



# MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PE-ME701E Selection and Testing of Materials

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

## Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :

[ 1 x 10 = 10 ]

- (i) How much carbon is present in medium carbon steel?
- (ii) Give an example of dry corrosion
- (iii) Which type of indenter used in Vickers hardness test?
- (iv) Which material can't be tested by Magnetic particle test?
- (v) Which type of lens is used in electron microscope?
- (vi) Write down at least 2 names of smart materials.
- (vii) The ease with which a magnetic field can be established in a test piece is called: \_\_\_\_\_
- (viii) What is the light source of electron microscope?
- (ix) Which type of composite is not classified under the category of a number of layers?
- (x) With an increase in the area of hysteresis curve, power loss will \_\_\_\_\_
- (xi) The relative permeability of a medium is 0.050. What is its magnetic susceptibility?
- (xii) \_\_\_\_\_ is used for measuring the hardness of brittle materials

## Group-B (Short Answer Type Question)

Answer any three of the following

[ 5 x 3 = 15 ]

2. What are the factors affecting mechanical properties? (5)
3. Differentiate between izod test and charpy test. (5)
4. Define fracture toughness. What factors affect fracture toughness? (5)
5. Write short notes on Brinell hardness test (5)
6. What is Shape -Memory alloys and how does it work? (5)

## Group-C (Long Answer Type Question)

Answer any three of the following

[ 15 x 3 = 45 ]

7. (a) What are four types of ceramics? (5) What are five products made from ceramics? (5)  
(b) Is clay a ceramic? What is porcelain material? (5) [ 5+5+2+3 ]
8. (a) Define fatigue and fatigue limit. What is the purpose of fatigue testing? (4) What are the types of fatigue tests? (3) (5)  
(b) Explain Rotating beam type fatigue test with neat sketch. (4) [ 4+3+3+5 ]
9. (a) How glass is manufactured? What are the properties of glass? (7)  
b. Write short notes on Piezoelectric material (4)  
c. What is bi-component spinning? (4) [ 7 + 4 + 4 ]
10. How many magnetic properties are there? Differentiate between paramagnetism & ferromagnetism with sketch. (2+4+3+6)  
What do you mean by environmental properties. Explain any five types of optical properties of materials (4+3+4+4) [ 4 + 3 + 4 + 4 ]
11. Why is ductile fracture preferred over brittle fracture? What causes brittle fracture in steel? (4)  
How does grain size affect brittle fracture? How does temperature affect brittle fracture? (4)

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