QP CODE: 25020379

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE / MERCY CHANCE EXAMINATIONS, FEBRUARY 2025

Sixth Semester

CHOICE BASED CORE COURSE - PH6CBT04 - INSTRUMENTATION

Common for B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics, B.Sc Physics Model II Computer Applications & B.Sc Physics Model III Electronic Equipment Maintenance

2017 Admission Onwards

26DA5643

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Write a note on mechanical instruments.
2. Explain intelligent instrumentation systems.
3. Which are the main functional elements of a measurement system?
4. What do mean by transducer response?
5. How is bath tub curve associated with failures of transducers?
6. Give the structure of a rotary POT.
7. Write a short note on construction of thermistor.
8. Describe the uses of LVDTs.
9. What are synchros? Write their uses.
10. Write the major advantages of capacitive transducers.
11. Give the applications of photovoltaic cell.
12. Differentiate between piezoelectric effect and piezoresistive effect.

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Write a note on Deflection type instruments.

14. A flat circular diaphragm of with a diameter of 10 mm made of a material having 200 GN/m^2 and Poisson's ratio 0.28 experiences a pressure pressure of 30 kN/m^2.
    a) Find the thickness of the diaphragm if the maximum stress is 300 MN/m^2
    b) Calculate the deflection at the centre for a pressure of 150 kN/m^2.

15. Describe the devices used for measurement of flow in open channels.

16. Differentiate between analogue and digital transducers.

17. With the help of a diagram explain unbonded metal strain gauges.

18. Differentiate between linear approximation and quadratic approximation in resistance thermometers.

19. How a variable inductance transducer works on principle of change of self induction?

20. a) Explain the working of hall effect transducers.
    b) A Hall effect transducer is kept in a magnetic field of 0.5 Wb/m^2 Calculate the Hall voltage developed if the thickness of sensor is 2.5 mm and Hall's coefficient is $-1.5x10^{-6}$ $Vm/(A\ Wb\ m^{-2})$ and the current is 3 A.

21. Why digital transducers are called encoders? What are their major categories?

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. Explain meaningful measurements. Which are the different methods of measurements?

23. Mechanical spring devices can be used as the primary detectors for the force measurement, explain.

24. Briefly explain the construction of thermocouples. How is its output measured?

25. Explain the working and construction of a photo voltaic cell.

(2×15=30)