

15/15

(18)

S.E  
BM/IV/CBGS

Q.P. Code : 3574

T.S.M.A

(3 Hours)

[ Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory.  
 (2) Attempt any three questions from the remaining questions.  
 (3) Figures to the right indicate full marks.  
 (4) Make necessary assumptions wherever require and state them.

1. Attempt any four :-

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| (a) Explain the typical Current versus Voltage characteristics of the bead type NTC thermistor.  | 5  |
| (b) Explain the capacitance microphone used for measuring dynamic displacement changes.  | 5  |
| (c) Explain the different internal electrodes used to measure the biopotentials.   | 5  |
| (d) Explain the blood gas and acid - base physiology   | 5  |
| (e) Classify biosensors. Define each type.   | 5  |
| 2. (a) With the help of an example explain in detail the second order instrument characteristics.  | 6  |
| (b) Explain the different types of pressure sensing elements.  | 8  |
| (c) A two-wire unbonded strain gauge system of gauge resistance $1k\Omega$ each is connected to a Wheatstone bridge in the others two arms fixed resistors of $1k\Omega$ each are connected. If the applied stress has caused a 2% change in the gauge length, calculate the bridge output. The bridge excitation voltage is 5Vdc and the gauge factor is 2. | 6  |
| 3. (a) Distinguish between potentiometric and amperometric sensors. Explain one example of an amperometric sensor.   | 10 |
| (b) Explain the term immunosensor. With the help of a diagram explain in detail any one immunosensor.  | 10 |
| 4. (a) Explain the following static characteristics with examples :<br>(i) Hysteresis<br>(ii) Linearity<br>(iii) Sensitivity<br>(iv) drift.  | 10 |
| (b) Explain the construction and working of LVDT. Draw the necessary diagrams.   | 10 |

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15/5/15

(2)

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5. (a) Drawing the labelled diagrams explain the laws governing the thermocouples. State the advantages and disadvantages of thermocouples. 10
- (b) What is half cell potential? Draw the diagram of Ag/AgCl electrode and prove that the half cell potential of Ag/AgCl electrode is quite stable when placed in an electrolyte having chloride (Cl) ions with stable activity as the principal anion. 10
6. (a) Explain the fibre optic temperature transducer. 6
- (b) Explain photon sensors 8
- (c) Explain microelectrodes. 6
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