

FACULTY OF ENGINEERING

B.E. III/IV Year (ECE) I Semester (Supplementary) Examination, May 2006

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Time : 3 Hours]

[Max. Marks : 75

Answer all questions of Part A.

Answer five questions from Part B.

Part A - (Marks : 25)

1. A Voltmeter having a sensitivity of $1000\Omega/V$ reads 100V on its 150V scale when connected across an unknown resistor in series with milli ammeter calculate the error due to loading effect of voltmeter. 3

2. Match the Statements: 3

Group A

Group B

- | | |
|--|----------------------------------|
| (a) Hotwire Hotfilm Anemometer is used for | (i) Measurement of humidity |
| (b) Hygrometer is used for | (ii) Measurement of liquid level |
| (c) Nucleonic Gauge is used for | (iii) Measurement of Temperature |
| | (iv) Measurement of fluid flow |
| | (v) Measurement of pH value |

3. Write the principle of Electrodynamical microphone. Mention its applications. 3

4. Explain Seebeck effect with reference to Thermocouple.

5. What is the main difference between the principle of operation of a wave analyser and spectrum analyser.

6. What is meant by $4\frac{1}{2}$ digit DVM? Find its resolution.

7. An electrically deflected CRT has a final anode Voltage of 2000V and parallel deflecting plates 1.2cm long and 5mm apart. If the screen is 50 cm from the centre of deflecting plates find Beam speed and deflection sensitivity of tube.

8. Show the NRZ recording of digital data for "11001011" data. 2

9. Compare the performance of different types of DVM's. 3

10. Explain the terms Action potential and resting potential.

Part B – (Marks : 5 × 10 = 50)

- 11. (a) Explain what do you understand by random errors. How do you reduce the effect of these errors in the measurement? 7
(b) Briefly give the classification of standards. 3
- 12. Draw the equivalent of Piezo Electric Transducer (PZT) and derive the expression for frequency response of PZT. Show that they are not suitable for static measurements.
- 13. A parallel plate capacitive transducer has plates of 600 mm^2 area which are separated by air by a distance of 0.2 mm . The resistance of the transducer is $20 \times 10^6 \Omega$. Calculate the time constant of the transducer and find the attenuation of the output at 1000 Hz . The permittivity of air is $8.85 \times 10^{-12} \text{ F/M}$. 10
- 14. (a) With a neat Schematic, explain the construction and operation of condenser type microphone. 4
(b) What is the use of Aluminium Oxide Hygrometers and feedback Pneumatic Load Cell. Explain their functioning. 6
- 15. The following sound pressure levels are measured for a machine working in Textile industry operating in a noisy environment: 10
(a) SPL of machine and background noise = 90 dB
(b) SPL of background noise = 80 dB
Determine the SPL of the machine alone.
- 16. Indicate the manifestation of the ECG signal on lead II and label all its component parts making the appropriate amplitudes and durations in a normal human subject. Explain what is happening electrically with in the heart during each wave or interval.
- 17. Write short notes on :
(a) Temperature Measurement
(b) GPIB Interface and protocol.