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Code No. : 15109 O(A)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. III Year I-Semester Supplementary (Old) Examinations, May/June-2019

Smart Materials and Applications
(Open Elective-V)

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Mention any four properties of ferro electric materials.
2. How magnetostrictive materials are different from electrostrictive materials?
3. Write a note on chromic materials.
4. List out few applications of MR fluids.
5. Classify different type of metal alloys.
6. Define shape memory effect.
7. Give any two examples for copper based shape memory alloys.
8. Mention any four applications of shape memory alloys.
9. Differentiate between thermo electricity and pyro electricity.
10. Draw stress – strain diagram of SMA.

Part-B (5 × 10 = 50 Marks)

11. a) Draw the structure of Barium Titanate and discuss three different phase transitions with temperature. [5]
b) Explain construction and working of Magnetostriction oscillator. [5]
12. a) What is seebeck effect ? How it is used to generate thermoelectric power. [5]
b) Draw the structure of an electro chromic device and explain the function of each layer. [5]
13. a) Explain how one way shape memory effect is different from two way shape memory effect. [5]
b) List out the merits and demerits of Shape Memory alloys. [5]
14. a) What are the salient features of Titanium alloys? [5]
b) Mention medical applications of Ni – Ti alloys. [5]
15. a) Outline the temperature dependence of dielectric constant of ferroelectric material using curie Weiss law. [5]
b) Write a note on smart fluids. [5]
16. a) Name two phases of shape memory alloys and explain how temperature and mechanical stress effect the phase transformations of SMA. [6]
b) Summarize the merits and demerits of copper based alloys. [4]
17. Answer any *two* of the following:
 - a) Discuss the applications of piezoelectric and ferroelectric materials [5]
 - b) Explain Pseudo elasticity using stress – strain curve. [5]
 - c) Classify different types of ferrous materials and list out few properties of ferrous alloys. [5]