



18-1151

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

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

Max. Marks: 60
Date : 04.01.2022
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

- Recycling reduces _____
(A) energy usage (B) air pollution (C) water pollution (D) all of the above
- The international recycling logo consists of ____ chasing arrows.
(A) two (B) three (C) four (D) five
- Recycle is ____ component of waste hierarchy.
(A) first (B) second (C) third (D) fourth
- ISO standard for environmental management control of recycling practice is -
(A) 14001:2012 (B) 14001:2013 (C) 14001:2014 (D) 14001:2015
- Following material has highest recyclate quality
(A) paper (B) plastic (C) steel (D) oil
- Plastic Pyrolysis can convert petroleum based streams such as plastics into
(A) fuels (B) carbons (C) both (A) and (B) (D) wax
- Following is (are) suitable raw material(s) for pyrolysis
(A) Mixed plastic (B) Mixed waste plastic from waste paper mill
(C) Multi-layered plastic (D) All of the above
- Type 1 (polyethylene terephthalate) plastic is commonly found in
(A) soft drinks and water bottles (B) laundry detergent bottle
(C) pipes (D) shopping bags
- Type 3 (polyvinyl chloride) plastic is commonly found in
(A) soft drinks and water bottles (B) laundry detergent bottle
(C) pipes (D) shopping bags
- Raw materials for plastics are ____ based.
(A) wax (B) petroleum (C) wood (D) all of the above
- Industrial wastes ____ municipal solid wastes.
(A) are more easily separated than are (B) are more difficult to separate than are
(C) is equally difficult to separate as that of (D) it depends upon type of industry
- The following plastic bottles are commonly collected for recycling.
(A) PET (B) HDPE (C) both (A) and (B) (D) PS
- LDPE stands for
(A) Low density polyethylene (B) Low density polyethene
(C) Low density polyethane (D) None of the above
- A major problem in plastics recycling is the _____.
(A) color (B) low weight-to-volume ratio (C) low melting point (D) all of the above
- In 4 R & I approach of Plastic waste management, I means _____
- What is the full form of CPCB.
(A) Central Pollution Control Board (B) Civil Pollution Control Board
(C) Central Plastics Consult Board (D) Central Petition Control Board
- Write the full form of PET
(A) Polyethylene Terephthalate (B) Polymethylene Terephthalate
(C) Polypropylene Terephthalate (D) Polyvinyl Terephthalate
- Write the full form of LLDPE.
(A) Low Density Polyethylene (B) Linear Low Density Polyethylene
(C) Low Linear Density Polyethylene (D) None of the above
- Write the SPI code of ABS.
(A) 1 (B) 2 (C) 5 (D) 7
- Write the full form of POM.
(A) Poly Oxymethylene (B) Poly Oxymethane (C) Poly Oxomethylene (D) None of the above

21. SPI code for PET is -----
22. 4R stands for -----, -----, -----, -----
23. SPI code for Nylon is -----
24. According to plastic waste (Management and handling rule) Carry bag made of virgin or recycled plastic, shall not be less than -----microns in thickness.
25. Monomer of PVC is -----
26. Littering of Plastic waste causes environment pollution Say True or False
27. Energy recovery is conversion of waste plastic to fuel. Say True or False
28. Additives enhance the property of plastic products Say True or False
29. Plastic packaging is the major source of waste generation Say True or False
30. Landfilling is the better option than recycling for plastic waste management. Say True or False

PART – B

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

4 x 2 = 8

1. What is recycling? How recycling is a better option for plastic waste management?
2. Write about primary, secondary and tertiary recycling.
3. How plastic waste is used in road construction?
4. Write about 4R in plastic waste management.

PART – C

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

4 x 3 = 12

1. Write about sink float method of plastic waste separation.
2. What are additives? Describe about the role of additives in recycling process.
3. What is SPI coding. How SPI coding is helpful in segregation of plastic waste?
4. What is Littering of plastic? How littering is harmful for Environment?
5. What is biodegradable plastic? Write name of some biodegradable plastics.

PART – D

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

2 x 5 = 10

1. What is depolymerization? Write the various steps for depolymerization of PET.
2. How plastic waste is coprocessed in cement kiln?
3. Write about the function of agglomerator and recycling extruder in recycling process.



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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIFTH SEMESTER EXAMINATION – JANUARY - 2022

Duration : 3 Hours

Max. Marks: 60

Course : DPT

Date : 05.01.2022

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. Nozzle heater replacement of an injection moulding machine comes under _____ maintenance type
 - a. Break down
 - b. Preventive
 - c. Predictive
 - d. None of these
2. The down time cost consists of _____
 - a. Lost revenue
 - b. Lost productivity
 - c. Cost to recover & Cost of intangibles
 - d. All of the above
3. The following is (are) scheduled maintenance _____
 - a. Overhauling of machine
 - b. Cleaning of tank
 - c. Whitewashing of building
 - d. All of the above
4. Belt of an electric motor is broken, it needs _____
 - a. Corrective maintenance
 - b. Scheduled maintenance
 - c. Preventive maintenance
 - d. Timely maintenance
5. A systematic approach for maintenance is _____
 - a. Problem – Cause – Diagnosis – Rectification
 - b. Problem– Diagnosis – Cause – Rectification
 - c. Problem – Measure – Diagnosis – Rectification
 - d. Problem– Diagnosis – Measure – Rectification
6. Down time in hours / Available hours) =
 - a. Maintenance effectiveness
 - b. Frequency of breakdown
 - c. Effectiveness of maintenance planning
 - d. None of the above
7. The speed at which the rotating magnetic field produced by a stator current rotates in an induction motor is _____
 - a. Synchronous speed
 - b. Rotor speed
 - c. Greater than synchronous speed
 - d. None of above
8. The starting torque of a squirrel-cage induction motor is _____
 - a. Low
 - b. Negligible
 - c. Same as full-load torque
 - d. Slightly more than full-load torque.
9. Star-delta starting of motors is not possible in case of _____
 - a. Single phase motors
 - b. Variable speed motors
 - c. Low horse power motors
 - d. High speed motors
10. Which type of bearing provides a bearing surface for forces acting along axis to the shaft _____
 - a. Thrust bearing
 - b. Journal bearing
 - c. Linear bearing
 - d. None of the above
11. Injection screws are rated by _____
 - a. L / D Ratio
 - b. Helix angle
 - c. Compression ratio
 - d. All the above
12. How does the piston in the clamping unit move?
 - a. Hydraulic energy
 - b. Pneumatic energy
 - c. Heat energy
 - d. Suction
13. Which of the following is not used as a component in hydraulic Power Pack?
 - a. Pressure gauge
 - b. Filler gauge
 - c. Valve
 - d. Reservoir
14. 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
15. Pressure drop in pipes, occurs due to _____
 - a. frictional resistance
 - b. load
 - c. flow pattern
 - d. none of the above
16. Check valve is a _____ way valve.
17. Check valve is a type of _____.
18. In industrial applications hydraulic fluids (synthetic oil) have viscosity grade ranging from__.
19. Screw Depth is constant in the following two _____ zones in an extruder.
20. Output of thermocouples is in _____.



- 21. Highest temperature at which a fluid in hydraulic system flows is called its pour point. Say True or False.
- 22. As capacity of pump increases, it pumps less oil per unit time. Say True or False
- 23. Pneumatic Systems use air as the fluid medium – Say true or false.
- 24. Motor starter is required to limit starting current of motor - Say true or false.
- 25. Electro pneumatic circuits are less reliable than pure pneumatic circuits. –say true or false

Write down the abbreviation following question

- 26. MCB-
- 27. OLR-
- 28. FRL-
- 29. SSR-
- 30. PLC-

PART – B

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

4 x 2 = 8

- 1. What are types of maintenance?
- 2. What is meant by L/D Ratio
- 3. State Pascal's law
- 4. What is the use of pressure release Valve?

PART – C

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

4 x 3 = 12

- 1. Explain FRL used in pneumatics and its purpose.
- 2. Define Compressor & Filters in Hydraulics?
- 3. What is PLC system? State its advantages.
- 4. What is the working principle of Star Delta Starter?
- 5. Define the function of Gear Box in molding machine

PART – D

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

2 x 5 = 10

- 1. What are different types of screws used in Injection Molding machine?
- 2. What are the different types of DC Motors? What is Squirrel cage motor?
- 3. What are the factors considered for installation & Commissioning?

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIFTH SEMESTER EXAMINATION – JANUARY - 2022

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

Max. Marks: 60
Date : 06.01.2022
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 commonly used material to produce overhead tank is
a) PP b) HDPE c) LLDPE d) PVC
2. The most preferable speed ratio between minor to major axis is _____ in rotational moulding process.
3. In calendaring process, each roll is _____ than the previous one in the stack.
a) Cooler & slower b) Cooler & faster c) Hotter & slower d) Hotter & faster
4. The gap between adjacent two rolls is called
a) Face b) Distance c) Nip d) None of these
5. Which reinforcement material is widely used in FRP?
a) Ceramic b) Asbestos fibre c) Glass fibre d) None of these
6. DMC stands for
a) Dough Machine Compound b) Dough Material Compound
c) Dough Moulding Compound d) None of these
7. Preheating is necessary for _____ type of materials
8. WAIM stands for _____.
9. Thickness in Rotational moulded components is maintained by amount of material only, Say True or False.
10. Products fabricated by filament winding have the lowest strength to weight ratio. Say True or False
11. Which material is used as a releasing agent in hand lay-up process?
12. The most commonly used mould material in FRP is _____
a) Steel b) Concrete c) Aluminium d) GRP
13. What is cull in transfer moulding?
14. Which of the following thermoforming process has excellent dimensional accuracy?
a) Vacuum forming b) Pressure forming c) Drape forming d) Matched die forming
15. For larger product, down-stroke press is used. say True or False.
16. RIM stands for _____.
17. In thermoforming, plastics sheet is heated to the
a) Melting point b) Sag point c) Tg point d) None of these
18. What is bulk factor?
19. What are the types of compression moulds?
20. Rotational moulded products are highly stressed. Say True or False
21. Very deep draw articles can be produced by
a) Drape forming b) Matched die forming c) Free forming d) Plug assist forming
22. For prototype and short production run _____ mould materials are used in thermoforming process.
23. Which welding technique is widely used in producing PVC folder?
a) Vibration welding b) High frequency welding
c) Ultrasonic welding d) Hot plate welding
24. Rotogravure printing is recommended for
a) Injection moulded objects b) Blow moulded objects
c) Films d) None of these
25. The type of printing recommended on film for short run is _____.
26. What is the compression ratio of the screw in thermoset injection moulding?
27. In thermoset injection molding, mould temperature is controlled by
a) Band heater b) Cartridge heater c) Water jacket d) None of these
28. The blowing agent used in structural foam moulding is
a) Azodicarbonamide b) Nitrogen c) Sodium bicarbonate d) All of these

29. 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
30. The cycle time of water assist molding is
- a) More than GAIM
 - b) Less than GAIM
 - c) Same as GAIM
 - d) None of these

PART – B

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

4 x 2 = 8

1. Name the various types of compression mould.
2. Define rotational moulding cycle.
3. State any two merits of pultrusion.
4. Name any four types of thermoforming process.

PART – C

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

4 x 3 = 12

1. Briefly describe fluidized-bed powder coating process.
2. Describe the merits of All electric injection moulding.
3. Briefly describe filament winding process.
4. Write down the merits & demerits of compression moulding process.
5. Briefly describe plug assist forming process.

PART – D

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

2 x 5 = 10

1. Describe Rotational moulding process with neat labeled diagram. Also write down their merits & demerits.
2. Write short notes on
 - a) Co-injection moulding
 - b) Vacuum bag moulding
3. Write short notes on
 - a) Water assisted injection moulding
 - b) Pot type transfer moulding

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FIFTH SEMESTER EXAMINATION – JANUARY - 2022

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

Max. Marks: 60
 Date : 07.01.2022
 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. As per IS 4985, class 3 pipes indicates working pressure (PN) of _____ kg/cm².
 a) 6.0 b) 3.0 c) 9.0 d) 0.3
 2. Which material has highest weathering resistance _____
 a) Rigid PVC b) Polysulfone c) Acrylics d) Polyurethane
 3. In Gas permeability test which gas is selected _____
 a) N₂ b) O₂ c) CO₂ d) All the above
 4. Ultrasonic Beam below the surface of a point of a material is called _____
 a) Dead Zone b) Near Zone c) Far Zone d) Non of the above
 5. Refractive index value of cellulose acetate is _____
 a) 1.53 b) 1.58 c) 1.35 d) 1.49
 6. Falling weight impact test at 0°C is carried out for
 a) UPVC Pipes b) Roto moulded water tank
 c) blow moulded containers d) All the above
 7. Unit of Arc resistance is
 a) Ohms b) Seconds c) Volts d) Watts
 8. Dissipation factor is directly proportional to _____ and square of the applied voltage
 a) current b) frequency c) resistance d) None of these
 9. The Limiting Oxygen Index value ----- with the increase in test temperature
 a) Increases b) decreases c) Equal d) No change
 10. In water storage tanks carbon black is used as _____.
 a) IR reflector b) UV stabilizer c) Thermal stabilizer d) None of these
 11. Samples exposure to sunlight and rain is called
 a) Natural weathering b) Outdoor Weathering
 c) Outdoor Natural Weathering d) All the above
 12. Test method for finding out resistance to fungi is
 a) ASTM G 21 b) ASTM D 22 c) ASTM D 5210 d) ASTM D 5526
 13. Rate of burning test is carried out in _____ position.
 a) Vertical b) Horizontal c) Inclined d) None of the above
 14. Test method for water absorption of plastics is
 a) ASTM D 570 b) ASTM D 618 c) ASTM D 638 d) ASTM D 256
 15. The unit for Di-electric strength is _____
 a) VK/mm b) VK/inch c) V/mil d) all the above
 16. Instrument used for colour measurement is _____
 17. The unit of irradiance is _____
 18. The unit of gas transmission rate is _____
 19. Determining the ability of an insulator to store electrical energy is _____
 20. Test method for flammability test is _____
 21. Decrease in the thickness of the specimen increases LOI. Say true or false.
 22. Isopropyl alcohol (LR) grade is used as a reagent for Acetic Acid immersion test. Say true or false.
 23. Dissipation factor is a dimensionless measure. Say true or false.
 24. Birefringence is the attribute of colour perception that expresses the degree of departure from gray of the same lightness- Say true or false.
 25. UV radiation accelerates the degradation. Say true or false.
- Expand the followings**
26. BIS
 27. ICE
 28. AFM
 29. ICE
 30. ISO

PART – B

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

4 x 2 = 8

1. What are the significance of Aerobic biodegradation under a) Sewage sludge b) Composting
2. Which factors control the resistance to weathering?
3. Which test methods can be carried out for determining the flammability characteristics in plastics?
4. Write down the durations and test conditions for short term and long term Immersion.

PART – C

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

4 x 3 = 12

1. Differentiate between natural weathering and accelerated weathering?
2. What is Dissipation factor and luminous transmittance?
3. What is smoke density test and write its significance?
4. What is to be observed in a burning test?
5. What is standardisation and write its importance

PART – D

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

2 x 5 = 10

1. What is the standard operating procedure for the carrying out the melt flow index test?
2. Define biodegradation of plastics. Explain short term biodegradation test?
3. Define weathering .Explain any one of it?
