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**Question Paper Code: 98762**

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

One credit

Mechanical Engineering

19UME862 – SMART MATERIALS

(Regulation 2019)

Duration: 1.30 hours

Maximum: 30 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Piezo-electric materials are used in CO1-U  
(a) Transducer      (b) Load gauges      (c) Batteries      (d) Switches
2. \_\_\_\_\_ which respond with a change in shape on the application of mechanical stress CO1-U  
(a) Wooden materials      (b) Plastic materials      (c) Iron materials      (d) Smart materials
3. Piezo-electric materials are used in----- CO1-U  
(a) transducer      (b) load gauges      (c) batteries      (d) switches
4. Intelligent materials which sense any environmental change and respond to it in an CO1-U  
(a) optical manner      (b) electro manner      (c) eco-friendly      (d) metal composites
5. The Smart Control System will provide---- for the sensors and actuators. CO2-U  
(a) quality      (b) condition      (c) feedback control      (d) signals
6. The  $(BN)_{1-x}(C_2)_x$  alloys are promising materials for band-gap engineering in CO2-U  
(a) 1Delectronics      (b) 2Delectronics      (c) 3Delectronics      (d) all the above
7. One of characteristic properties of polymer material \_\_\_\_ . CO2-U  
(a) High temperature stability      (b) High mechanical strength  
(c) High elongation      (d) Low hardness

8. -----type charge sensor for highly sensitive detection of a DNA sequence CO2-U
- (a) JFET                      (b) PTFE                      (c) LED                      (d) FET
9. Smartness describes self-adaptability, ----- memory and multiple functionalities of the materials or structures. CO3-U
- (a) Self – assembly              (b) Self-sensing              (c) Capability              (d) Consciously
10. The end products of organic pigments CO3-U
- (a) UV liquid                      (b) fluorescence              (c) poly acryl              (d)minerals

PART – B (1x 20 = 20 Marks)

11. (a) Apply the concept and discuss about Electrical properties (piezoelectric effect) of smart materials with suitable example. CO2-App (20)
- Or
- (b) Select and explain the application of smart materials in self-healing protective surfaces of aircraft CO3-App (20)