Faculty of Engineering & Technology
Fourth Semester B.E. (Electronics)/ET/EC (C.B.S.)
Examination
POWER DEVICES & MACHINES

Time—Three Hours]   [Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

(1) All questions are compulsory.

(2) Due credit will be given to neatness and adequate dimensions.

(3) Assume suitable data wherever necessary.

(4) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What is an on state condition of thyristors ? Draw and explain $V_T.I_T$ characteristic of SCR.   7

    (b) Explain two transistor analogy of SCR.   7

OR

2. (a) With neat circuit, explain how a triac can be used as an AC regulator. Derive output voltage equation.   7

    (b) Draw a TRIAC phase control circuit and explain its principle of operation.   7

3. (a) Explain IGBT with the help of characteristic and symbol and also explain performance parameter of ·IGBT.   7

    (b) Give the comparison of IGBT with SCR.   6

www.solveout.in

4. (a) Explain GTO with the help of characteristic and symbol. 6

(b) Draw symbolic representation of n channel depletion type power MOSFET with characteristic. 7

5. (a) Explain single phase, halfwave controlled Rectifier with R-L load and sketch Load voltage waveform. 7

(b) A single phase half wave converter in following figure 5 (b) is operated from a 120 V, 60 Hz supply and the resistive load is R = 10 Ω. If average output voltage is 25% of maximum possible average output voltage calculate (i) delay angle (ii) the rms and average output currents.
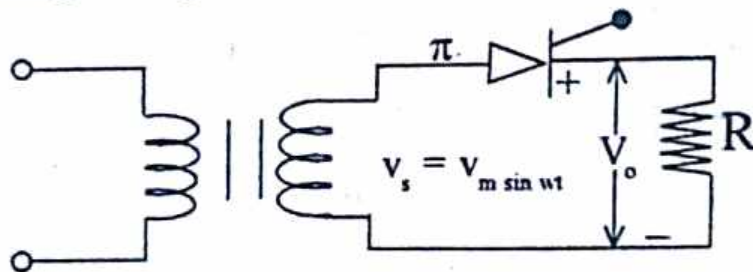

Fig 5 (b)

OR

6. (a) A single-phase AC voltage controller is supplied with 230 V ac voltage. If resistive load of 1 kW rating at 230 V rated voltage is connected to AC voltage controller calculate the firing angle if the load consume 50% power of its rated power at rated voltage. 6

(b) Explain with waveform three phase half wave controlled rectifier with resistive load. 7

7. (a) Explain the operation of step down chopper with circuit diagram and waveform. 6

(b) Draw and explain operation of two quadrant chopper. 7

OR

8. (a) Explain the operation of single Half bridge Inverter with wave form. (For resistive load) 6

(b) Explain the operation of 3 phase bridge Inverter in 180° conduction mode. Draw output and line voltage waveforms. 7

9. (a) What is open delta system ? What are the applications of this system ? 7

(b) A 500 kVA, 8 phase, 50 Hz transformer has a voltage ratio (line voltage) of 33/11/LV and is delta/star connected. The resistance per phase are : high voltage 35 Ω, low voltage 0.876 Ω and the iron losses is 3050 watt calculate the value of efficiency at full load and one half of full load (a) at unity p.f. (b) 0.8 pf. 7

OR

10. (a) Discuss various methods of speed control of 3 phase Induction motor. Explain any one method from stator side. 6

www.solveout.in

(b) Describe with construction diagram the working of :

    (i)   Star-Delta starter

    (ii)   Autotransformer starter.   8

11. (a) Explain working principle of operation of DC motor.

                                                        4

    (b) Write short notes on Ward-Leonard system of speed control.   5

    (c) Explain Flux control method of DC series motor.

                                                          4

OR

12. (a) A 240 V dc shunt motor takes 32 amp of line current. It the armature and field resistance are 1.2 Ω and 240 Ω respectively. If the load torque remains constant. Find the resistance inserted in series with the armature to halve the speed.   6

    (b) Explain with neat diagram construction and principle of operation of universal motor. State the application of universal motor.   7