

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- APRIL-2023

COURSE CODE (CREDITS): 21B1WPH831(3)

MAX. MARKS: 25

COURSE NAME: BIOSENSORS

COURSE INSTRUCTORS: DR. RAGINI RAJ SINGH

MAX. TIME: 1 Hour 30 Minutes

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

**Q.1:** The set of voltage measurement that were recorded by eight different students in the laboratory as follows: 532V, 548V, 543V, 535V, 546V, 531V, 543V and 536. Calculate the Arithmetic mean, Deviations from mean, average deviation, the standard deviation, variance and probable error on recorded voltage data. [CO: 4, Marks: 3]

N	x	$d_i = x_i - \bar{X}$	$d_i^2$
1	532	-7.25	52.56
2	548	8.75	76.56
3	543	3.75	14.06
4	535	-4.25	18.06
5	546	6.75	45.56
6	531	-8.25	68.06
7	543	3.75	14.06
8	536	-3.25	10.56
	$\sum x_i = 4314$	$\sum  d_i  = 46$	$\sum d_i^2 = 299.48$

**Q.2.** If a resistor is specified by the manufacturer as 5.7 k ohm with a tolerance of  $\pm 10\%$  then the actual value of the resistance is guaranteed with the limits? [CO: 4, Marks: 2]

**Q.3.** Define the following: [CO: 1, Marks: 4]

1. Sensors
2. Actuators
3. Beer Lambert's law
4. Variable conversion element

**Q.4.** Discuss different types of electrochemical sensors with the help o diagram to show their basic design. [CO: 2, Marks: 5]

**Q.5.** What may be the approaches those are capable to increase the selectivity of the detecting electrodes? [CO: 3, Marks: 4]

**Q.6.** What are the main elements of generalized measurement system? [CO: 3, Marks: 3]

**Q.7.** With reference to static characteristics of measurement system discuss the following:

[CO: 4, Marks: 4]

1. Range and Span
2. Accuracy and precision
3. Drift
4. Hysteresis
5. Threshold