

Scheme – I
Sample Question Paper

Program Name : Plastics Engineering Program Group
Program Code : PS
Semester : Fifth
Course Title : Plastic Product Designing (Elective I)
Marks : 70

22551

Time: 3 Hrs.

Instructions:

- 1) All questions are compulsory.
- 2) Illustrate your answers with neat sketches where necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.
- 5) Preferably, write the answers in sequential order.

Q.1) Attempt any five of the following.

10 Marks

- a) Define composites.
- b) State the significance of shrinkage.
- c) Draw structural formulae of PVC, Nylon 6, PMMA and PTFE.
- d) If in plastic bottle the corners are kept sharp what would happen during molding?
- e) List down the materials used in rotomolding.
- f) State the concept of polymer blend.
- g) Define Creep.

Q.2) Attempt any three of the following.

12 Marks

- a) Describe in detailed difference between thermoplastics and thermosets.
- b) Suggest the name of plastic material for following product.
i) Gear ii) O ring iii) Bobbins iv) thermal tape
- c) Describe in detail the design feature like uniform wall thickness and tapers or drafts.
- d) How will you determine the tensile strength of plastic material?

Q.3) Attempt any three of the following.

12 Marks

- a) Suggest the location and type of gate for plastic pen cap, chair, Box and tv cabinet cover.
- b) Describe Injection moulding with neat sketch.
- c) List down the factors considering during design of plastic product.
- d) A polypropylene **beam** is **100 mm** long, simply supported at each end and is subjected to a load **W** at its mid-span. If the maximum permissible strain in the material is to be **1.5%**,

calculate the largest load which may be applied so that the deflection of the beam does not exceed 5 mm in a service life of 1 year. For the beam second moment of area $I = 28 \text{ mm}^4$ and the creep curves in Fig. 3. should be used.

Q.4) Attempt any three of the following.

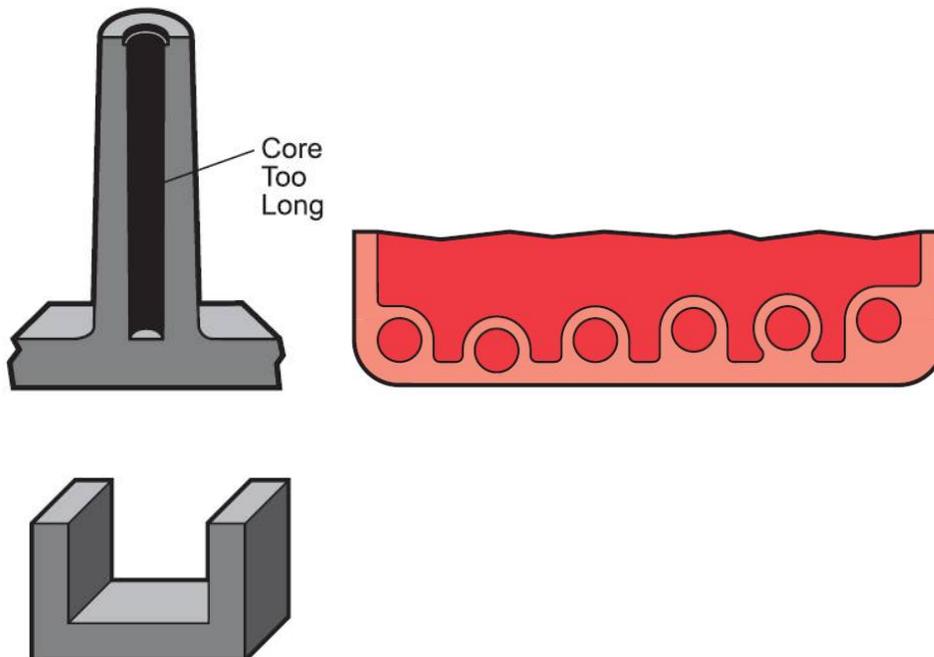
12 Marks

- Draw structural formulae of PC and write its any four important properties.
- Write down the advantage and disadvantage of PA, POM, PBT and PU TPE.
- Describe in detail design features like ribs and bosses with neat sketch.
- Compare injection molding process with compression with respect to product.
- Describe the different types of snap fits with neat sketch.

Q.5) Attempt any two of the following.

12 Marks

- Explain viscoelastic behavior of plastic material.
- Describe the extrusion blow molding process with neat sketch.
- Draw correct design of following design features.



Q.6) Attempt any two of the following.

12 Marks

- Explain the characteristics of crystalline and amorphous polymer.
- Suggest and explain the characteristics of plastic material if it is used in gears, snap fits and bearings.
- A ball-point pen made from polypropylene has the clip design shown in Fig.1. When the pen is inserted into a pocket, the clip is subjected to a deflection of 2 mm at point A. If the limiting strain in the material is to be 0.5% calculate (i) a suitable thickness, d , for the clip

(ii) the initial stress in the clip when it is first inserted into the pocket and (iii) the stress in the clip when it has been in the pocket for 1 week. The creep curves in Fig2. may be used and the short-term modulus of polypropylene is 1.6 GN/m^2 . Use creep curve data given

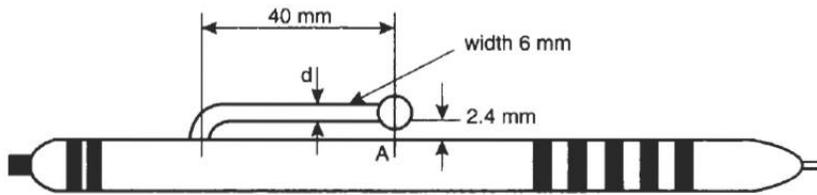


Fig 1

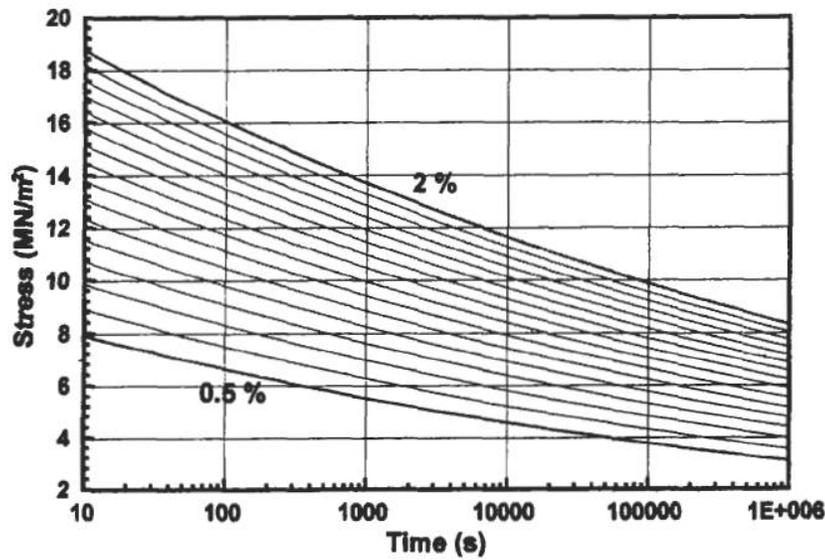


Fig 2

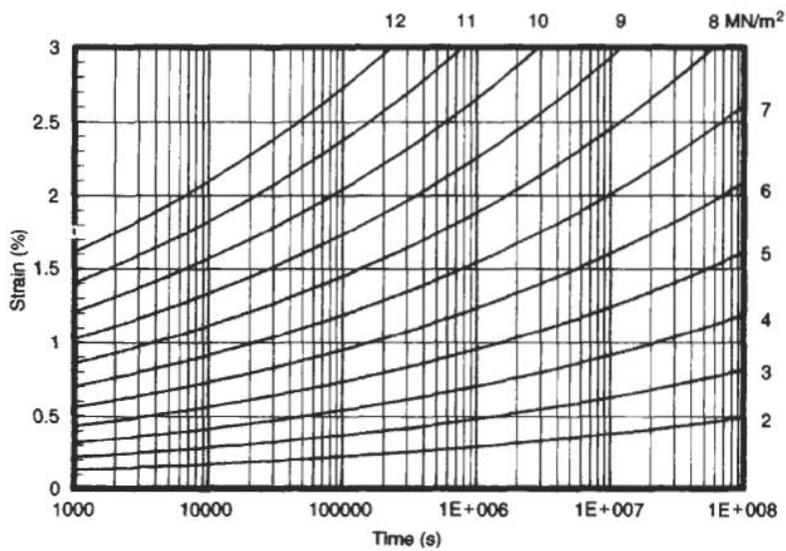


Fig3

Scheme – I
Sample Test Paper - I

Program Name : Plastics Engineering Program Group
Program Code : PS
Semester : Fifth
Course Title : Plastic Product Designing (Elective I)
Marks : 20

22551

Time: 1 Hour

Instructions:

- 1) All questions are compulsory.
- 2) Illustrate your answers with neat sketches where necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.
- 5) Preferably, write the answers in sequential order.

Q.1) Attempt any four of the following.

08 Marks

- a) Define Polymer Blend.
- b) What do you mean by fatigue?
- c) State the significance of shrinkage in design.
- d) List down the examples of engineering plastics.
- e) What will happen when below uneven wall thickness product molded?



Q.2) Attempt any three of the following.

12 Marks

- a) Explain open cell and closed cell structure.
- b) Explain design features like molded in insert.
- c) State any four important properties of PP.
- d) Draw neat sketch of injection molding screw.

Scheme – I
Sample Test Paper - II

Program Name : Plastics Engineering Program Group
Program Code : PS
Semester : Fifth
Course Title : Plastic Product Designing (Elective I)
Marks : 20

22551

Time: 1 Hour

Instructions:

- 1) All questions are compulsory.
- 2) Illustrate your answers with neat sketches where necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.
- 5) Preferably, write the answers in sequential order.

Q.1) Attempt any four of the following.

08 Marks

- a) Define draw down ratio.
- b) state limitations of compression moulding with respect to product.
- c) List down the thermoplastic material used for making gear
- d) Why powder materials are used in rotomoulding?
- e) Define coefficient of thermal expansion.

Q.2) Attempt any three of the following.

12 Marks

- a) Explain rock and roll rotomoulding with neat sketch.
- b) Explain creep and stress relaxation in plastics.
- c) Explain design of snap fits with neat sketch.
- d) Explain the concept of isochronous and isometric curves.