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Reg. No. :

Question Paper Code : 70040

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Second Semester

Electronics and Communication Engineering

BE 3254 — ELECTRICAL AND INSTRUMENTATION ENGINEERING

(Common to Electronics and Telecommunication Engineering)

(Regulations – 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the feature of an ideal transformer.

2. Draw the no load equivalent circuit of a transformer.

3. Why commutator employed in DC machines?

4. What is the need of a starter to start the DC motors?

5. Write the speed control method of three phase induction motor from stator side.

6. Name the starting methods of synchronous motor.

7. Define calibration and classify its methodologies.

8. Classify the types of instruments.

9. List the various voltage are used in distribution system.

10. Recall any four the electrical safety precautions.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the construction and principle of operation of three phase transformer.   (13)

Or

    (b) What is autotransformer? Describe the working of step up and step down auto transformer.   (13)

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12. (a) Explain the construction details and principles of operation of a DC generator also derive its emf equation. (13)

Or

   (b) (i) Draw and explain the various characteristics of DC shunt and series motors. Also write its applications based on their characteristics. (7)

      (ii) Explain the principle of operation of stepper motor. (6)

13. (a) Describe the constructional details of squirrel cage and slip ring induction motors. Also discuss working principle of induction motor. (13)

Or

   (b) Name the different types of single phase induction motor and explain its operating principle with the help of neat diagram. (13)

14. (a) Enumerate three phase power measurement by two wattmeter method for balance load star connected system with relevant diagram. (13)

Or

   (b) With neat sketch describe the construction and working of an instrument transformer for measurement of current and voltage. (13)

15. (a) (i) Draw the power system structure and explain briefly. (5)

      (ii) What is earthing and explain any one type of earthing. (8)

Or

   (b) (i) Explain the construction details of ELCBs with necessary diagram. (8)

      (ii) Discuss the operation of switch fuse unit. (5)

PART C — (1 × 15 = 15 marks)

16. (a) A 5 kVA, 500/250 V, single phase transformer gave the following readings,

   O.C. Test :   500 V, 1A, 50 W (L.V. side open)

   S.C. Test :   25 V, 10 A 60 W (L.V. side shorted)

   Draw the equivalent circuit referred to primary and insert all the values in it.

Or

   (b) A single phase transformer has 350 primary and 1050 secondary turns. The primary is connected to 400 V, 50 Hz a.c. supply. If the net cross sectional area of the core is 50 cm^2, calculate

      (i) The maximum value of the flux density in the core

      (ii) The induced e.m.f. in the secondary windings. (15)

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