ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : DECEMBER 2009

REGULATIONS : 2007

FIFTH SEMESTER : ELECTRICAL & ELECTRONICS ENGINEERING

070280033 – MEASUREMENTS & INSTRUMENTATION

TIME : 3 Hours **Max.Marks : 100**

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. What is the difference between fundamental and derived units?
2. Why is damping mechanism provided in electrical measuring instruments?
3. How is dynamómeter type instrument used as an ammeter for measurements of small currents?
4. A moving coil instrument has a resistance of 10Ω and gives a full-scale deflection when carrying 50mA.Show how it can be adopted to measure voltage up to 750V and current 100A.
5. Explain why you cannot measure power in ac circuits using an ammeter and voltmeter.
6. The rotating system of the energy meter is made as small as possible. Why?
7. What is trivector meter?
8. The disc of an energy meter makes 600 revolutions per unit of energy. When a 1000 watt load connected, the disc rotates at 10.2 rpm. If the load is on for 12 hours, how many units are recorded as error?
9. For low resistance measurements by Kelvin's double bridge is superior than wheatone bridge-Justify
10. State the factors which affect the resistance of earthing system.
11. List the factors that may lead to inaccuracies in measurement by ac bridges.
12. What are the advantages and limitations of Anderson's bridge?

13. What are Rosettes?
14. Give three basic requirements of a Transducer.
15. What are thermistors?
16. Why is the frequency of the excitation of primary winding of LVDT kept very high as compared to the frequency of the signal being measured?
17. What are the factors for the selection of a voltmeter?
18. What is dual trace oscilloscope?
19. What is the dynamic range of a spectrum analyzer with third order intercept point of +25 dbm and noise level of -85 dbm?
20. What are strip-chart recorders?

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. a Derive the torque equation of Electrodynamic type instrument 8

    b Calculate the reading of an electrodynamometer when a current $i(t) = 80 - 60\sqrt{2}\sin(wt + 30°)A$. 4

22. Give the construction and principles of operation of single phase Induction type energy meter

23. Describe how Schering bridge can be used for measurement of un unknown capacitance and its loss angles. Derive the conditions for balance and draw the phasor diagram of the bridge under balanced conditions.

24.	a	Explain the operating principles of Resistance strain gauge and derive the gauge factor	8
	b	State merits and demerits of Thermocouple	4
25.	a	Explain the principle of operation of a staircase ramp digital voltmeter with the help of block diagram	8
	b	Explain the following the terms used in digital displays (i) Resolution (ii) Sensitivity (iii) Accuracy of digital meters	4
26.	a	The ratio of error of a given 1000/5 A CT is zero when feeding 5VA,upf burden at rated current. Estimate the iron loss of the transformer at this operating condition if the secondary has 198 turns and a winding resistance of 0.02 Ω. Neglect leakage reactance	6
	b	Write short notes on Instrument Standards	6
27.		Explain the construction and working principle of a single phase dynamometer type power factor meter. Discuss its limitations	
28.	a	Write short notes on X-Y recorders	6
	b	Discuss advantages and disadvantages of LVDT	6

*****THE END*****