

**SUBJECT CODE NO:- P-8029**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**M.E. (Mechanical) Examination May/June 2017**  
**Modern Engg. Materials**  
**(Revised)**

**[Time : Three Hours]**

**[Max Marks :80]**

Please check whether you have got the right question paper.

N.B

- i) Solve any three questions from each section.
- ii) Figures to the right indicate full marks.
- iii) Draw neat sketches wherever necessary.

Section A

- |     |       |   |    |
|-----|-------|---|----|
| Q.1 | (a)   | With justification, state which stainless steel would you recommend for a-            | 07 |
|     |       | (i) Welded structure  |    |
|     |       | (ii) Very high strength   |    |
|     |       | (iii) Good forming qualities  |    |
|     |       | (iv) Utensils   |    |
|     | (b)   | Discuss in detail any two heat treatment processes with specific application.         | 06 |
| Q.2 | (a)   | Explain in detail Austempering & Martempering.  | 07 |
|     | (b)   | Explain the process of carburizing & its subtypes in details.                         | 06 |
| Q.3 | (a)   | Give the composition, properties and applications of cartridge brass & Monel.         | 06 |
|     | (b)   | What is season cracking of brasses? How it can be avoided?                            | 07 |
| Q.4 | (a)   | Suggest the composite materials used for high speed application. Justify your answer. | 07 |
|     | (b)   | What are whiskers? Write their applications.  | 06 |
| Q.5 |       | Write short note on any two:-   | 14 |
|     | (i)   | Precipitation hardenable steels   |    |
|     | (ii)  | Alloy cast iron   |    |
|     | (iii) | Ball bearing steel.   |    |

Section B

- |     |       |  |    |
|-----|-------|--|----|
| Q.6 | (a)   | Briefly describe sandwich panels. What are the functions of faces and core?  | 07 |
|     | (b)   | A glass fibre reinforced polystyrene contains 35% volume of parallel fibres. Estimate the young's modulus of the composite in the longitudinal direction of the fibre. Young's modulus of glass is 70 GN m <sup>-2</sup> & that of polystyrene is 2.6 GN m <sup>-2</sup> . | 06 |
| Q.7 | (a)   | Cite several reasons why fibre glass reinforced composites are utilized extensively? Also cite several limitations of this type of composite.  | 07 |
|     | (b)   | Briefly explain the difference in molecular chemistry between silicon polymer & other polymeric material.  | 06 |
| Q.8 | (a)   | Some of our modern kitchen cookware is made of ceramic materials. List at least three important characteristic required of a materials to be used for this application. On the basis of this comparison select the material most suitable for the cookware.                | 07 |
|     | (b)   | Explain the process, vulcanization of rubber in detail.  | 06 |
| Q.9 |       | Write short notes on (Any two):-   | 14 |
|     | (i)   | Electronic ceramic   |    |
|     | (ii)  | Plastics and elastomers  |    |
|     | (iii) | Structure of refractories  |    |