G 584

(Pages : 2)

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering/Automobile Engineering

ELECTRICAL TECHNOLOGY (MU)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all *questions.*
Each question carries 4 marks.

1. State the different methods of cooling of transformers.

2. Describe how torque is developed in a d.c. motor.

3. "An induction motor can be considered as a generalized transformer." Explain.

4. Explain, why a synchronous motor has no starting torque.

5. Explain the dynamic breaking of d.c. motor.

6. Explain the various features of traction drives.

7. State and explain Barkhausen criteria for oscillators.

8. Draw a positive clamper and explain its working with the help of sinewave input.

9. Distinguish between Latching current and Holding current of SCR.

10. List the different types of power diodes and explain their salient features.

$$(10 \times 4 = 40 \text{ marks})$$

Part B

Answer all *questions.*
Each full question carries 12 marks.

(6 marks)

11. (a) Describe the Swinburne's test for DC machines.

    (b) A d.c. shunt motor takes 50 A on full-load from 250 V mains. Its speed is to be raised by 40 % by weakening of the field flux. If the torque at the increased speed is 20 % more than that at the initial speed, find the percentage change in field flux. Take armature resistance as 0.5 Ω.

    (6 marks)

Or

Turn over

12. Open-circuit and short-circuit tests on a 5 kVA, 200/40 V, 50 Hz, 1-phase transformer gave the following observations :

OC test : 200 V, 1A, 100 W on l.v. side

SC test : 15 V, 10A, 85 W, with primary shorted.

   (a) Draw the equivalent circuit referred to primary and label the values. (6 marks)

   (b) Calculate the approximate regulation of the transformer of 0.8 p.f. lagging, and leading. (6 marks)

13. (a) With a neat sketch, explain the operation of direct on line starter used for an induction motor. (6 marks)

   (b) The no-load excitation of an alternator required to give rated voltage is 100 A. In a short circuit test with full-load current flowing in the armature the field excitation was 80 A. Determine the approximate excitation that will be required to give full-load current at 0.8 p.f. lag and at the rated terminal voltage. (6 marks)

Or

14. (a) Draw, and explain the torque-slip characteristics of three-phase induction motor, showing clearly the starting torque, maximum torque, and normal operating region. (6 marks)

   (b) Explain the different types of excitation schemes used for a synchronous machine. (6 marks)

15. (a) State and explain the functions of various converters employed in an electric drive. (6 marks)

   (b) What are the main factors which decide the choice of electrical drive for a given application ? (6 marks)

Or

16. Explain dynamic braking operation of 25 kV a.c. traction drive using thyristor converter fed d.c. motors.

17. Draw the circuit diagram of RC coupled potential divider bias CE amplifier and explain the function of each component.

Or

18. With a block diagram, explain the working of a CRO, highlighting the functions of each electrode in the CRT. Explain how a sine wave display is produced.

19. (a) Sketch the complete characteristics of SCR and explain the features. (7 marks)

   (b) Compare and contrast induction heating and dielectric heating. (5 marks)

Or

20. With a neat block diagram, describe the resistance welding. Explain the features of different timers used.

$[5 \times 12 = 60 \text{ marks}]$