Progressive Education Society's

Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16

(Autonomous)

End Semester Examination: 2023-24

Faculty: Science and Technology

Program: B.Sc. Code (Gen03) **Semester: III** **SET: A**
Program (Specific): General B.Sc. **Course Type: Core course**
Class: S.Y.B.Sc. (Gen) **Max. Marks: 35**
Name of the Course: Instrumentation
Course Code: 23-PHY-232 (B) **Time: 2Hr**
Paper: II

Instructions to the candidate:

1) ***There are 4 sections in the question paper. Write each section on separate page.***
2) ***All Sections are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well labeled diagram wherever necessary.***
5) ***Use of calculator and log table is allowed.***

SECTION: A

Q1) Answer the following (<u>any 5</u>) (One Mark Each) 5

i) State four types of standards of measurement.

ii) What is the working principle of a resistive transducer?

iii) What is a cantilever beam?

iv) Draw a neat diagram of spiral bourdon tube.

v) Define piezoelectricity.

vi) What is a sample and hold circuit?

vii) Explain gain of buffer amplifier?

SECTION: B

Q2) Answer the following (<u>any 5</u>) (Two Marks Each) 10

i) State parameters of operational amplifier.

ii) Draw the circuit diagram of low pass filter.

iii) Explain working of a rotary pump.

iv) What will be the frequency of diaphragm when equivalent mass of diaphragm is 0.3 kg and force constant is 10 N/m?

v) Explain piezoelectric effect.

vi) Explain classification of transducers based on source of energy.

vii) The dead zone in certain thermometer is 0.125 percent of span. The calibration is 400^0C to 1200^0C. What temperature change might occur before it is detected.

SECTION: C

Q3) Answer the following (<u>any 4</u>) (Three Marks Each) 12

i) Explain the working of a photomultiplier tube.

ii) Write a note on thermal element as a first order system of measurement.

iii) Explain the working of a rotary potentiometer as a variable resistance device.

iv) What is a strain gauge? Explain the working of a bonded strain gauge.

v) Explain how LVDT cam measure using bourdon tube?

vi) Explain principle and working of bimetallic thermometer.

vii) For certain thermistor, β = 3000K and resistance at 27^0C is 1000Ω. When the thermistor is used for temperature measurement, the resistance measured is 2400 Ω. Find the temperature measured.

SECTION: D

Q4) Answer the following (<u>any 2</u>) (Four Marks Each) 8

i) With the help of a neat diagram, explain working of a current to voltage converter.

ii) With the help of a block diagram explain functional elements of a typical measurement system.

iii) Explain what are corrugated diaphragms and bellows.

iv) Explain working of a thermistor. Draw different forms of thermistor. Explain what is NTC and PTC.

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