31 : 1st half.11-AM(m)

Con. 3108-11.   (REVISED COURSE)   **RK-3348**

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
     (2) Attempt any **four** questions from remaining **six** questions.
     (3) **Figures** to the **right** indicate full marks.
     (4) Assume suitable **data**, if any.

1. Attempt the following :—   20
     (a) With the help of block diagram, explain the operation of Online UPS system.
     (b) Explain Dynamic braking for D. C. motor.
     (c) What is time ratio control in D. C. choppers ? Explain the use of TRC for controlling the output voltage in choppers.
     (d) State the need of reduction of harmonics in inverter output.

2. (a) With the help of neat circuit diagram and waveforms, explain the operation of 10 isolated forward converter.
     (b) Explain the effect of source inductance on the performance of a single phase 10 fully controlled converter with neat diagrams and waveforms, indicating clearly the conduction of various thyristors during one cycle.

3. (a) Explain single pulse width modulation as used in PWM inverters.   10
     (b) With the help of circuit diagram and associated waveforms, explain the principle 10 of working of two quadrant (class C) chopper.

4. (a) State the various methods of speed control of Induction motor. Discuss the stator 10 voltage control method.
     (b) Describe the working of a single phase full converter fed D. C. separately excited 10 motor with circuit diagram, relevant waveforms and expressions.

5. (a) Explain the slip power recovery control of three phase Induction motor. **10**
   (b) A load commutated chopper, fed from a 230 V d. c. source has a constant load **10**
   current of 50 A. For a duty cycle of 0·4 and a chopping frequency of 2 kHz,
   calculate :—
       (i) the value of commutating capacitance.
       (ii) average output voltage.
       (iii) circuit turn-off time for one SCR pair.
       (iv) total commutation interval.

6. (a) Explain with diagram, the operation of series inverter. State its limitations. How **10**
   these limitations are overcome ?
   (b) The speed of a separately excited D. C. motor is controlled by a semiconverter. **10**
   The field current which is also controlled by a semiconverter is set to the maximum
   possible value. The A. C. input voltage is single phase, 208 V, 50 Hz. The armature
   resistance $R_a = 0·25\ \Omega$, $R_f = 147\ \Omega$ and the motor voltage constant
   $K_v = 0·7032$ V/A – rad/sec. The load torque is $T_L = 45$ Nm at 1000 rpm. Assume
   armature current to be continuous and ripple free, calculate :— (i) the field current
   I_f (ii) the delay angle of converter in armature circuit (α_a)

7. Write short notes on the following :— **20**
   (a) Parallel Inverter
   (b) Dual Converter
   (c) V/f control for Induction Motor.