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**Reg. No. :**

**Question Paper Code: 46031**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Sixth Semester

Electrical and Electronics Engineering

14UEE601 – ELECTRIC DRIVES AND CONTROL

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. What type electric drive is used in cranes?

(a) Maximum (b) Group (c) Individual (d) Both A& C

2. A four quadrant operation requires

(a) two full converters in series

(b) two full converters connected in parallel

(c) two full converter connected in back to back

(d) two semi converters connected in back to back

3. In a discontinuous mode of conduction for converter fed dc drive which is true

(a) Peak current increases (b) Average current increases

(c) RMS current decreases (d) average current decreases

4. What is the condition for continuous mode of conduction for converter fed dc drive

(a) Torque is greater than the rated torque (b) Torque is lesser than the rated torque

(c) Rated torque is greater than torque (d) Rated torque is lesser than torque

5. For an IM to operate in braking region slip should be always

(a) Less than zero (b) Greater than 1

(c) Is equal to 1 (d) None of these

6. A variable frequency variable voltage induction motor

(a) can be accelerated at constant torque or constant current

(b) suffer from poor starting characteristics as in the case of main feds motors

(c) has only stepped variation of speed

(d) suffers from stability considerations

7. By self control of a synchronous motor we mean that

(a) Elimination of torque ripple

(b) the speed of the motor is a function of input frequency

(c) the speed of the motor is varied in steps

(d) the input frequency is controlled from the speed of the motor

8. The operation of ac motors fed from current source inverters in characterized by

(a) Sinusoidal line voltage (b) Peaky armature voltage

(c) good harmonic torques (d) sinusoidal armature voltage with spikes

9. The transfer function is applicable to which of the following

(a) Linear and time-invariant systems (b) Linear and time-variant systems

(c) Linear system (d) Non linear System

10. Tachogenerator feedback is sometimes used in position control systems to

(a) Increases the effective damping

(b) decreases the effective damping

(c) improve the steady state response of the system

(d) Decrease the steady state response of the system

PART - B (5 x 2 = 10 Marks)

11. Mention the different factors for the selection of electric drives?

12. What is called continuous and discontinuous conduction?

13. What is meant by commutation of the current source inverter .

14. What is meant by margin angle of commutation?

15. What is field weakening control?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Classify and explain various types of load of electrical drive based on the speed-

torque characteristics. (8)

(ii)Discuss the various factors involved in the selection of electrical drives. (8) Or

(b) Illustrate in detail about the multi quadrant dynamics in the Speed torque plane. (16)

17. (a) Explain in detail the operation and steady state analysis of 1 phase fully controlled

converter fed dc drive with neat waveforms in continuous and discontinuous

conduction modes. (16)

Or

(b) The speed of a 125 HP, 600V, 1800rpm, separately excited dc motor is controlled by a three phase full converter. The converter is operated from a 3ɸ, 480V, 60 Hz supply. The rated armature current of motor is 165A.The motor parameters are Ra=0.0874Ω,La=6.5 mH and Ka ɸ=0.33V/rpm. The converter and ac supply are considered to be ideal. Compute i) No-load speeds at firing angles α=0 degree and α=300 degree. Assume that at no-load, the armature current is 10% of the rated current is continuous ii) Find the firing angle to obtain the rated speed of 1800 rpm at rated motor current. (16)

18. (a) (i) Explain the voltage/frequency (V/f) control of induction motor drives. (8)

(ii) Explain the closed loop speed control of CSI fed induction motor drives (8)

Or

(b) Explain in detail about the vector control for an induction motor. (16)

19. (a) (i) Explain self control of synchronous motor drive operated with constant margin

control. (8)

(ii) Explain power factor control of synchronous motor drive (8)

Or

(b) Explain in detail about the operation of permanent magnet synchronous motor drive in detail. (16)

20. (a) Explain in detail the design of speed controller of closed loop speed control system of

separately excited DC motor. (16)

Or

(b) Explain the armature voltage control with field weakening mode of closed loop

operation of separately excited DC motor drive. (16)