Reg. No. : | | | | | | | | | | |

Question Paper Code: 98762

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

One credit

Mechanical Engineering

19UME862 – SMART MATERIALS

(Regulation 2019)

Duration: 1.30 hours Maximum: 50 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Piezo-electric materials are used in

   (a) Transducer (b) Load gauges (c) Batteries (d) Switches

2. _____which respond with a change is shape on the application of mechanical stress

   (a) Wooden materials (b) Plastic materials (c) Iron materials (d) Smart materials

3. _____type charge sensor for highly sensitive detection of a DNA sequence.

   (a) JFET (b) PTFE (c) LED (d) FET

4. A smart material may be considered as a replacement for a ----- material.

   (a) Traditional (b) Conventional (c) Un conventional (d) Recycle

5. Self-healing may also be achieved through deliberately applied _____ mechanisms.

   (a) psychological (b) chemical (c) mechanical (d) obvious

6. Light sensors are used in _____

   (a) Lights (b) Electric switches

   (c) Pyroelectric materials (d) Piezoelectric materials

7. Glass fiber tensile strength is_____ (GPa)

   (a) 3.5 to 4.6 (b) 3.2 (c) 4.6 to 5.0 (d) 2.3

8. Embedding sensors within structures to monitor _____and damage can reduce maintenance costs and increase lifespan.

(a) Strain (b) Temperature (c) Stress (d) Condition

9. Smartness describes self-adaptability, --------- memory and multiple functionalities of the materials or structures.

(a) Self – assembly (b) Self-sensing (c) Capability (d) Consciously

10. PTFE means_____

(a) Polytetra-fluid emulsion (b) Polytetrafluoroethylene

(c) Polytetra fluorescence (d) **P**olytetra fluid ethanol

PART – B (2x 20 = 40 Marks)

11. (a) What are smart materials and explain the commonly used smart materials (20)

Or

(b) Discuss about features and application of smart materials. (20)

12. (a) Discuss about optical properties of smart materials. (20)

Or

(b) Explain the application of smart materials in self-healing protective surfaces of aircraft (20)