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Question Paper Code : 52949

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third Semester

Electronics and Communication Engineering

EE 6352 – ELECTRICAL ENGINEERING AND INSTRUMENTATION

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the conditions to build up voltage in shunt generator.

2. Why series motor cannot be started without any load?

3. What is an ideal transformer and how does it differ from a practical transformer?

4. Define the all day efficiency of a transformer.

5. Write the principle of operation of three phase induction motor.

6. What is synchronous speed?

7. Define the term Accuracy and precision.

8. Write the merits and limitations of thermistor.

9. List the types of DVM.

10. What are the advantages of digital instruments?

PART B — (5 × 13 = 65 marks)

11. (a) With neat sketch explain the theory of operation of DC generator.

Or

(b) (i) Describe the characteristics of DC generators.   (7)

(ii) Write short notes on different types of DC motors.   (6)

12. (a) (i) Develop an equivalent circuit of a single phase two winding transformer referring to primary side.   (7)

(ii) Draw the phasor diagram for a single phase transformer supplying a leading power factor load and explain the diagram.   (6)

Or

(b) (i) Explains the principle of operation of an Auto-transformer. List the merits and demerits.   (6)

(ii) Draw the equivalent circuit of transformer and obtain the expression for efficiency.   (7)

13. (a) Explain the starting methods of single phase induction motors.

Or

(b) (i) Discuss torque equation of synchronous motor.   (7)

(ii) A factory takes 600 kVA at a lagging power factor of 0.6. A synchronous motor is to be installed to raise the power factor to 0.9 lagging when the motor is taking 200 kW. Calculate the corresponding apparent power (in kVA) taken by the motor and the power factor at which it operates.   (6)

14. (a) (i) Obtain the expression for step response of first order transducer. (7)

(ii) Explain the working of strain gauge.   (6)

Or

(b) (i) Explain the construction and working of LVDT. Also explain how the magnitude and direction of the displacement of core of LVDT is detected.   (7)

(ii) Describe the working and construction of RTD.   (6)

15. (a) (i) Explain the construction and working of digital multimeter. (7)

        (ii) Write neat diagram explain the operation of storage oscilloscope. (6)

Or

    (b) (i) Explain with neat diagrams the bridge balance condition for Maxwell's bridge. (7)

        (ii) Explain the working of Q meter with neat circuit diagram (6)

PART C — (1 × 15 = 15 marks)

16. (a) A 10 kVA, 115 / 115 V single phase, 50 Hz transformer has a full load efficiency of 97% at UPF and has an iron loss of 109 W. The transformer is now connected as an Auto-transformer to a 230 V supply. If it delivers a load of 10 kW at UPF to a 115 V circuit, calculate the efficiency of operation.

Or

    (b) A 37 kW, 500 VDC, compound machine when run as a shunt motor has a full-load efficiency of 88% and a speed of 800 rpm. The series field winding is added to increase the speed to 850 rpm. Calculate the efficiency and armature current under this new load condition. Given that the armature, series field, and shunt field resistances are 0.4 Ω, 0.1 Ω, and 250 Ω respectively. Assume that the output and constant loss remain the same.