POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year : 2024
Programme: BE | Full Marks:100
Course: Instrumentation (New) | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Assume suitable data if necessary.

Attempt all the questions.

1.	a)	Define instrumentation system. What are the components of an instrumentation system explain with a block diagram.	8
	b)	Describe the operation of LVDT for the measurement of direction of the movement.	7
2.	a)	A pressure gauge of range 50 bar is stated to have an error of 10.15 bar when calibrated by the manufacturer. Determine a) percentage error on the basis of maximum scale value. b) possible error as a percentage of the indicated value when a reading of 10 bar is obtained in a test.	8
		OR	
		A strain gauge is bounded to a beam 0.1 m long and has cross-sectional area of 4 cm^2. Young's modulus for steel is 2.7GN/m^2. The strain gauge has an unstrained resistance of 240Ω and gauge factor of 2. When a load is applied the resistance of gauge changed by 0.017Ω. Calculate the change in length of the steel beam and the length of the steel beam and the amount of force applied to the beam.	
	b)	Describe the construction and working principle of an Induction type single phase energy meter.	7
3.	a)	Define power factor meter. Explain the working principle of single phase electrodynamometer power factor meter with necessary expressions.	8
	b)	Explain the single channel Data Acquisition System (DAS) with the help of block diagrams.	7
4.	a)	Define Instrumentation amplifier. Explain the working principle of an instrumentation amplifier.	8
	b)	What digital output you will find of 7.27 volts input from 5-bit SA ADC with reference voltage of 11V.	7

5. a) Explain the working principle of delta-sigma ADC with necessary block diagram and steps. 7

   b) Define wave analyzer. Explain the frequency selective wave analyzer in detail with necessary block diagram. 8

6. a) Explain operation and application of Spectrum Analyzer. 7

   b) Explain about the working principle of oscilloscope with the help of its block diagram. 8

OR

What is a recorder? Draw and explain the strip-chart recorder in detail.

7. Write short notes on: (**Any two**) 2×5

   a) Magnetic tape recorder

   b) Digital Multimeter

   c) RS-232 cable