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321504

December 2023

B.Sc. (Phy.) - V SEMESTER

Experimental Techniques

(DECP – 502A)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) Write the example of first and second order instruments. (1.5)

(b) How the power can be controlled in a circuit? (1.5)

(c) What is Johonson noise? (1.5)

(d) A Wheatstone bridge requires a change of 7 Ω in the unknown arm of the bridge to produce a change in deflection of 3 mm of the galvanometer. Determine the sensitivity. (1.5)

(e) What is precision? (1.5)

(f) A low pass filter has input of signal to noise ratio 2.0. If input voltage is 3 mV. Calculate the noise voltage. (1.5)

(g) Write two examples of Active transducer. (1.5)

(h) What is piezoelectric transducer? (1.5)

(i) Which gauge is used for the measurement of 5.6×10^{-7} Torr pressure? (1.5)

(j) Write the formula of mean free path. (1.5)

PART–B

2. (a) A set of current measurements were taken and readings were recorded as 11.3 mA, 11.6 mA, 10.9 mA, 12.1 mA, 12.5 mA and 11.9 mA. Calculate the average deviation. (10)

   (b) Write a short note on chemical earthing. (5)

3. (a) A resistance, wire strain gauge with a gauge factor of 2 is bonded to a steel structural member subjected to a stress of 100 MN/m^2. The modulus of elasticity of steel is 200 GN/m^2. Calculate the percentage change in the value of the gauge resistance due to the applied stress. (5)

   (b) Explain the strain gauge theory with example. (10)

4. Explain the different principles of working of capacitive transducers. (15)

5. (a) Write a short note on comparison of digital and analog instruments. (5)

   (b) Explain the working principle of LCR bridge with block diagram. (10)

6. (a) Explain in detail of Geiger Muller Tube. (10)

   (b) Write a note on Scintillation detector. (5)

7. Draw the neat sketch of vacuum system and explain the working of diffusion pump. (15)