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Q 2227

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Third Semester

Electronics and Communication Engineering

EE 253 — ELECTRICAL ENGINEERING

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the different types of losses in a Transformer.

2. What are the necessary tests to determine the equivalent circuit of a transformer?

3. In every DC motor, a generator action occurs. Justify.

4. Why a DC series motor should not be started on no load?

5. Can a three phase Induction motor run at synchronous speed? Why?

6. A 3 phase, 6 pole, 50 Hz induction motor has a slip of 3% at full load, determine the speed at full load.

7. Why is the Ampere turns method called as Optimistic method?

8. What is meant by synchronous reactance?

9. What are the advantages of EHVDC transmission over AC transmission?

10. Define string efficiency of an insulator.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain how 3 phase power can be measured using two watt meters method.

    (ii) Obtain the expression for the total power and load power factor in terms of wattmeter W_1 and W_2.

Or

    (b) (i) Derive the condition for maximum efficiency of a transformer.

    (ii) For a 40 KVA, single phase transformer, the iron losses and full load copper losses are 350 W and 400 W respectively. Find the efficiency at unity power factor on full load and determine the load for maximum efficiency.

12. (a) (i) Draw the Speed-Torque characteristics of different types of DC motors.

    (ii) Explain the different methods of speed control of DC motors.

Or

    (b) (i) Explain the Swinburne's test to predetermine the efficiency of a DC machine.

    (ii) Obtain the expression for efficiency of the DC machine both as a motor and as a generator using the observations from the Swinburne's test.

13. (a) (i) Explain the construction and principle of operation of a 3 phase Induction motor.

    (ii) What is the condition for maximum torque under starting and running condition?

Or

    (b) (i) Why are the starters used for the starting of an induction motor?

    (ii) Explain the construction and operation of a Star-delta starter.

14. (a) (i) Derive an expression for the induced emf of an alternator.

    (ii) Explain the EMF method to determine the voltage regulation of an alternator.

Or

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(b) (i) Explain the construction and working of a Variable reluctance stepped motor.

(ii) Give the expression to find the step angle and resolution of a stepper motor.

15. (a) (i) Sketch and explain the structure of an electric power station and the voltage level at various points.

(ii) What are the advantages and disadvantages of underground cables?

Or

(b) What are the various types of insulator used in Overhead Transmission system and explain them in detail.

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