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Reg. No. : .....

Name : .....

ALL SAINTS COLLEGE LIBRARY TRIVANDRUM

Sixth Semester B.Sc. Degree Examination, April 2022

First Degree Programme under CBCSS

Physics

Elective Course

PY 1661.1 – ELECTRONIC INSTRUMENTATION

(2014 & 2017 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences. **Each** question carries **1** mark.

1. What is a standard of measurement?
2. What is the basic difference between primary and secondary standards?
3. What will happen to the electron beam of oscilloscope when voltage is applied to the vertical and horizontal plates simultaneously?
4. What are the important requirements of a sweep generator?
5. What is an attenuator?
6. Why does the selectivity requirement in fundamental suppression harmonic distortion analyser be not severe?
7. What is piezoelectric effect?

P.T.O.

8. What does radiation pyrometer measure?

9. A basic meter shows full scale deflection for 1 mA. If it has to be used as a dc voltmeter, what is its sensitivity?

10. Which are the common materials used as shunt for ac and dc instruments?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions, not exceeding a paragraph. Each question carries **2** marks.

11. Distinguish between accuracy and precision.

12. What is instrumental error? How can it be avoided?

13. Subtract 123±4 from 321±4.

14. Give the basic diagram of a CRT.

15. What is the function delay line in oscilloscope?

16. What is the use of signal generators? What are their characteristics?

17. What is harmonic distortion?

18. List out any four advantages of resistance thermometers.

19. Explain the differences between an instrumentation amplifier and an ordinary op-amp.

20. Which are the different phenomena employed in the transduction elements of transducers?

21. Give any two applications of the wave analyser with a brief explanation.

22. Write notes on Aryton shunt.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks.

23. Evaluate $\frac{22.3 \times 1734}{30.02} + 24.36 - 0.0625$. All the digits in the expression are significant.

24. A length was calculated to be 5.80 m, but the absolute length was 5.72 m. Calculate the absolute, relative and percentage errors.

25. What is the minimum distance that will allow full scale deflection of 4 cm at the oscilloscope screen with a deflection factor of 100 V/cm and accelerating potential of 2500 V?

26. With the help of block diagram, explain how multiple trace oscilloscopes work.

27. Derive the expression for the period of oscillation in an astable multivibrator.

28. A resistance strain gauge with a gauge factor of 3 cemented to a steel member. It is subjected to a strain 1.5×10^{-6}. The original resistance of the gauge is 150 Ω. Calculate the change in resistance.

29. Give a brief description on different types of thermocouples.

30. Calculate the value of the multiplier resistance on the 50 V range on a dc voltmeter that uses 100 μA meter movement with internal resistance of 200 Ω.

31. A 2 mA meter movement with an internal resistance 200 Ω is to be converted to 0-250 mA ammeter. Calculate the shunt resistance required.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks.

32. Explain the working of a storage oscilloscope.

33. Describe the working of a frequency synthesizer.

34. Discuss about photosensitive transducers.

35. Give a detailed account of integrating type DVMs.

(2 × 15 = 30 Marks)
