20-211

CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE: GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIRST SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours | Max. Marks: 60
Course : PGD - PPT | Date : 08.01.2024
Subject : Polymer Science & Technology | 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 12 x 1 = 12

1. Expandable polystyrene beads are produced by
   a) Bulk polymerization technique (c) solution polymerization technique
   b) Suspension polymerization technique (d) interfacial condensation
2. Polymers below Tg are
   (a) Hard & Brittle (b) Soft & Flexible (c) Hard & Tough (d) None of these
3. Large molecules made up of small monomers are called
   a) Peptides b) polymers c) peptones d) monomers
4. Monomer of Nylon-6 is _____
5. If the arrangement of functional groups on carbon chain is alternating. It is called _____
6. A plastic resin which becomes soft on heating & rigid on cooling is called _____
7. Natural rubber is basically a polymer of isoprene .True/False
8. The most commonly used reagent for vulcanization of natural rubber is sulphur . True/False
9. The polymerization in which two or more chemically different monomers take part is called addition polymerization. True/False
10. FTIR stand for _____
11. TGA stand for _____
12. GPC stand for _____

PART – B

Answer **all** questions (Max. 40 words) 4 x 2 = 8

1. Define degree of polymerization.
2. What is catalyst?
3. Write two example of natural polymer.
4. What is Condensation Polymerization?

PART – C

Answer any **six** questions (Max. 100 words) 6 x 4 = 24

1. Define types of tacticity of polymer.
2. Define Suspension polymerization.
3. Write short note on GPC.
4. Write Difference between thermo plastic and Thermoset plastic.
5. Describe Emulsion Polymerization.
6. What is the factor effecting crystallinity.
7. Difference between natural Polymer and Synthetic polymer.

PART – D

Answer any **two** questions (Max. 300 words) 2 x 8 = 16

1. What is DSC and write its application.
2. Describe how many Mn and Mw derived?
3. Describe MFI test and its significance.

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIRST SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours | Max. Marks: 60
Course : PGD - PPT | Date : 09.01.2024
Subject : Plastics Materials and its Applications-I | 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 12 x 1 = 12

1. Which Statement is not Correct.?
   a) PVC sinks in Water b) The melting point of PTFE is 325^0C
   c) PC is a transparent material d) The Density of PP is greater than LDPE
2. Electroplating is best suitable for _____plastics materials.
   a) PVC b) PS c) ABS d) LDPE
3. Nylon 6 is made by polymerization of _____.
   a) Caprolactum b) both (a) & (b)
   c) Hexamethylene diamine and adipic acid d) None of these
4. Polycarbonates are the condensation product of _____ and phosgene gas.
5. Nylon 66 is manufactured by using _____& _____monomers.
6. Specific gravity of PVC_____.
7. PP has better hinge property –say true or false.
8. SAN is a copolymer of styrene- say true or false.
9. Nylon show Mould shrinkage due to its Semi crystalline / crystalline nature. - say true or false.
10. Full form of LLDPE_____ .
11. EPDM stand for _____.
12. ABS stand for _____.

PART – B

Answer **all** questions (Max. 40 words) 4 x 2 = 8

1. Give example of two hygroscopic materials.
2. Distinguish between thermoplastic and thermoset materials.
3. What is Shellac.
4. Define homo polymer and co-polymer with suitable example.

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PART – C

Answer any **six** questions (Max. 100 words) 6 x 4 = 24

1. Write down the the properties and applications of PET and PBT.
2. Compare LDPE, LLDPE and HDPE material based on their structure and properties.
3. Write short notes on polyoxymethylene.
4. Explain the properties & applications of Nylon 66.
5. Write briefly about the additives used in PVC compounds.
6. Write short notes on any two-
   (a) PMMA (b) Nature rubber (c) Cellulose Nitrate
7. Describe the properties & Applications of PTFE.

PART – D

Answer any **two** questions (Max. 300 words) 2 x 8 = 16

1. Describe the various properties of PVC and the processing techniques involved in PVC products manufacturing.
2. Discuss the manufacturing method, properties and application of ABS.
3. Explain the polymerization of polycarbonate with chemical reaction with properties and Applications.

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIRST SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours | Max. Marks: 60
Course : PGD - PPT | Date : 10.01.2024
Subject : Plastics Processing Technology – I | 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 12 x 1 = 12

1. The transfer moulds with in-built pot and plunger is called
   a) Loose plate mould b) Integral mould
   c) Top ram mould d) Bottom ram mould
2. Positive clamping of the mould is seen in
   a) Hydraulic clamping b) Tie bar less clamping
   c) Toggle clamping d) All the given
3. Back pressure is applied for
   a) Better mixing b) Increase Injection pressure
   c) Increase Injection speed d) none of these
4. Suck back is a term used in ……..…… process.
5. Rotational moulding process is practiced by…….movement of mould.
6. Curing time is setting in the compression moulding to allow the material to……..…….
7. Screw cooling may be recommended to prevent degradation - (Say true or false)
8. The temperature profile of the barrel from feed zone to die is set in increasing order – (Say true or false)
9. Projected area is length times width - (Say true or false)
10. ISO stands for ……..
11. PPE stands for ……....
12. NRV stands for …….……..

PART – B

Answer **all** questions (Max. 40 words) 4 x 2 = 8

1. Write the advantages of rotational moulding?
2. What is the L/D Ratio?
3. Name of the Use of materials of Compression Moulding machine?
4. What is MTC?

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PART – C

Answer any **six** questions (Max. 100 words) 6 x 4 = 24

1. Define the followings:
   A) Breathing time B) Bulk facture C) L/D Ratio
2. Explain advantages of the microprocessor injection moulding process.
3. Write the 6 defects and remedies in injection moulding product.
4. What are the different zones of screw used in injection moulding?
5. State the merits of preheating.
6. What is mixed resin in rotational moulding process?
7. What are the process variable in compression moulding?

PART – D

Answer any **two** questions (Max. 300 words) 2 x 8 = 16

1. Explain in the brief about the rotational process with sketch.
2. Explain in brief about the microprocessor controlled injection moulding process & its applications.
3. Name the various types of defects observed in injection moulding process. Explain any four with its causes & remedies

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIRST SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours | Max. Marks: 60
Course : PGD - PPT | Date : 11.01.2024
Subject : Plastics Testing – I | 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 12 x 1 = 12

1. The unit of specific gravity is _____
   a) Kg/m^3 b) g/cc c) mg/kg d) none of these
2. The standard test method for Vicat softening temperature of plastics is ----------
   a) ASTM D638 b) ASTM D648 c) ASTM D1525 d) ASTM D695
3. Which one of the following is a solvent for PVC?
   a) Toluene b) Benzene c) Cyclohexanone d) Xylene
4. Which material having lowest density value_____
5. The ASTM D standard for determining the thermal expansion is_____
6. K-Value is measured for _____material
7. Micrometer is used to measure the wall thickness say True or False
8. ASTM D5635 is the test method for ash content say True or False
9. Abbreviation of ABS
10. Abbreviation of NABL
11. Abbreviation of BIS
12. Unit of apparent density is mg/kg True or False

PART – B

Answer **all** questions (Max. 40 words) 4 x 2 = 8

1. Define Density.
2. Write a short note on Moisture analysis.
3. What is the confirmation test for PVC.
4. Significance of melt flow index test.

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PART – C

Answer any **six** questions (Max. 100 words) 6 x 4 = 24

1. What is the importance of conditioning the test specimen.
2. Write down the procedure for lassaigne's test?
3. Write a short note on any two of the following
   a) Ash content b) melting point c) bulk density
4. Write a short note on heat deflection temperature.
5. Explain Cup flow test.
6. Write shore note on measuring instruments.
7. Write down the procedure for brittleness temperature.

PART – D

Answer any **two** questions (Max. 300 words) 2 x 8 = 16

1. Write about identification of plastics by simple method.
2. Explain Melt flow index test?
3. Explain dilute solution viscosity test and K value.

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HEAD OFFICE : GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
FIRST SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours | Max. Marks: 60
Course : PGD - PPT | Date : 12.01.2024
Subject : Plastics Product and Mould Design | 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 12 x 1 = 12

01. The size of trimmed A2 size paper is _____.
    (a) 210 x 297 (b) 420 x 297 (c) 594 x 420 (d) 841 x 594
02. _____ helps in assembling of the plastic parts.
    (a) Ribs (b) Gussets (c) Bosses (d) Fillet
03. The thickness of Rib is not more than 66% of the nominal wall thickness. Say True or False.
04. The part of the mould which gives the outer shape of the moulding is _____
05. _____ is used to give proper alignment of the mould with machine nozzle axis.
06. Name the mould part used for returning the ejector unit.
07. The general shape of Dog-leg cam is _____.
    (a) Rectangle (b) Circle (c) Hexagon (d) Triangle
08. RPT is the abbreviation of _____.
09. SLS is the abbreviation of _____.
10. HP / VP is the abbreviation of _____ & _____ in Engineering drawing.
11. In Extrusion blow moulding process, core is a necessary part. Say True or False
12. In Compression moulding process, Flash is not required on moulding. Say True or False

PART – B

Answer **all** questions (Max. 40 words) 4 x 2 = 8

1. What is the purpose of providing ribs on plastic parts?
2. What do you mean by parison programming?
3. How to calculate depth of loading chamber in compression mould?
4. What do you mean by Runner balancing?

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PART – C

Answer any **six** questions (Max. 100 words) 6 x 4 = 24

1. What are the different methods of split mould actuation? Explain any one.
2. Define boss and make a boss design for thermoplastic material?
3. Explain positive type compression mould with neat sketch?
4. Describe the sprue bush and locating ring with neat sketch.
5. What are the types of ejection used in Injection moulds? Explain any one with neat sketch.
6. Why does mould need cooling? What are the functions of a gate?
7. Write short notes on the followings: (a) Pinch-off (b) Flash pocket.

PART – D

Answer any **two** questions (Max. 300 words) 2 x 8 = 16

1. Differentiate between two plate injection mould and three plate injection mould with neat sketch.
2. Write short notes on the following.
   (a) 3D printing (b) Factors affecting Shrinkage (c) Hand compression mould
3. Write the types of blow mould and explain Injection blow moulding with its advantages.

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