6. (a) What are bio-Amplifiers ? Write a short note on different types of Bio Amplifiers.

   (b) What are Data Acquisition Systems? Draw its block diagram.

   (c) Draw the block diagram of an ECG system. Draw an ECG wave and analyse it. (6×3)

7. (a) What instruments are used in computer controlled instrumentation?

   (b) Explain the principle and working of a DSO.

   (c) Distinguish between A/D and D/A converters. Explain the working of a D/A converter. (6×3)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4674 **J**

Unique Paper Code : 2514002005

Name of the Paper : Instrumentation

Name of the Course : **B. Sc.(H) Electronics NEP (GE)**

Semester : IV

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. Question **1** is compulsory.
4. **All** questions carry equal marks.
5. Use of a scientific calculator is allowed.

1. (a) Differentiate between precision and accuracy.

   (b) Define a Multimeter.

   (c) A voltmeter shows 4.7 V across a resistor while

the expected value is 5V. Calculate

(i) Error in percentage

(ii) Relative accuracy

(d) What is a transducer? What are the factors that influence its selection?

(e) Draw a PMMC Galvanometer showing its constructional details.

(f) What is an Instrumentation Amplifier? (3×6)

2. (a) What are Digital Voltmeters. What are the advantages of using them?

(b) Define "error". Explain different types of errors.

(c) What is loading effect? Consider two voltages as $V_1 = 220 \pm 1\%$ and $V_2 = 100 \pm 5\%$. Find the maximum percentage error in $V_1 + V_2$. (6×3)

3. (a) A galvanometer can work as an Ammeter and a Voltmeter. Explain.

(b) Draw the block diagram of a general-purpose CRO. Label all the blocks and show the waveforms entering and leaving each block assuming a

sinusoidal voltage is applied to the input of the vertical amplifier.

(c) What is the reason for using a delay line in the vertical deflection system of a Laboratory type CRO? Why the Vertical Deflection plates are placed at a greater distance from the screen compared to the Horizontal Deflection plates? (6×3)

4. (a) Distinguish between Active and Passive Probes.

(b) Explain the elements of standard Signal Generator with the help of a block diagram? How is it different from a function generator?

(c) What are transducers? Distinguish between Active and Passive transducers with examples. (6×3)

5. (a) What are the requirements of an ideal transducer? Suggest a stable transducer and its working principle to measure the temperature in the range of 60°Celsius to 100°Celsius.

(b) Explain the working of a pressure transducer.

(c) What is LVDT? Explain its operation. (6×3)

P.T.O.