DCEL601

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

VI Semester B.Sc. Degree Examination, July/August - 2024

ELECTRONICS

Electronic Instrumentation and Biomedical Instruments

(NEP 2020 Scheme)

Paper : VII

Time : 2½ Hours **Maximum Marks : 60**

Instructions to Candidates:

1. Answer **All** questions from Part 'A', any **Four** questions from part 'B', and any **Four** questions from Part 'C'.
2. Answer **All** questions of Part - 'A' in any one page, the same questions answered multiple times will not be considered for evaluation.

PART - A

Answer **All** the subdivisions. **(12×1=12)**

1. i) The deviation of the measured value to the desired value is defined as

a) absolute error b) repeatability.

c) hysteresis d) resolution.

ii) Piezo - electrictransducer is used to measure.

a) light b) temperature.

c) pressure d) sound

iii) Which of the following is an active transducer?

a) strain gauge

b) thermistor

c) LVDT

d) thermocouple.

iv) The main function of the sensor is to sense and

a) convert physical quantities into electrical signals

b) convert electrical signals into physical quantities.

c) control the speed of a moving object

d) control the temperature of a system.

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v) The device which is used to perform controlled motion actions.

a) transducer b) sensor

c) actuator d) none of these

vi) Actuators are used in

a) automotive systems b) aerospace systems

c) consumer products d) all of the above

vii) The action potential of a cell is _____

a) -20 mV b) -40 mV

c) -70 mV d) +40 mV

viii) The process of changing from action potential to resting potential

a) repolarisation b) depolarisation

c) hyperpolarisation d) sodium pumping.

ix) The frequency bands in EEG activity

a) alpha b) beta

c) theta d) all of the above

x) Oscillometric method of blood pressure measurement is

a) direct method b) indirect method

c) mean method d) none of the above

xi) Pressure due to ventricle relaxation is

a) systolic pressure b) diastolic pressure

c) mean pressure d) none of the above

xii) ISFET is used

a) Amplification b) ion concentration

c) Immune agent identification d) all of the above.

PART - B

Answer any **Four** of the following questions. **(4×7=28)**

2. a) Define the following measurement characteristics.
   i) Accuracy
   ii) Lag
   iii) Precision.
   b) Compare systematic and gross errors. **(3+4)**
3. What is a transducer? Explain the basic principles of
   i) resistive.
   ii) inductive and
   iii) Capacitive transducers.
4. What is an actuator? Explain briefly the logical, rotary and electro - pneumatic actuators.
5. a) Define
   i) action potential.
   ii) resting potential.
   iii) half - cell potential
   b) Draw ECG waveform. Explain briefly. **(3+4)**
6. With the block diagram, explain EEG system.
7. With relevant diagram, explain the working principle of ISFET.

PART - C

Answer any **Four** of the following. **(4×5=20)**

8. The expected value of the current through a resistor is 20 mA. However, the measurement yields a current value of 18 mA. calculate
   i) absolute error.
   ii) % error.
   iii) relative accuracy.
   iv) % accuracy.
9. With a diagram, explain the construction and operation of strain gauge.
10. Mention any five types of sensors with their applications.
11. Explain the working of isolation amplifier.
12. Explain the working of flame photometer.
13. a) What is blood cell counter?
    b) With a suitable diagram, explain the working of spectrophotometer? **(1+4)**
