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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Fifth Semester

Branch : Electronics and Communication Engineering

EC 010 504—ELECTRICAL DRIVES AND CONTROL (EC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. What is meant by critical resistance of DC Generator ?
2. Why does a single-phase induction motor require capacitor ?
3. List the different protection schemes required for SCR.
4. What is meant by four quadrant chopper ?
5. What is the need for V/f control in induction motor drives ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. An eight pole dc generator has a simple wave wound armature containing 32 coils of 6 turns each. Its flux per pole is 0.06 Wb. The machine is running at 250 r.p.m. Compute the induced armature voltage.
7. Determine the power delivered by a 440 V, 3-phase, 10 pole and 50 Hz synchronous motor delivering a torque of $\frac{50}{\pi}$ Nm.
8. Draw and explain any one of the triggering circuit of SCR.
9. A single phase full converter feeds power to RLE load with $R = 10 \Omega$, $L = 10 \text{ mH}$ and $E = 50 \text{ V}$ in continuous conduction mode. The AC source voltage is 230 V 50 Hz. What is the average value of load current for firing angle delay of 60° ?
10. Write short notes on chopper fed drives.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each question carries 12 marks.

11. (a) Explain the load characteristics of DC shunt generator. (6 marks)
(b) Discuss the different losses in shunt generator. (6 marks)

Or

12. (a) Explain the speed-torque characteristics of a DC shunt motor with respect to any one of its application. (8 marks)
(b) Explain the importance of Swinburne's test. (4 marks)
13. (a) Draw the equivalent circuit of a transformer and give the procedure to obtain the values of all the parameters for a given single phase transformer. (8 marks)
(b) Derive the e.m.f. equation of an alternator. (4 marks)

Or

14. (a) Draw the torque-slip characteristics of a three-phase induction motor and explain its stable and unstable portions. What is meant by pull out torque? (8 marks)
(b) What happens to the power drawn by an induction motor if its rotor is externally driven to synchronous speed? (4 marks)
15. (a) Narrate the constructional features of SCR with neat sketch. (6 marks)
(b) What is power diode and where are they used? (6 marks)

Or

16. (a) Narrate the constructional features of TRIAC with neat sketch. (6 marks)
(b) How can be obtain the functionality of TRIAC using SCRs. (6 marks)
17. Explain the principle of operation and application of UPS with neat block schematic.

Or

18. Explain the step down and step up chopper with neat circuit diagrams and mathematical expression for output voltage.
19. Explain different methods of speed control of DC motors.

Or

20. Explain the principle of rotor side control of the speed of three phase induction motor and its applications.

(5 × 12 = 60 marks)