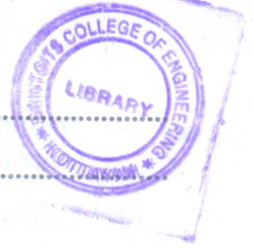F 3345

(Pages : 2)

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 703—DRIVES AND CONTROL (EE)

(New Scheme—2010 Admission onwards—Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 marks.

1. What are the functions of power modulators ?

2. Discuss the drawbacks of rectifier fed dc drives.

3. What is meant by constant torque and constant power operation ?

4. Compare VSI and CSI drives.

5. What are the disadvantages of dc traction ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 marks.

6. Explain the basic block diagram of an electric drive with functions of each block.

7. Explain the operation of two quadrant chopper fed dc drive.

8. Variable frequency control of an induction motor is more efficient than stator voltage control why.

9. Discuss about the regenerative braking of CSI fed drives.

10. What are the advantages and disadvantages of dc traction using PWM VSI induction motor drives ?

(5 × 5 = 25 marks)

Part C

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

11. What is meant by load equalisation ? Derive an expression for the moment of inertia of the flywheel required for load equalisation.

Or

Turn over

12. With neat circuit diagram and relevant waveforms, explain the operation of a single-phase fully controlled rectifier fed dc separately excited motor in the discontinuous conduction mode.

13. Explain the operation of dual converter fed DC motor drive.

Or

14. A 220 V, 1500 r.p.m., 50 A separately excited motor with armature resistance of 0.5 Ω, is fed from a 3 phase fully controlled rectifier. Available a.c. source has a line voltage of 440 V, 50 Hz. A star-delta connected transformer is used to feed the armature so that motor terminal voltage equals rated voltage. When converter firing angle is zero.

    (i) Calculate transformer turns ratio.

    (ii) Determine the value of firing angle when (a) motor is running at 1200 r.p.m. and rated torque; (b) when running at –800 r.p.m. and twice the rated torque. Assume continuous conduction.

15. Explain voltage source inverter fed induction motor drive with its multiquadrant operation.

Or

16. Discuss the different speed control methods of three phase induction motor.

17. Explain the operation of static Scherbius drive.

Or

18. Explain the operation of induction motor drive under fixed frequency and under variable frequency.

19. (a) Discuss the adjustable frequency operation of synchronous motors.   (7 marks)

    (b) What are the important features of traction drives ?   (5 marks)

Or

20. Explain self controlled synchronous motor drive employing load commutated thyristor inverter.

[5 × 12 = 60 marks]