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**Question Paper Code: 31951**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Elective

Electronics and Instrumentation Engineering

01UEI904 - ADVANCED SENSORS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. List the three basic components of a chemical sensor.
2. Draw the structure of an ion selective electrode.
3. What is echolocation?
4. Classify the fibre optic sensor based on the application.
5. List any two disadvantages of purified enzymes.
6. Write the expression for the drain current in MOSFET sensor, when the transistor is in the saturation mode.
7. What is silicon accelerometer? Mention its uses.
8. Mention the use of resolvers.
9. List the few excitation signals for sensing elements in a smart sensor.
10. Compare touch sensing and tactile sensing.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Which sensor is mainly used for gas sensing? Explain in detail. (10)  
(ii) Write short notes on hydrogen sensitive MOSFET. (6)

Or

- (b) Describe the sensor matrices for the two dimensional measurements of concentrations in detail. (16)
12. (a) Define echolocation. Explain the working principle of echolocation and its applications. (16)

Or

- (b) Explain the sensors used in space and environmental applications. (16)
13. (a) (i) Derive the expression for the response time of the biosensor in a transient state. (12)  
(ii) Compare  $pNH_4$  sensor and  $pNH_3$  sensor. (4)

Or

- (b) Explain the construction and the working principle of Piezo-electric-enzyme sensor. (16)
14. (a) Mention the steps involved in fabricating the high pressure sensor. Explain with a neat sketch. (16)

Or

- (b) Explain the principle and working of angle of attack sensors. (16)
15. (a) With suitable diagram, explain the general architecture of smart sensor. (16)

Or

- (b) Explain how the temperature is measured using the smart sensors. (16)