

Total No. of Questions : 12]

SEAT No. :

P1772

[Total No. of Pages : 3

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**B.E. (Polymer Engineering)
c-PACKAGING TECHNOLOGY
(2008 Course) (Elective-II) (Semester-I)**

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to Section-I and Section-II should be written on separate answer book.*
- 2) *Solve 3 questions from Section-I and 3 questions from Section-II.*
- 3) *Neat diagrams should be drawn wherever necessary.*
- 4) *Figures to right indicate full marks.*
- 5) *Assume suitable data, if necessary.*
- 6) *Use of electronic pocket calculator is allowed.*

SECTION-I

- Q1)** a) Enlist various materials used for packaging purpose. With appropriate application example explain these in detail. [8]
- b) Polymers have secured significant share in packaging sector. Do you agree? Justify your answer. [3]
- c) Briefly explain the purposes of packaging. [5]

OR

- Q2)** a) With suitable examples explain in detail concept of primary-, secondary- and tertiary-packaging. [8]
- b) Explain the concept of packaging and comment on the characteristics of packaging. [8]
- Q3)** a) What is 3-R technology? Explain in detail its significance. [8]
- b) What are various inspection methods used in packaging field? Explain any two in detail. [8]

OR

- Q4)** a) Write a short note on Legislation followed in packaging sector. [8]
- b) What do you understand by Shelf Life of Packaging? Briefly explain various factors affecting it. [8]

P.T.O.

- Q5) a)** Explain the terms Permeability, Diffusivity and Solubility. Derive the equation to explain their relationship. [9]
- b) A multilayer structure was made up of HDPE and PP with 50 μ m and 75 μ m thickness respectively. Calculate the overall permeability constant of this structure for oxygen. The oxygen permeability constants of HDPE and PP are $4.0 \times 10^4 \text{ cm}^3 \mu\text{m}/\text{m}^2\text{d.atm}$ and $5.0 \times 10^4 \text{ cm}^3 \mu\text{m}/\text{m}^2\text{d.atm}$ respectively. [9]

OR

- Q6) a)** Explain in detail the stages involved in design and development of plastic bottle. [8]
- b) A packaging material had 3-layered structure-2 mil PC, 0.6 mil PVDC, and 4 mil PC. Calculate the overall WVTR. [Given data: WVTR for PC is 11.0 g mil/100 in² 24h at 37.8°C, 90%RH, while that for PVDC is 0.40g mil/100 in² 24h at 37.8°C, 90% RH]. [8]
- c) Enlist the advantages of MAP. [2]

SECTION-II

- Q7) a)** Explain in detail following tests-Puncture Resistance and Torsion Resistance. [10]
- b) Comment on significance of burst strength in packaging. Explain in detail Mullen burst test. [6]

OR

- Q8) a)** Write a short note measurement of tensile strength of packaging structure. [8]
- b) Explain in detail the method to find out chloride content. Give at least one example where this test will be necessary. [8]
- Q9) a)** Comment on importance of stiffness in packaging. With schematic diagram explain how it is measured. [8]
- b) Write a short note on Chemical properties and Flammability of packaging material. [8]

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- Q10)a)** Write short note on-Sulphate Content and Elmendor tear strength. [10]
- b) Comment on the micro-organism sensitivity of packaging material and its importance. [6]

- Q11)a)** Alongwith the significance explain the concept of Eco-friendly packaging. [6]
- b) Comment on the importance of labeling in packaging. [6]
- c) Explain the process of VFFS. Draw suitable diagram. [6]

OR

- Q12)a)** Write a short note on Tetrapack® process. [8]
- b) Discuss in detail pre-wash and wash cycles used in cleaning packaging bottles. [4]
- c) With suitable schematic, explain various considerations to be taken into account while exporting the packaging material. [6]

