

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

Duration : 3 Hours
 Course : DPT
 Subject : Plastics Recycling & Waste Management

Max. Marks: 60
 Date : 10.01.2023
 Time : 02.00 p.m. to 05.00 p.m.

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

PART – A

Answer **all** questions

30 x 1 = 30

1. Which among the given is not a preferred material for conversion of plastics waste to oil?
 (a) PP (b) PE (c) PVC (d) None of these
2. Rotary knife cutters are also known as -----
 (a) Shredders (b) Rotary Grinders (c) Granulators or knife mill granulators (d) All of these
3. ----- is used to separate ferrous metals from plastic waste?
 (a) Shredder (b) Granulator (c) Magnetic separator (d) Rotary grinder
4. Which property is used to separate different plastics in sink and float technology?
 (a) Size (b) Volume (c) Density (d) Shape
5. A Screen is fitted between ---- and barrel of the extruder?
 (a) Screw (b) Hopper (c) Die (d) Sizing unit
6. Forth flotation techniques is most effective method to separate which of the given plastics?
 (a) PVC (b) HDPE (c) Nylon (d) All of these
7. X-ray fluorescence sorting method can only sort----from other plastics streams
 (a) PE (b) PVC (c) PP (d) PC
8. PET can be chemically decomposed by----
 (a) Hydrolysis (b) Alcoholysis (c) Glycolysis (d) All of these
9. ----- containing plastic waste will not be accepted in cement kilns as it is impairs the cement quality
 (a) PP (b) LDPE (c) HDPE (d) PVC
10. Hospital plastics waste can be
 (a) Mechanically recycled (b) Reused (c) Incineration (d) All of these
11. Single use plastics is harmful to the environment. Say True/False
12. A major problem in plastic recycling is the-----
 (a) Color (b) Low weight to volume ratio (c) low melting point (d) All of these
13. SPI code for PS is-----
14. 5R stands for-----,-----,-----,-----,-----
15. Where dose Municipal solid waste come from
 (a) Hospital and medical facilities (b) Industry and Trade
 (c) Household and local councils (d) None of these
16. Hydrophobic polymer is often is less degradable than hydrophilic polymer. Say True/False
17. Biopolymers are harmful to the environment. Say True/False
18. Which is GHG
 (a) CO₂ (b) CO (c) CFC (d) All of these
19. Additives are used in recycled products. .Say True/False
20. Recycling of plastic waste is difficult task in india scenario due to
 (a) Economy (b) Contamination (c) lack of awareness (d) All of these
21. Plastic waste is constitute about----% by weight in MSW India
 (a) 0.1 to 1 (b) 1 to 4 (c) 5 to 10 (d) 10 to 15
22. Incineration of waste
 (a) Can be used to generate electricity (b) increase the volume of waste
 (c) Enhance the need for landfills (d) All of the above
23. Hospital plastics waste can be hazardous in nature. Say True/False
24. In----the cutting edges of the knife cutters are cooled by direct water cooling.
25. E-waste stand for -----
26. Foams, labels, dirt and fine particles can be removed by Air Classification . Say True or False.
27. Processing of scrap plastics into similar type of products comes under primary recycling. Say True or False.
28. Expand RDF
29. Write the full form of NIR.
30. Write the full form of WEEE.

PART – BAnswer **all** questions (Max. 40 words)

4 x 2 = 8

1. Differentiate between Primary recycling and Secondary recycling?
2. How to use the agglomerators in plastics waste recycling ?
3. What are the potential problem problems with recycled plastics?
4. Abbreviates the following: SPI, SUP

PART – CAnswer any **four** questions (Max. 100 words)

4 x 3 = 12

1. How plastics waste is converted into fuel?
2. Explain with flow chart how PP/HDPE woven sacks converted to pots.
3. What are the additives for improving the quality of recycled products?
4. Explain the PET chemical recycling process.
5. What do you mean by Air Classification?

PART – DAnswer any **two** questions (Max. 300 words)

2 x 5 = 10

1. What is mechanical recycling? Explain in details with flow chart.
2. Write in details note on types and sources of Plastics waste.
3. Write short notes on any two of the followings
 - a. Basic Mechanical Recycling Plant
 - b. Cutting process used in plastics waste
 - c. Plastics waste used in Road Construction

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ACADEMIC CELL
FIFTH SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours

Max. Marks: 60

Course : DPT

Date : 11.01.2023

Subject : Maintenance of Plastics Processing & Testing Equipments

Time : 02.00 p.m. to 05.00 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. Which energy is used to transmit power in hydrostatic system?
 - a. pressure energy
 - b. kinetic energy
 - c. potential energy
 - d. all the above
3. The heat generated in hydraulic systems can be absorbed by _____
 - a. Lubrication
 - b. cooling
 - c. sealing
 - d. all the above
4. Which of the following is used as an accessory in hydraulic power unit?
 - a. Pumps
 - b. valves
 - c. motor
 - d. reservoir
5. What is the principle of operation used in gear pumps?
 - a. two gears rotate in same direction
 - b. two gears rotate in opposite direction
 - c. both a and b
 - d. none of the above
6. Radial piston pumps can have,
 - a. cylinder block rotating and cam stationary
 - b. cylinder block stationary and cam rotating
 - c. both (a) and (b)
 - d. none of the above
7. 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
8. What are different operations performed by PLC's?
 - a. boolean logic
 - b. timing
 - c. arithmetic
 - d. all the above
9. In pneumatic systems, AND gate is also known as _____
 - a. check valve
 - b. shuttle valve
 - c. dual pressure valve
 - d. none of the above
10. Check valve is a _____ way valve.
 - a) One
 - b) Two
 - c) Three
 - d) Four
11. By using _____ value, we can control the speed of the actuator in the hydraulic system.
 - a) Flow control
 - b) Director Control
 - c) Pressure control
 - d) Check
12. _____ is a rotating machine part having cut teeth.
 - a) Gear
 - b) Chain
 - c) Belt
 - d) Both a & b
13. Which among these devices are required for manual control of induction motors?
 - a. Drum controller
 - b. Face plate starter
 - c. Toggle switch
 - d. All of these
14. Output of thermocouples is in _____.
 - a) Micro ampere
 - b) Micro volts
 - c) Milliohms
 - d) Millivolts
15. Which of the following gas is used in gas charged accumulator?
 - a. Oxygen
 - b. Nitrogen
 - c. Carbon dioxide
 - d. all the above
16. Rotary valve is also called _____ valve.
17. _____ valve is used in blow molding to control the wall thickness of the extruded bottle.
18. _____ is found in hydraulic ram and pumps and internal combustion (diesel) engines?
19. A relay is considered as an electro _____ actuated switch.
20. Mold closing speed can be controlled by changing setting of _____.
21. Pyrometer is device used to measure temperature. Say True / False.
22. Proximity sensor is contact type sensor. Say True or False.
23. Levelling is a part of machine Installation. Say True / False.
24. FRI unit is used for Hydraulic Systems. Say True /False
25. Motor starter is required to limit starting current of motor - Say true or false.

26. DOL Full Form
27. NRV Full Form
28. PCB Full Form
29. PSI Full Form
30. NC Full Form

PART – B

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

4 x 2 = 8

1. What is a non-return valve?
2. List out the properties of Hydraulic oil?
3. What is meant by maintenance? State its types.
4. What is the function of thermocouple in molding machine?

PART – C

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

4 x 3 = 12

1. What are the factors considered for installation & Commissioning?
2. Write a short note on relay?
3. What is meant by L/D Ratio & CR ratio of Screw?
4. Define Compressor & Filters in Hydraulics?
5. Common causes of mechanical seal failure

PART – D

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

2 x 5 = 10

1. Give four safety precautions to be followed in plastics processing shop floor?
2. What are the different types of DC Motors? What is Squirrel cage motor?
3. Write Short note on SSR.

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FIFTH SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
Course : DPT
Subject : Plastics Processing Technology-II

Max. Marks: 60
Date : 12.01.2023
Time : 02.00 p.m. to 05.00 p.m.

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

PART – A

Answer **all** questions

30 x 1 = 30

1. The ratio of rotation in rotomoulding process for minor axis to major axis is _____.
(A) 1:1 (B) 2:1 (C) 4:1 (D) 1:4
2. The angle in 3 – Station Carousel type machine rotates in _____.
(A) 180° (B) 120° (C) 90° (D) None of these
3. Jacketed mould machine is a type of _____.
(A) Injection moulding (B) Compression moulding (C) Extrusion (D) Rotomoulding
4. Thermoforming process usually uses _____ type materials.
(A) Thermoset (B) Thermoplastics (C) Composite (D) Elastomers
5. In vacuum forming process _____ type mould is used.
(A) Male (B) Female (C) Male / Female (D) None of these
6. Embossing unit is available in
(A) Thermoforming (B) Powder coating (C) Calendaring (D) Metalizing
7. Pultrusion process uses _____.
(A) Unidirectional fiber (B) Fiber mat (C) Bulk fiber (D) Chopped fibers
8. FRP is a composite material made of a _____ reinforced with _____.
(A) polymer matrix, fibres (B) polymer material, fillers
(C) metal matrix, fillers (D) plasticizer, fibers
9. The function of accelerator is to _____.
(A) Speed up curing (B) Inhibit cross linking (C) Catalyze curing (D) retard curing
10. The Bulk factor for general purpose material of compression moulding.
(A) 8 to 15 (B) 2 to 3 (C) 12 to 24 (D) All of these
11. Robots can help in increasing productivity by reducing dead time. Say True or False
12. High injection pressure is needed in Thin wall Injection Molding. Say True or False
13. Which welding technique is widely used in producing PVC folder?
(A) Vibration welding (B) High frequency welding
(C) Ultrasonic welding (D) Hot plate welding
14. What is the compression ratio of the screw in thermoset injection moulding?
15. In Co-injection moulding it is always preferable to use _____.
(A) A more viscous material as the core (B) A more viscous material as the skin
(C) A less viscous material as the core (D) None of these
16. The cycle time of water assist molding is
(A) More than GAIM (B) Less than GAIM
(C) Same as GAIM (D) None of these
17. The main difference between a conventional liquid paint and a powder coating is that the powder Coating does not require a _____
18. Dry blend is used in the technique of _____
19. Thermoforming is a secondary processing technique. Say True or False
20. Co-Injection molded products are multilayer products. Say True or False
21. Melt spinning is a process for producing filaments. Say True or False
22. SMC stands for
23. WAIM stands for
24. SFM stands for
25. ABS stands for
26. RIM stands for

27. Screen printing process supports _____ printing.
(A) Multi-colour (B) Single colour (C) Both (a) and (b) (D) None of these
28. Carbon fibers used in FRP processing for reinforcement is _____.
(A) Crystalline (B) Amorphous (C) Both (a) and (b) (D) Chopped
29. Screen printing process supports _____ printing.
(A) Multi-colour (B) Single colour (C) Both (a) and (b) (D) None of these
30. The four types of calendars are L – type, inverted L – type, _____ and _____ type.

PART – BAnswer **all** questions (Max. 40 words)

4 x 2 = 8

1. Name the various types of transfer mould
2. Define Cull
3. Define rotational moulding cycle
4. State any two merits of compressing moulding

PART – CAnswer any **four** questions (Max. 100 words)

4 x 3 = 12

1. Explain Mechanical thermoforming process with neat sketch
2. List out types of compression mould and explain in details
3. What is FRP. Classify various types of reinforcement used with suitable examples
4. What are the advantages of microprocessor controlled injection moulding machines
5. What is lost core moulding

PART – DAnswer any **two** questions (Max. 300 words)

2 x 5 = 10

1. Explain the WAIM. Draw the neat sketch of a WAIM Machine along with latest application.
2. Write short notes on
 - a) Co-injection moulding
 - b) Liquid Resin Moulding
3. With a neat sketch explain briefly about Rotational moulding Process

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FIFTH SEMESTER EXAMINATION – JANUARY - 2023

Duration : 3 Hours
 Course : DPT
 Subject : Plastics Testing-II

Max. Marks: 60
 Date : 13.01.2023
 Time : 02.00 p.m. to 05.00 p.m.

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

PART – A

Answer **all** questions

30 x 1 = 30

1. Unit of dielectric Constant?
 a) KV/MM b) Second c) Vol/mil d) None of these
2. IS Standard for PVC Pipe?
 a) IS 4984 b) IS 12701 c) IS 4985 d) IS 2508
3. Standard for ESCR?
 a) ASTM 1608 b) ASTM 5288 c) ASTM 1693 d) ASTM 638
4. Test method for Arc Resistance?
 a) ASTM 495 b) ASTM 1238 c) ASTM 257 d) ASTM 150
5. What is the ASTM Standard for Conditioning of test specimen?
 a) D 648 b) D 618 c) D 638 d) D 177
6. Opacity limit for IS 4985?
 a) 0.2% b) 1.0% c) 0.4% d) 2.0%
7. Test method for Resistance to bacteria?
 a) ASTM G22 b) ASTM G21 c) ASTM D5526 d) ASTM D5210
8. Test cycle description for weathering test using florescent UV for Cycle A.
 a) Continuous UV uninsulated black panel temperature controlled at 50±3°C
 b) 20 h UV uninsulated black panel temperature controlled 50±3°C, 4 h condensation with uninsulated black panel temperature controlled 40±3°C
 c) 4 h UV uninsulated black panel temperature controlled 50±3°C, 4 h condensation with uninsulated black panel temperature controlled 40±3°C
 d) None of the above
9. IS 2508 is used for....
 a) Foam b) LDPE Film c) Woven sack d) container
10. Specimen Size for LOI test ?
 a) 127mm*6.5mm*3mm b) 127mm*6.5mm*2mm c) 127mm*12.5mm*12.5mm d) All of these
11. PVC class 2 pipe, How much pressure given for Acceptance test in IS 4985 ?
 a) 25.14 Kg/cm² b) 10.475 Kg/cm² c) 4 Kg/cm² d) 16.76 Kg/cm²
12. Minimum deflection angle for Haze?
 a) 5.2° b) 6° c) 2.50° d) None of the above
13. for CTI test the drop interval regulated time between two consecutive drops must be..... ?
 a) 30 ± 5 Seconds b) 10 ± 5 Seconds c) 20 ± 5 Seconds d) 60 ± 5 Seconds
14. ASTMD for Specular Gloss?
 a) D 523 b) D 1525 c) D 785 d) D 520
15. What we need Testing?
 a) For quality control b) To meet standard c) Safety d) All of these
16. IS 4984 use for..... ?
17. Overall migration test use for..... ?
18. Unit of Dielectric Strength..... ?
19. Unit of Oxygen Index Test..... ?
20. ASTM D 257 used for..... ?
21. Molding defects in the test specimen is affect the result for Surface resistivity- Say True or False
22. Incorporation of fillers and flame retardant decrease the LOI value- Say True or False
23. The reagent is surface active agent igepal CO-630 is not used in ESCR test-Say True or False.
24. Acrylics, PTFE and other Flurocarbon have high Weathering Resistance. True / False
25. Oxygen gas use for Carbon Black Content Test in HDPE pipes . Say True / False
26. Expand GC.
27. Expand CIE.
28. Expand FTIR.
29. Expand NDT.
30. Expand ESCR.

PART – B

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

4 x 2 = 8

1. What is the Dielectric Strength.
2. Write a short note on Smoke Density.
3. Write a short note on Oxidation Induction Time Test.
4. What is the pressure required all class UPVC pipe according to IS 4985?

PART – C

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

4 x 3 = 12

1. Explain the Specular Gloss?
2. What is the difference between Volume & Surface Resistivity?
3. Significance of Resistance to Fungi?
4. Explain In-door & Out-door Weathering?
5. What is the Dissipation Factor and Power Factor?

PART – D

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

2 x 5 = 10

1. Briefly explain Biodegradable with factor affecting.
2. Explain IS 12701 test method in detail.
3. Briefly explain ESCR Test.
