

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

Duration : 3 Hours
 Course : PD - PMD with CAD/CAM
 Subject : Plastics Materials

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. Liquid crystal polymers are
 a) Thermotropic b) Lyotropic c) Both a and b d) None of these
2. In some high temperature, non-stick applications _____ can replace PTFE.
 a) PMMA b) PES c) PEEK d) PPS
3. Which one of the following has higher impact strength and better chemical resistance?
 a) Polysulphones b) Polyethersulphones c) ABS d) None of the above
4. Which one of the following has lowest toxic gas emission and smoke emission
 a) Polysulphone b) PPS c) PPO d) PEEK
5. Which one of the following is used as wire enamels
 a) PEEK b) PET c) PPS d) Polyimide
6. Trimellitic anhydride is used to synthesize
 a) Polyimide b) Polyamide-imide c) Polyether imide d) All the
7. Reason for blending TPU with POM is
 a) To increase the modulus b) To increase the tensile strength
 c) To increase the toughness d) All the above
8. Reason for blending ABS with PVC is
 a) To improve Tg b) To improve processability c) To improve toughness d) all the above
9. NBR in PVC/NBR blend acts as
 a) Curing agent b) lubricant c) plasticizer d) thinner
10. Which of the following is not an example of an organic fiber?
 (a) Polyester (b) Glass (c) Nylon (d) Aramid
11. For high temperature applications, which of the following matrix material is preferred?
 (a) Vinyl ester (b) PF (c) Epoxy resins (d) Unsaturated polyester
12. Amongst the choices given below, high performance applications in the aerospace industry use
 (a) Kelvar 49 (b) Kelvar 29 (c) Kevlar (d) None of the above
13. Which of the following molding processes is most labor-intensive?
 (a) Hand Lay-up process (b) Spray-up Process
 (c) Vacuum bag process (d) None of these
14. A molding operation that uses sheet-molding compound is a form of which one of the following:
 (a) compression molding (b) contact molding
 (c) injection molding (d) open mold processing
15. Pultrusion is most similar to which one of the following plastic shaping processes:
 (a) Blow molding (b) Extrusion (c) Injection molding (d) Thermoforming
16. Lyotropic liquid crystal transition occurs by _____.
17. Polymer blend with improved interphase is called _____.
18. PC/ABS is an _____.
19. Composites which do not have the same mechanical or physical property in all directions are said to be _____.
20. The first man-made fibre is _____.
21. Compounding is used for R&D Purpose .(say True or False)
22. Toughening agent improves the impact strength of plastics.(say True or False)
23. Pigment are insoluble in the plastics and hence the induce opacity.(say True or False)
24. High speed mixer is used for melt blending of Rigid Plastics. (say True or False)
25. Transverse Tensile strength of glass fibre will improve by adding coupling agent .(say True or False)

- 26. Full form of LCP is _____
- 27. Full form of EPDM is _____
- 28. Full form of HALS is _____
- 29. Full form of PEI is _____
- 30. Full form of PEEK is _____

PART – B

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

4 x 2 = 8

- 1. Write the preparation of Polyvinylchloride?
- 2. Write down the unique properties of thermotropic LCP?
- 3. What are the different types of Polyblends?
- 4. What is Natural Polymer?

PART – C

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

4 x 3 = 12

- 1. What do you meant by speciality plastics? Give examples of them.
- 2. Write trade name of following plastics
a.PEEK b.PTFE c.PI
- 3. What are alloys with examples.
- 4. Write short notes on Polyethylene.
- 5. What is Thermoset Plastics with example ?

PART – D

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

2 x 5 = 10

- 1. Enlist the properties of Polysulphone with structure and its applications.
- 2. What is polyamides ? Write the structure and general properties of polyamide family.
- 3. What is blends? Explain its types with examples.

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

Duration : 3 Hours
 Course : PD – PMD with CAD/CAM
 Subject : Plastics Product Design

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. What are the essential factors of product design
 a) Financial Feasibility b) Optimality c) Morphology d) all of the above
2. _____ is defined as the geometry and topology in plastic components.
3. Thin wall parts typically shrink _____ than thick wall parts.
4. Which of the following factors is holistically responsible for the economic success of a business?
 a) Marketing b) Design c) Manufacturing d) Product Design
5. One of the core teams of product development
 a) Finance b) Marketing c) Manufacturing d) Legal
6. Plastics are not good insulators? True/ False
7. _____ is a group of techniques used to quickly fabricate a scale model of a physical part.
8. _____ is a mark on a molded piece made by the meeting of two flow fronts.
 a) Meld line b) weld line c) knit line d) flow line
9. Sink marks and voids developed due to thicker Rib? True/ False
10. _____ thread is used where the highest strength
 a) Bottle thread b) Buttruss thread c) Square thread d) American standard thread
11. _____ rivet is used when it is impossible to have access to the reverse side of the joint.
12. _____ hinge uses elliptical shaped steel spring clips to hold a box lid tightly closed or wide open
 a) Piano hinge b) Rathbun hinge c) Lug and pin hinge d) both a&b
13. Full form of ASTM
14. Full form of NEMA
15. Inserts are used most frequently Brass Materials because it _____.
16. _____ composites is the first composites that was made by the Man
 a) Laminar composite b) Fibre composite c) Flake composite d) Filled composites
17. _____ this is a white, shiny crystalline materials used as a lubricant in many plastic resins and also lowers the coefficient of friction.
 a) Carbon Black b) Molybdenum Di sulfide c) cotton flock d) Macerated Fabrics
18. Full form of MMC in GD&T
19. Full form of DFMA
20. Which of the following is related to aesthetics of the plastic product.
 a) Taper b) Coring c) Undercuts d) all of the above
21. An angular piece of material used to support the bosses and strengthen the wall is called
 a) Rib b) Gusset c) both a&b d) None of the above
22. Generally _____ relief should be provided to prevent high stress at the end of the threads
 a) 0.8mm to 0.9mm b) 1.5mm to 2mm c) 3 mm to 5mm d) above 5mm
23. For self-tapping screws cored holes should have _____ to _____ draft angle
 a) 1° to 3° b) 0.25° to 0.5° c) 0.75° to 1.5° d) 3°
24. The O.D of the boss should be ideally 2.5 times of screw diameter for self tapping screw application ? True or False
25. Living hinge are very good at bearing a load parallel to the hinge ? True/ False
26. Rib height should be _____ times of wall thickness for effective strength
 a) 0.5 to 1.5 times b) 2.5 to 3 times c) 5 to 8 times d) 12 to 15 times
27. Minimum Rib spacing is
 a) T b) 2T c) 3T d) 4T
28. Uneven wall thickness in the product results
 a) Sink mark b) Warpage c) Voids d) surface blemishes
29. Which of the following is the numerator of factor of safety formula
 a) working stress b) shear stress c) Tensile stress d) ultimate stress
30. Which of the following can be the factor of safety for a dead load

- a) 6 b) 2 c) 4 d) 7

PART – B

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

4 x 2 = 8

1. What is limits of size of GD&T/
2. What is meant by Datum in GD&T
3. What are the purpose of ribs and bosses ?
4. What are the properties of composites?

PART – C

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

4 x 3 = 12

1. Mention some product design and development steps.
2. What is meant by draft angle and mention its applications
3. Draw a Rathbun Hinge
4. Explain types of fits
5. Explain what is meant by coring with neat sketch.

PART – D

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

2 x 5 = 10

1. Draw a living hinge for a 180 ° polypropylene and polyethylene.
2. Explain (i) Shrink fit (ii) Force fit (iii) Easy push fit (iv) Normal running fit (v) Slide running fit.
3. Explain the types of threads used in plastic components with neat sketches

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

Duration : 3 Hours
 Course : PD – PMD with CAD/CAM
 Subject : Plastics Mould Design – I

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. Feed system is
 - (a) Flow path from Runner to impression
 - (b) Nothing but moulding and safe
 - (c) Melt flow path which connects nozzle with the impression
 - (d) None of the above
2. Register Ring is used for
 - (a) Ejecting the moulding
 - (b) Matching core and cavity
 - (c) Aligning plates together
 - (d) Locating mould with machine
3. Material used for making core / cavity for long productions
 - (a) Mild steel
 - (b) P20 steel
 - (c) EN18 steel
 - (d) Cast iron
4. Shot weight is referred as
 - (a) Weight of the mould
 - (b) Weight of the machine
 - (c) Weight of the moulding
 - (d) Weight of the moulding and feed system
5. Eye bolt is used for
 - (a) Clamping plates together
 - (b) Clamping mould with the machine
 - (c) Lifting the mould to the machine
 - (d) None of the above
6. The main sprue will be removed by
 - (a) Ejector pin
 - (b) Sprue puller
 - (c) Dowel pin
 - (d) Push back pin
7. The small gate cross section is desired so that _____
 - (a) Gate freezes soon
 - (b) Easy degating
 - (c) Small witness mark on impression
 - (d) All of these
8. The main advantage of Air ejection is _____
 - (a) Ejector grid is not required
 - (b) Operated at any half of the mould.
 - (c) Useful for double ejection
 - (d) All of these
9. The final closing of split cavities will be done by
 - (a) Finger CAM
 - (b) Spring
 - (c) Locking heel
 - (d) Dogleg CAM
10. The automatic degating is possible by using the
 - (a) Sprue gate
 - (b) Edge gate
 - (c) Film gate
 - (d) Submarine gate
11. The fit used for mould Guide pillar and Guide bush is
 - (a) H8 g6
 - (b) H7 g9
 - (c) H7 g6
 - (d) H7 g8
12. A pin used to mould a hole in the molded part is
 - (a) Core pin
 - (b) Dowel pin
 - (c) Ejector pin
 - (d) None of these
13. Which of the method is recommended for delayed opening in split cavities
 - (a) Dogleg Cam
 - (b) Finger Cam
 - (c) Angle lift
 - (d) Hydraulic
14. What mould steel material generally prefer for the Guide Pillar /Guide Bush ?
 - (a) En-31
 - (b) OHNS
 - (c) Mild steel
 - (d) H-13
15. The best preferred runner type is _____
 - (a) Half round
 - (b) Full round
 - (c) Trapezoidal
 - (d) Modified Trapezoidal
16. Uneven Shrinkage will lead to _____.
17. Clamping force = _____ x Effective Injection Pressure.
18. Ejection system is provided generally in the _____ side of the mould.
19. _____ is used to give alignment of the mould with the Injection moulding machine.
20. Split mould is suitable for _____ components.
21. H13 steel is a core /cavity material . (Say True or False)
22. Automatic degating is possible in direct sprue gate. (Say True or False)
23. Push back pin is used to push the moulding from the core. (Say True or False)
24. The stripper plate is used for ejecting the product from the mould. (Say True or False)
25. Compression mould is used for Thermoset moulding. (Say True or False)

26. Expand BOM.
27. Expand ISO.
28. Expand MFI.
29. Bulk factor of plastics materials is not useful in compression mould design. (Say True or False)
30. The term 'Cull' is associated in transfer moulding process. (Say True or False)

PART – B

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

4 x 2 = 8

1. What do you mean by runner balancing?
2. Explain Diaphragm Gate.
3. Beryllium – copper materials are good for faster moulding cycles in the moulds .Why?
4. What is the use of cold Slug well?

PART – C

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

4 x 3 = 12

1. Explain sub-marine gating system with neat sketch
2. Differentiate 2-plate vs. 3-plate mold with neat sketches
3. Explain stripper plate ejection system with neat sketch.
4. What are the advantages & Disadvantages of compression Molding
5. Differentiate between integer and insert type of mold with sketches.

PART – D

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

2 x 5 = 10

1. Describe a 3-plate mold with the help of a neat sketch?
2. List the types of compression molds. Explain with neat sketch any one in detail.
3. Explain feeding system of a injection mould with neat sketch.

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

Duration : 3 Hours
 Course : PD – PMD with CAD/CAM
 Subject : Plastics Processing Technology

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. The part dimension and weight decreased as the holding pressure is reduced because
 - a) Less plastic is packed into the cavity
 - b) The melt temp. increases when holding pressure is reduced
 - c) the fill time is reduced
 - d) all of the above
2. The gas assisted injection molding the gas injection can be done through _____
 - a) Nozzle
 - b) Mould
 - c) both (a) and (b)
 - d) none of above
3. Which of the following material cannot be used for molds in thermoforming process?
 - a) Wood
 - b) Cast aluminum
 - c) Gypsum
 - d) None of the above
4. Dimensional accuracy is max. in _____
 - a) Drape forming
 - b) Matched mould forming
 - c) Vacuum forming
 - d) Plug assist forming
5. Cull is associated with _____ moulding process.
 - a) Blow
 - b) Compression
 - c) Transfer
 - d) Injection
6. The function of torpedo is to increase _____
 - a) Space to mass ratio
 - b) compression ratio
 - c) Mixing
 - d) L /D ratio
7. An increase in the cushion size _____
 - a) Reduces the effective operating length of the screw
 - b) Increase the effective length of the screw
 - c) Does not change the effective operating length of the screw
 - d) None
8. The life of thrust bearing depends upon.
 - a) RPM of screw
 - b) Back pressure
 - c) Temperature
 - d) Both (a) & (b)
9. _____ type of heater is used in compression mould.
 - a) Band heater
 - b) Cartridge heater
 - c) IR heater
 - d) UV heater
10. Material used in reaction injection moulding is _____
 - a) PVC colloid
 - b) Polyurethane
 - c) Rubber latex
 - d) None of these
11. The part weight in structural foam moulding is reduced to _____
 - a) 50 % to 60 %
 - b) 10 % to 30 %
 - c) 70 % to 90 %
 - d) 0% to 5 %
12. Which of the following techniques is used to make PET preform?
 - a) Blow moulding
 - b) Injection moulding
 - c) Thermoforming
 - d) Compression moulding
13. Transfer moulding is a combination of _____ and compression moulding.
 - a) Blow
 - b) FRP
 - c) Injection
 - d) Rotational
14. Rotational moulding process is practiced by _____ movement of mold.
 - a) Uniaxial
 - b) Biaxial
 - c) Triaxial
 - d) None of these
15. Which of the following is not a thermoforming process?
 - a) Vacuum forming
 - b) Pressure forming
 - c) free blowing
 - d) None of the above
16. Carousel type machines use up to _____ arms and _____ stations.
17. For deep drawn components _____ forming is used.
18. The die used for coating of wire and cable is _____.
19. 100 ml Pharmaceuticals bottles with accurate neck finish is produced by _____ process.
20. Poly Propylene film is produced by _____ extrusion film process.
21. The amount of material controls the wall thickness of rotational molded products. Say True or False
22. In vacuum forming, Pressure is used to get the shape – Say True or False
23. PET bottles are produced by Extrusion stretch blow moulding- Say True or False.
24. In compression molding, more flash occurred in Positive mould than semi positive mould – Say True or False
25. Hollow parts with narrow neck is produced by Blow moulding – Say True or False.
26. What is L/D ratio in Extrusion process?
27. Abbreviate ISBM.
28. Abbreviate RTM.
29. Abbreviate TQPP.
30. Abbreviate BUR.

PART – B

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

4 x 2 = 8

1. Name the different co extrusion dies.
2. Define rotational molding cycle.
3. What is Blow ratio in Blown film Extrusion?
4. Define Breaker Plate & Its function.

PART – C

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

4 x 3 = 12

1. Describe in detail the various principles involved in joining of plastics with examples.
2. With neat sketch explain gas-assisted injection molding process with emphasizing its key advantages.
3. Compare and Contrast Toggle clamping system & Hydraulic clamping system in Injection moulding machine.
4. Distinguish between rotogravure printing and flexographic printing.
5. Describe the process of continuous thermoforming and state the merits of pressure forming over vacuum forming.

PART – D

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

2 x 5 = 10

1. Explain the process of manufacturing 10000 litre water tank using HDPE material in Rotational moulding process.
2. Write the advantages and disadvantages of Compression moulding process.
3. Explain the Extrusion Stretch Blow moulding process with neat sketch.
