper shrinkage
15. Edge gates are usually located on _____
(a) the 'A' half of the mold (b) the sprue (c) the parting line (d) below the parting line
16. Tolerance is maintained by the unit _____
17. _____ is used to prevent the leakage of cooling medium
18. In Moulding Machine the distance between fixed platen and moving platen in closed condition is called
19. _____ is used to give alignment of the mold with the machine.
20. The other name of spacer block is _____
21. The holes may be provided by matching core and cavity. Say True or False?
22. Submarine gate is used in three plate mould. Say True or False.
23. Direct sprue gate is possible on core side. Say true or False
24. A sprue puller is a part of ejection system. Say True or False.
25. In modern Blow molding machine, the Parison can be programmable from 1 to 500 points —say True or False
26. Expand HSS
27. Expand RPM
28. Expand ISO
29. Expand HCHCR
30. Expand EDM

PART – B

Answer all questions (Max. 40 words)

4 x 2 = 8

1. Define parting line.
2. What are the different types of runner?
3. What is pinch off?
4. What is shrinkage?

PART – C

Answer any four questions (Max. 100 words)

4 x 3 = 12

1. Write the objectives of product design.
2. Describe the blow mould process.
3. Explain fingercam actuation
4. Explain three zones of extruder
5. Define core and cavity

PART – D

Answer any two questions (Max. 300 words)

2 x 5 = 10

1. Write short notes on the following
a) Shot capacity b) Plasticizing capacity c) Clamping tonnage d) Tie bar distance e) daylight
2. Explain any five mould parts
3. What are factors to be considered on selection of moulding machine? Explain any two

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
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FOURTH SEMESTER EXAMINATION – JULY 2023

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

Max. Marks: 60
 Date : 06.07.2023
 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. Knee of milling machine is attached and slides up and down on
 a) Base b) Column c) Knee d) Table
2. Following is an abrasive machining
 a) Milling b) Pedestal Grinder c) Laser beam machining d) All of the above
3. Synthetic oil is used as cutting fluid in grinding for
 a) Cast iron b) Stainless steel c) Plastics d) All of the above
4. Abrasives must possess this/these property-
 a) Hardness b) Wear Resistance c) Fracture Resistance d) All of the above
5. Arbor is use in-
 a) Shaper b) Lathe c) Milling d) All of the above
6. Adaptors in milling machines are generally used to
 a) Hold cutters b) Hold the work piece on table
 c) Act as auxiliary spindle d) None of the mentioned
7. Diameter of milling cutter is 100mm, running at 280 rpm. Cutting speed in m/min is approx. equal to
 a) 88 b) 86 c) 68 d) 66
8. Which of the following milling cutters have teeth on their periphery as well as on their end face?
 a) Plain milling cutters b) Side milling cutters
 c) End milling cutters d) Face milling cutters
9. Which of the following milling cutters can be used for formation of V-grooves?
 a) Angle milling cutters b) Form milling cutters c) Gear cutters d) Woodruff-key cutter
10. Collets in milling machines are generally used to
 a) Hold cutters b) Hold the work piece on table c) Act as auxiliary spindle d) None of the mentioned
11. Which of the following is a correct range for grain number of the grinding wheel for coarse grains?
 a) 220-600 b) 80-180 c) 30-60 d) 10-24
12. Which of the following is a surface finishing operation?
 a) Drilling b) Lapping c) Milling d) Turning
13. For machining a cast iron workpiece by a high speed steel tool, the average cutting speed is
 a) 10 m/min b) 15 m/min c) 22 m/min d) 30 m/min
14. Grinding wheel is specified as "A 600 K 5 B 17". Grain size of a wheel will be
 a) Coarse b) Medium c) Fine d) Very Fine
15. *Why would you want to tap a grinding wheel with the non-metallic handle of a screwdriver?*
 a) You would never want to do that. It could hurt the wheel.
 b) If the wheel makes a ringing noise, you will know it is not fit for use.
 c) It's part of a test to check the usability of the wheel.
 d) Tapping a grinding wheel shakes any impurities out of its pores.
16. _____ grain grinding wheel will give a better result for rough machining
17. Resin bond is also known _____ bond
18. 'Lapping' is type of _____ technique.
19. Part of drill between neck and tang is known as _____
20. _____ is the narrow flat surface running along flutes of twist drill on its leading
21. The ceramic tools are fixed to a tool body by brazing. (true/false)
22. Grinding wheel denoted by A 80 K 5 B 17 will have Silicon carbide abrasive? (true/false)
23. The thrust force, is also called the feed force. (true/false)
24. In machining cast iron, no cutting fluid is required. (true/false)
25. Flank wear is due to the abrasive action of hard mis-constituents. (true/false)
26. **SiC** is the acronym for-
27. **ASTM** is the acronym for
28. **HMC** is the acronym for-
29. **CNC** is the acronym for
30. What is **SFM** in Milling Machine.

PART – B

Answer **all** questions (Max. 40 words)

4 x 2 = 8

1. What are the different methods used for indexing in milling machines.
2. Why chattering appears in machined surface?
3. What is up milling process?
4. What is Machinability?

PART – C

Answer any **four** questions (Max. 100 words)

4 x 3 = 12

1. What are the basic workshop safety Precautions.
2. What are the advantages of Coolants and lubricants?
3. Write the important operations performed in Milling machine.
4. Explain the important operations performed in Cylindrical Grinding Machine.
5. Write the types of abrasives.

PART – D

Answer any **two** questions (Max. 300 words)

2 x 5 = 10

1. Explain in detail about the Grinding Wheel Nomenclature.
2. Explain the working principle of Tool and Cutter Grinder with Neat Sketch.
3. What are the various types of Milling M/c attachments, explain each with neat sketch.

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FOURTH SEMESTER EXAMINATION – JULY 2023

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

Max. Marks: 60
Date : 07.07.2023
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. Suck back is a term used in process
a) Calendaring b) Compression molding c) Injection molding d) None of this
2. Drooling can be controlled by using
a) Shut off nozzle b) Reverse taper c) spring operated valve nozzle d) All of these
3. Microprocessor based process controllers in injection molding can lead.....
a) Set up time reduction b) Easier operator tuning c) Smoother operation d) All of these
4. For pipe extrusioncross sectional dies are used
a) Solid b) Hollow c) Rigid d) None of these
5. Compression molding processing temperature range is
a) 100 to 120^o C b) 140 to 250^o C c) 280 to 320^o C d) None of these
6. Which material can't be processed in compression molding?
a) PF b) UF c) MF d) PTFE
7. In rotational molding the material perfectly.....
a) Melts b) Fuses c) Both a & b d) none of these
8. Main root cause for burn mark is
a) High screw rotation b) Excessive melt temperature
c) Inadequate air vent d) All of the above
9. Energy savings in clamping can be achieved with
a) Hydraulic clamping system b) Toggle clamping system c) Both a & b d) None of these
10. Mold releasing agents can be
a) Zinc stearate b) Silicon Spray c) Both a & b d) None of these
11. In blown film extrusion, the BUR is normally in the range of
a) 2:1 to 4:1 b) 5:1 to 7:1 c) 6:1 to 8:1 d) 7:1 to 9:1
12. PET large carbonated beverage bottles (2.5) are produced using _____
a) Extrusion blow molding b) Injection blow molding
c) Extrusion stretch blow molding d) Injection stretch blow molding
13. Which plastic material shows affinity towards metals while processing?
a) PP b) Nylon c) PC d) None of these
14. Calcium carbonate is an example for
a) Filler b) Plasticizer c) Antioxidant d) None of these
15. The plastics are compared to other materials.
a) Light weight b) cheaper c) versatile d) All of these
16. HDPE Pipes are manufactured using _____ process.
17. _____ Capacity can be defined as the amount of material that can be processed by the machine per hour.
18. _____ is the unit in which the melt is plasticized and forced into the mould.
19. Flow Lines can be reduced by _____ the temperature.
20. In the _____ zone, the plastic material first enters the screw and is conveyed along a constant root diameter in an injection moulding machine.
21. Day light refers to injection moulding machine (True/False)
22. In Blow Moulding, pinch off is required. (True/False)
23. Water Buckets are manufactured using Blow Moulding Machine. (True/False)
24. HDPE stands for High Density Poly Ethylene (True/False)
25. Sink marks are defects in plastic product. (True/False)

Write the abbreviation

26. PVC
27. NRV
28. ABS
29. L/D ratio
30. MFI

PART – B

Answer **all** questions (Max. 40 words)

4 x 2 = 8

1. Write down different types of Injection molding machine.
2. Define L/D ratio of the screw? What is the significance of larger L/D ratio?
3. Write down the functions of different zones of screw.
4. Name the equipment required for pipe extrusion.

PART – C

Answer any **four** questions (Max. 100 words)

4 x 3 = 12

1. What are the types of transfer moulding process?
2. What is bambooing in extrusion?
3. Write down any three faults and their remedies of extrusion process.
4. Explain compression moulding process with diagram.
5. Write short notes on
 - a. Pinch off
 - b. Blow Pin
 - c. Preform & Parison

PART – D

Answer any **two** questions (Max. 300 words)

2 x 5 = 10

1. Compare thermoforming and injection moulding process with neat diagram.
2. Describe the principles of rotation moulding process with neat diagram.
3. With neat diagram explain the construction and working of an Injection Moulding Machine.
