

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

Duration : 3 Hours
 Course : PGD – PPT
 Subject : Plastics Materials & its Applications - II

Max. Marks: 60
 Date : 18.07.2022
 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. Novolaks are crosslinked by using _____
2. The DGEBA resin is _____
 a) silicone b) phenol formaldehyde c) unsaturated polyester d) epoxy
3. Role of styrene during synthesis of UP resin is
 a) initiator b) accelerator c) diluent d) inhibitor
4. Curing agent used to crosslink epoxy resin is
 a) Aliphatic amine b) Aromatic amine c) Anhydrides d) All the above
5. Which thermoset materials are extensively used as adhesives-----,
 a) Epoxy b) UF c) MF d) PF
6. What is C stage phenolic resin?
7. Which one of the following exhibits higher thermal stability
 a) DGEBA resin b) DGEBF resin c) Glycidyl ester resin d) Epoxy-novolak resin
8. Curing agent used to crosslink epoxy resin is
 a) Aliphatic amine b) Aromatic amine c) Anhydrides d) All the above
9. High temperature, high performance polymeric materials are called _____ polymers
 a) Engineering b) Liquid crystal c) Specialty d) Commodity
10. _____ are known as self-reinforced polymers
11. Recommended Mold Temperature for PEEK is _____
 a) 90-130°C b) 200-220°C c) 100 -140°C d) 160-200°C
12. Characteristics of PSU are
 a) high strength and hardness b) very high dimensional stability
 c) Stability at high temperatures d) all of the above
13. Astrel is the trade name of _____
14. Victrex is the trade name of _____
15. Abbreviate PAEK. :
16. Starting materials for PPS are _____ & _____
 a) p-benzene, and sodium sulfide b) p-dichlorobenzene, and sodium sulfide
 c) p-chlorobenzene, and sodium hydroxide d) p-chlorobenzene, and calcium sulfide
17. Which one of the following has lowest toxic gas emission and smoke emission
 a) Polysulphone b) PPS c) PPO d) PEEK
18. Kapton is the trade name of _____
19. PBS is synthesized by
 a) Trans-amidification reaction b) Trans-esterification reaction c) hydrolysis d) oxidation
20. PCL full form
21. PBS full form
22. Biodegradable polymer is the one which undergoes degradation in the presence of
 a) Microorganism b) UV irradiation c) High temperature d) chemical environment
23. Which one of the following is water soluble material
 a) Methyl cellulose b) carboxymethyl cellulose c) hydroxyl ethylcellulose d) All the above
24. Natural polymers are
 a) Polysaccharides b) Chitin c) RNA-DNA d) All of the above
25. Proteins are _____
 a) Natural polymer b) Synthetic polymer c) Enzymes d) None of these
26. Full Form of MWCNTs
27. The most common representation of Zero dimensional nanomaterials are Nano dots. Say True or False.

28. The melting point of C-60 crystal
a) 1180°C b) 1200°C c) 200°C d) 5000°C
29. Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers. Say True or False.
30. The Diameter of CNT is 5-10 nm Say True or False.

PART – B

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

4 x 2 = 8

1. Give two applications of unsaturated Polyester?
2. Liquid crystalline polymer are known as self-reinforced polymer- Justify.
3. Give few examples of synthetic bio-degradable polymers
4. What are the different types of structure based depending upon the chiral angle?

PART – C

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

4 x 3 = 12

1. Write down the difference between Novolak and resol resin.
2. Explain in detail about the structure, properties and Application of PTFE.
3. Write short notes on LCP.
4. Write short notes on Water soluble polymer. Give Some examples
5. Write the short note of CNT

PART – D

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

2 x 5 = 10

1. Explain in detail about the synthesis of Polyurethane. Explain the processing method.
2. How do you manufacture **polyamideimide**? write their properties and applications in details
3. Write short notes on a) nano material b) Bio Plastics



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ACADEMIC CELL
SECOND SEMESTER EXAMINATION - JULY 2022

Duration : 3 Hours
Course : PGD-PPT
Subject : Plastics Processing Technology-II

Max. Marks: 60
Date : 19.07.2022
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. A calendar is a device used to process a polymer melt into a _____.
a. Rod b. Pipe c. Profile d. Sheet
2. Which of the following thermoforming process has excellent dimensional accuracy?
a. Vacuum forming b. Pressure forming c. Drape forming d. Matched die forming
3. The total cycle time of vibration welding is _____.
a. 8 to 15 sec b. 15 to 25 sec c. 25 to 35 sec d. 35 to 50 sec
4. The friction between two parts generates heat which causes the polymer to melt at the interface is called.
a. Spin welding b. Ultrasonic welding c. Laser welding d. All of these.
5. _____ items produced by thermoforming process.
a. Ducts b. Toys c. panels d. All of these.
6. The scratched die contamination is the causes of _____.
a. Die line b. Flow line c. Weld line d. All of these
7. A Too large parison will result in too much _____ cause problems.
a. Flash b. Blow out c. Rupture d. All of these
8. For pipe extrusion _____ cross sectional dies are used.
a. Solid b. Hollow c. Rigid d. None of thes
9. What is the function of blow pin?
a. Eject the product b. Inject the material c. Cool the melt material d. Blow pressurized air
10. The Best Methods for manufacturing the bottles.
a. Injection Blow b. Stretch Blow c. Extrusion blow d. All of these
11. The Technique for controlling the parison wall thickness in blow moulding.
a. Parison programming b. Die shaping c. a & b d. None of these
12. The ratio of length measured after axial stretching of the container to original length in unstretched preform
a. Axial ratio b. Hoop ratio c. blow up ratio d. Draw ratio
13. Thermoforming process technique.
a. Drape forming b. Snap-back forming c. Matched-die forming d. All of these
14. _____ calendaring process the offset roll is on the bottom and the take-off is from the top roll.
a. L-calendar b. F-calendar c. Z-calendar d. All of these
15. Chilled rollers are using in the _____ process to form the sheet.
a. Thermoforming b. Injection c. Blow d. Calendaring
16. Radio frequency welding also called as _____.
17. Frequency of ultrasonic welding is _____.
18. Disk Extruders is a _____ extruders.
19. Vacuum metallization is also called as _____.
20. _____ process plastic melt passes through a die that forms it into an annular shape usually directed upward.
21. Ram Extruder is used in discontinuous process. Say True/False
22. Uniform cooling occurs in free forming process. Say True/False.
23. Spray coating is also called as flame coating, Say True/False.
24. The haul-off draws the plastic melt from the die and controls the rate of film movement. Say True/False
25. High vacuum and pressure is required in matched die forming. Say True/False.
26. Expand the abbreviation of PVDC _____.
27. Write an abbreviation of SSE _____.
28. Write an abbreviation of PARA _____.
29. Abbreviate PECVD _____.
30. Expand the abbreviation of SBM _____.

PART – B

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

4 x 2 = 8

1. Write the function of screen pack plate?
2. Define pinch-off?
3. Define Melt fracture?
4. Define Parison Swell?

PART – C

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

4 x 3 = 12

1. Explain about Pipe extrusion process with neat sketch?
2. Explain about any one printing methods used for plastic products?
3. Write down any three causes & remedies of blow moulding process
4. Write the advantages & disadvantage of thermoforming moulding process?
5. Briefly explain about continuous mixers with neat sketch?

PART – D

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

2 x 5 = 10

1. Define the Calendaring process and explain with a neat sketch?
2. Explain about blow molding techniques with neat sketch and their causes & remedies.
3. Briefly explain about process requirement of PET Bottle manufacturing?

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SECOND SEMESTER EXAMINATION - JULY 2022

Duration : 3 Hours
 Course : PGD – PPT
 Subject : Plastics Testing-II

Max. Marks: 60
 Date : 20.07.2022
 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. Choose the correct condition for ASTM-D618
 a) 23±2°C and 65±5% b) 27±2°C and 55±5% c) 23±2°C and 50±5% d) 27±2°C and 65±5%
2. ASTM D1044 use for
 a) HAZE Test b) Abrasion Test c) Opacity Test d) Hardness test
3. If temperature and humidity increases results hardness value will be
 a) Increase b) Decrease c) Constant d) Neither increase nor decrease
4. Glass transition temperature can be determined by
 a) DSC b) DMA c) TGA d) Both A & B
5. Whiteness index is measured by
 a) Spectrophotometer b) FTIR c) Hazemeter d) Glossmeter
6. ASTM-D-570 standard test is use for
7. If the transmitted light deviates less than 2.5° from the incident angle is called.....
8. On the basis of stress-strain graph PE is categorized as.....
9.standard test method use for Dielectric constant.
10. ASTM D543 standard test is use for....
11. American Society for Testing & Materials (ASTM) is a international Standards is T/F
12. Interfacial polarization caused by inhomogenities in the material. T/F
13. Lowest refractive index (1.35) material is PTEF. T/F
14. Area under stress-strain curve is called Hardness. T/F
15. Moisture percentage can be calculated by DSC.T/F
16. NABL stand for.....
17. DSC stands for.....
18. CIE stand for ...
19. UL-94 stand for.....
20. What is ESCR full form....
21. Single cantilever bending test can be done by
 a) By DMA test b) By Creep test c) By Tensile Test d) By Fatigue Test
22. Viscoelastic response of material can be measured by
 a) By TGA test b) By DSC test c) By FTIR Test d) By DMA test
23. Increases the percentage of crystallinity the Impact strength.
 a) Increases b) Decreases c) By Constant d) None
24. Calibrated abrasive wheels H-18 is used for
 a) Rigid material b) Liquid material c) Hard material d) Flexible material
25. Dissipation factors depends on
 a) Frequency and applied voltage b) Frequency and RPM c) Pressure and voltage d) None
26. The incidence angle increase, gloss value for the surface also...
 a) Decreases b) Increases c) No changes d) None
27. Nonyl phenoxy polyethyleneoxy ethanol reagent is use for
 a) ESCR test b) Density test c) RI test d) Gas permeability test
28. Distinguish the destructive test is
 a) Tensile test b) Impact test c) Abrasion test d) All
29. Creep test under...
 a) Short term test b) Long term test c) Non destructive test d) All
30. Filler content increases results elongation at break
 a) Increases b) constant c) decreases d) None

PART – B

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

4 x 2 = 8

1. Define Tear resistance.
2. Which factors affecting the flexural strength?
3. What are the applications of TGA?
4. Define HAZE and its standard test method.

PART – C

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

4 x 3 = 12

1. Discuss the significance of Long-term mechanical properties.
2. Define dielectric constant and discuss the failures which influence this characteristic of polymer materials.
3. Discuss the following optical properties and the significance of their measurements.
a) Clarity b) Gloss
4. Explain DMA test and its applications.
5. How does the attack of chemical reagents causes failure of plastic product under stress?

PART – D

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

2 x 5 = 10

1. Define the following terms:
a) Plasticity b) Modulus of elasticity c) Yield point d) Poisson's Ratio e) Strain
2. Describe the method of an arc resistance test. What are the limitations of the test?
3. Define ESCR and explain the method of ESCR measurement for PE materials.

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
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SECOND SEMESTER EXAMINATION - JULY 2022

Duration : 3 Hours
Course : PGD-PPT
Subject : Machine Maintenance

Max. Marks: 60
Date : 21.07.2022
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. What is PLC?
(a) Process logic control (b) Programmable language converter
(c) Programmable logic control (d) Programmable logic converter
2. Down time related to
(a) Increase in sales (b) Reduction in overheads (c) Loss of production (d) none
3. Belt of an Electric motor is broken, it needs
(a) Break down maintenance (b) Preventive maintenance (c) Quarterly maintenance (d) None
4. Anti-vibration pads absorb ----- shocks due to machine dynamics
(a) Mechanical (b) Electrical (c) Hydraulic (d) None
5. Which fluid is used in hydraulic power systems?
a. water b. oil c. non-compressible fluid d. all the above
6. Can all hydraulic fluids be compressed when extremely large pressure is applied? Say Yes or No.
7. As capacity of pump increases, it pumps less oil per unit time. Say True or False
8. Which of the following is used as an accessory in hydraulic power unit?
a. pumps b. valves c. motor d. reservoir
9. What is the advantage of internal gear pump?
a. moderate speed b. medium pressure c. high viscosity fluids can be used d. all the above
10. Which type of motion is transmitted by hydraulic actuators?
a. linear motion b. rotary motion c. both a and b d. none of the above
11. ----- valve is used for Back flow prevention.
12. Crowning of a pulley is done to
(a) Prevent the slipping of a belt (b) To increase the tension of a belt
(c) To increase the angle of contact (d) none of the above
13. Which stage in two stage direction control valve is solenoid operated?
a. main stage direction control valve b. pilot stage direction control valve
c. both stages in two stage direction control are solenoid operated d. none of the above
14. Which type of solenoid has more chances of coil failure?
a. AC solenoid b. DC solenoid c. both AC and DC solenoids d. none of the above
15. Why are bleed off circuits used?
a. bleed off circuit is used to restrict the flow of fluid into the hydraulic cylinder
b. bleed off circuit is used to restrict the flow of fluid out of the hydraulic cylinder
c. bleed off circuits are used to reduce the speed of actuator
d. all the above
16. What are different operations performed by PLC's?
a. Boolean logic b. timing c. arithmetic d. all the above
17. FRI unit is used for Hydraulic Systems. Say True /False
18. Levelling is a part of machine Installation. Say True / False.
19. Mold closing speed can be controlled by changing setting of -----
a) Pressure relief valve b) Direction control valve c) Flow Control valve d) none of these
20. Voltage between Neutral and earth should be less than ---V for microprocessor based machine
(a) 5V (b) 10 V (c) 1 V (d) 20V
21. In which of the following drives, there is no slip
(a) Open belt drive (b) Crossed belt drive (c) Rope drive (d) Chain drive
22. Other name of Ring plunger is
(a) Non return valve (b) Two way valve (c) Piston valve (d) None
23. V Belt drive is ----- drive
(a) Negative (b) positive (c) Non positive (d) None

24. Piston pump is ----- pump
 (a) Positive (b) Non positive (c) Vane (d) Centrifugal
25. The temperature at which a fluid starts flows is called ----- point
 (a) Pour (b) Flash (c) freezing (d) Fire
26. Pressure switch works as ----- for compressor
 (a) Controller (b) Regulator (c) Lubricator (d) none
27. Relief valve controls -----
 (a) Speed (b) pressure (c) Flow (d) direction
28. Double Acting cylinder has -----ports
 (a) 3 (b) 4 (c) 2 (d) 1
29. What does PLC stands for
 (a) Process logic controller (b) Programmable language converter
 (c) Programmable logic controller (d) Programmable logic converter
30. For Starting of above 10HP motors -----starter is used
 (a) DOL (b) Star delta (c) Transformer type (d) All the above

PART – B

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

4 x 2 = 8

1. Write the function of accumulator
2. What is ACB, where it is used?
3. What is the use of thrust bearing in molding machine?
4. List out the properties of Hydraulic oil?

PART – C

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

4 x 3 = 12

1. What is use of pump in Hydraulics & any four types?
2. What is the use of V- belts and Chains?
3. What is the use of Heat exchanger in Moulding machine and types of exchangers?
4. What are different types of screws used in Injection Molding machine?
5. What is the working principle of Star Delta Starter?

PART – D

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

2 x 5 = 10

1. Explain the working principle of external gear pump.
2. Explain working of Bridge Rectifier
3. Explain the working of four way direction control valve with neat diagram

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SECOND SEMESTER EXAMINATION - JULY 2022

Duration : 3 Hours Max. Marks: 60
 Course : PGD-PPT Date : 22.07.2022
 Subject : Environmental Science and Plastics Waste Management 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. National Institute of Disaster management is located at?
 (a) Pune (b) Manipur (c) New Delhi (d) Calcutta
2. Instrument used to measure earthquake is known as
 (a) Quake meter (b) quake graph (c) seismograph (d) typanicgraph
3. Formation of ozone hole is maximum over
 (a) Africa (b) India (c) USA (d) Antarctica
4. Gas released during Bhopal tragedy was
 (a) Methyl isocyanate (b) potassium isothiocyanate
 (c) sodium isothiocyanate (d) ethyl isothiocyante
5. Deforestation will decrease _____
 (a) Soil erosion (b) soil fertility (c) landslides (d) rainfall
6. Monomers are obtained from plastics or polymer waste in _____ recycling process.
 (a) Depolymerisation (b) Mechanical (c) Incineration (d) None of the
7. Renewable source of energy is _____
 (a) Biomass (b) coal (c) petroleum (d) kerosene
8. Products made out of PVC material sink in water for its-----density.
 (a) Higher (b) medium (c) lower (d) none of the above
9. _____ containing plastic waste will not be accepted in cement kilns as it impairs the cement quality.
 (a) PP (b) LDPE (c) HDPE (d) PVC
10. Surface active agent is used in _____ technique used for sorting plastic waste.
 (a) Sink-Float (b) Electrostatic Separation (c) Centrifugal (d) Froth-Flotation
11. NIR Spectroscopy based sorting equipments are well suited for analysis of _____ plastics such as automotive components
 (a) Transparent (b) white colored (c) dark colored (d) None of these
12. _____ is not a preferred raw material for conversion of plastics waste to oil.
 (a) PP (b) PE (c) PVC (d) None of these
13. The 4 R's of recycling are: _____, Reuse, Recycling and Recovery.
 (a) Reduction (b) Rethink (c) Recreate (d) Refuse
14. Recovery of chemicals from plastics comes under _____ recycling.
 (a) Primary (b) secondary (c) tertiary (d) quaternary
15. The pollutant which is highly responsible for ozone depletion is-----
 (a) CO₂ (b) SO₂ (c) CO (d) CFC
16. For size reduction of polymer foams _____ is most suitable.
17. A good robust extruder with a screw L/D ratio of _____ is desirable for a Mechanical recycling plant.
18. Sink-float technique separates different plastics by their differences in _____.
19. The Society of Plastics Industry has developed a recycling coding system for plastics consisting of _____ categories.
20. Polycarbonate have _____ plastic recycling code.
21. Birds and animals are the examples of abiotic environment. (Say True or False)
22. Biosphere is made of atmosphere, hydrosphere, and lithosphere. (Say True or False).
23. On burning PVC gives a yellow, sooty smoke. Does not continue to burn if flame is removed. (Say True or False).
24. The movement of water from the surface of plants into the atmosphere by a process called transpiration (Say True or False)
25. Recovery of chemicals from plastics comes under quaternary recycling. (Say True or False).

26. Give full form of WHO.
27. Give full form of WEEE.
28. Give full form of ISO.
29. Give full form of ASTM.
30. Give full form of GHGs.

PART – B

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

4 x 2 = 8

1. Enlist Natural Disaster.
2. Write component of Environment.
3. Draw Recycling code of HDPE & PP.
4. Which plastics are Single-Use Plastic?

PART – C

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

4 x 3 = 12

1. Describe the term Desertification?
2. Write a short note over Land pollution.
3. Enlist Machineries used in Recycling of Plastics.
4. Explain in detail about Bio-Plastics.
5. Discuss various sources of Plastics Waste.

PART – D

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

2 x 5 = 10

1. Describe in detail Ozone depletion phenomena.
2. Explain about Secondary Recycling of Plastics.
3. "Plastic Recycling can be Profitable business" Justified this sentence by giving examples.
