

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

Time—Three Hours]

[Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
- (2) All questions are compulsory.
- (3) Due credit will be given to neatness and adequate dimensions.
- (4) Assume suitable data wherever necessary.
- (5) Illustrate your answers wherever necessary with the help of neat sketches.
1. (a) Draw the characteristics of SCR. Discuss the important operational features of SCR from the characteristic. 7
- (b) Explain the four modes of operation of TRIAC. 7

OR

2. (a) Explain the two transistor analogy of SCR. 7
- (b) With the help of characteristics explain operation of DIAC. 7

3. (a) Explain any one type of power MOSFET. 7
(b) Explain the construction and operation of IGBT. 6

OR

4. (a) Explain the construction and operation of G.T.O. 7
(b) Compare IGBT and SCR and Power MOSFET and TRIAC. 6
5. (a) Explain the operation of single phase half wave fully controlled converter for RL load. Also write equation of output voltage and current. 7
(b) What are the applications of cyclo-converter? 6

OR

6. (a) Explain principle and operation of single phase A.C. voltage controller for Resistive load. 6
(b) Explain the operation of three phase full wave controlled rectifier with resistive load. 7
7. (a) Explain class B chopper with voltage and current waveforms. 6
(b) Explain three phase bridge Inverter in 120° mode of operation. 7

OR

8. (a) Explain four quadrant operation of chopper. 6
(b) Explain working principle of single phase half bridge inverter for resistive load. 7
9. (a) Explain Star-Star and Delta-Delta connection of three phase transfer. 7
(b) Explain auto transformer starter for 3-phase Induction motor. 7

OR

10. (a) Write different condition for parallel operation of three phase transformer. Also discuss the necessity of parallel operation. 7
(b) What are different methods used for controlling speed of three phase Induction motor ? Explain any one method in detail. 7
11. (a) Explain Armature control method for speed control of D.C. shunt motor. 6
(b) What is Universal motor ? Explain with neat diagram construction and principle of operation, advantages and application of universal motor. 7

OR

Contd.

12. (a) Explain flux control method of speed control for D.C. series motor. 6

(b) A 250 V dc series motor draws a current of 60A while running at 600 rpm. The total resistance of the machine is 0.12Ω . Calculate the regulating resistance to be connected in series with the motor circuit to reduce the speed to 400 rpm, the torque being reduce to 60% of the previous value. Assume flux to be proportional to the current. 7