

**B.E. DEGREE EXAMINATIONS: NOV/DEC 2010**

Third Semester

**ELECTRONICS AND INSTRUMENTATION ENGINEERING**

EEE264: Electrical Measurements and Instruments

**Time: Three Hours****Maximum Marks: 100****Answer ALL Questions:-****PART A (10 x 1 = 10 Marks)**

1. The resistance required for critical damping in a circuit is 1000ohms. The galvanometer circuit has a resistance of 800 ohms. Is the galvanometer circuit
  - a) Underdamped
  - b) Undamped
  - c)Overdamped
  - d)None of the above.
2. The operating magnetic field in an electrodynamicometer type of instrument has a flux density typically about
  - a) 1 Wb/m<sup>2</sup>
  - b)0.5 Wb/m<sup>2</sup>
  - c)0.05 Wb/m<sup>2</sup>
  - d) 0.005 Wb/m<sup>2</sup>
3. In an electrodynamicometer type of wattmeter:
  - a) The current coil is made fixed
  - b) The pressure coil is fixed
  - c) Any of the two coils ie current coil or pressure coil can be fixed
  - d) Both the coils should be movable
4. The controlling torque in single phase power factor meters is provided by:
  - a) Spring control
  - b) Gravity control
  - c) Stiffness of suspension
  - d) None of the above
5. Brooks deflectional potentiometer is used when the unknown voltage:
  - a) Is constant
  - b) Is varying at a slow rate
  - b) Is varying very quickly
  - d)All the above
6. The compensation is used in current transformers primarily for reduction of:
  - a) Phase angle error
  - b)Both ratio and phase angle errors
  - b) Ratio error, reduction in phase angle error is incidental
  - c)None of the above
7. A wheatstone bridge cannot be used for precision measurements because errors are introduced into on account of
  - a) Resistance of connecting leads
  - b) Thermo electric emfs
  - c) Contact resistances
  - d) All of the above.
8. The value of resistance of an earthing electrode depends upon:
  - a) Shape and material of electrode
  - b) Depth to which electrode is driven into earth
  - c) Specific resistance of soil
  - d) All of the above.
9. Maxwell's inductance-capacitance bridge is used for measurement of inductance of:
  - a)Low Q coils
  - b)Medium Q coils
  - c)High Q coils
  - d)Low and medium Q coils
- 10 Frequency can be measured by using
  - a)Maxwell's bridge
  - b) Schering bridge
  - c)Heaviside Campbell bridge
  - c) Wien's bridge

**PART B (10 x 2 = 20 Marks)**

11. When the ferromagnetic cores between poles of permanent magnet of d'Arsonval galvanometer cannot be used?
12. State the advantages of rectifier instruments?
13. Why it is difficult to use ordinary electrodynamic wattmeters in low power factor circuits?
14. What is creeping?
15. A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 ohm is balanced at 75 cm. Find the magnitude of the current if the standard cell is 1.45 V is balanced at 50 cm.
16. What are the advantages of using instrument transformers?
17. How the resistances are classified? Give their ranges.
18. A resistance of approximately 3000 ohms is needed to balance a bridge. It is obtained on a 5 dial resistance box having steps of 1000, 100, 10, 1 and 0.1. The measurement is to be guaranteed to 0.1 percent. For this accuracy, how many of these dials would it be worth adjusting?
19. What are the sources of errors in bridge circuits?
20. What is residual error?

**PART C (5 x 14 = 70 Marks)**

21. a) (i) What are the various methods available for the calibration of (7)  
ballistic galvanometer? Brief them with neat diagrams.  
(ii) Explain the construction and working principle of PMMC type (7)  
instruments.

**(OR)**

- b) (i) With neat diagrams explain the types of moving iron instruments (10)  
and also write general torque equation of the type.  
(ii) What are all the errors in Moving iron instruments? (4)
22. a) (i) Draw the diagram of the single phase induction type energy meter (10)  
and explain the working principle with necessary equations.  
(ii) What are all the compensations required in single phase energy (4)  
meters?

**(OR)**

- b) (i) Explain the construction and theory of operation of (14)  
electrodynamometer type wattmeter and also indicate the errors.

23. a) (i) Explain the construction and operating principle of current transformer and draw the characteristics. (7)
- (ii) What are all the errors present in the usage of current transformer? (7)  
And also explain the means to reduce these errors.

**(OR)**

- b) (i) What are the types of AC potentiometers available? Explain the drysdale polar potentiometer with necessary diagrams.
24. a) (i) What are the methods available for high resistance measurement?  
With neat diagrams explain.
- a) Loss of charge method  
b) Meggar

**(OR)**

- b) (i) Explain the measurement of high resistance with wheatstone bridge.  
Derive the equation for the bridge sensitivity
25. a) (i) Explain how self inductance of a circuit can be measured with the help of maxwell's bridge.

**(OR)**

- b) (i) With neat diagram and necessary equations explain how schering bridge is used for capacitance measurement.

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