Reg. No. :

Question Paper Code : 30066

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

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. Define the voltage regulation of transformer.

2. Identify any two causes for harmonics.

3. What are universal motor?

4. State the EMF equation of DC machine.

5. Which is the most commonly used induction motor? Why?

6. Name any four applications where induction motors are used.

7. What is the difference between current transformer and potential transformer?

8. Which meter is used moving coil for measurement?

9. What is the need for Earthing?

10. Write the broad classification of circuit breakers.

PART B — (5 × 13 = 65 marks)

11. (a) Obtain the phasor diagram of single phase transformer when the secondary is loaded with capacitive load.

Or

    (b) A single phase transformer has 350 primary turns and 1050 secondary turns. The net cross sectional area of the core is $55 \, cm^2$. If the primary winding is connected to a 400v, 50Hz single phase supply, calculate.

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

        (ii) The voltage induced in the secondary winding.

12. (a) Derive the EMF and torque equation with circuit model of DC motor.

Or

 (b) Explain the characteristics of brushless DC motor.

13. (a) Explain the construction, principle and equivalent circuit of three — phase induction motor.

Or

 (b) Derive the torque equation of synchronous motor.

14. (a) Sketch the schematic diagram with the functional elements of an instrument. Explain the function performed by each of the element.

Or

 (b) Describe the operation and working principle of energy meter with its internal components.

15. (a) (i) Explain any one Earthing scheme.   (6)

   (ii) Give an overview for power system structure.   (7)

Or

 (b) (i) Explain how a fuse rating is selected.   (6)

   (ii) Discuss earth leakage circuit breaker.   (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Derive the equation for induced EMF of an alternator.   (7)

   (ii) Sketch the block diagram of DSO and highlight the salient features when compared with CROs.   (8)

Or

 (b) (i) Highlight the difference between synchronous motors and induction motors.   (7)

   (ii) With equivalent circuit, obtain the expression for efficiency and voltage regulation of transformer.   (8)

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