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Total No. of Questions : 09

B.Tech. (Electrical & Electronics Engg.) / (Electrical Engg.)   (Sem.–4)

POWER ELECTRONICS

Subject Code : BTEE-403-18 M.Code : 77608

Date of Examination : 07-07-22

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) Name the various components of a power electronic circuit, use a diagram to indicate them.

b) In a BJT, why is $\alpha < 1$, and $\beta > 1$?

c) List out the various thyristor communication techniques.

d) What do the following terms mean in context with power diodes (i) cut-in voltage (ii) peak inverse voltage.

e) Write a brief note on natural commutation in a thyristor.

f) Draw the RC firing triggering circuit.

g) Enumerate the industrial applications where phase-controlled rectifier is needed.

h) Enlist the main type of DC-DC converters. Which of these is more commonly used?

i) What type of conversion does an inverter do? List out a few applications of inverters.

j) Which are the two types of inverters? Distinguish between them.

SECTION-B

2. Elaborate upon the switching characteristics of an IGBT. Give some applications of IGBT.

3. Explain the following voltage commutation techniques

    (a) Impulse commutation

    (b) External pulse commutation.

4. A dc-dc boot converter has an input voltage of 200V and output voltage of 600V. If the conducting time of converter is 100 ⍰s, compute the pulse width of the output voltage. Further, if the output voltage pulse width is halved for constant frequency operation, find the average value of new output voltage.

5. Draw and discuss the load voltage and load current for steady operating conditions of a single phase full-bridge inverter connected to a resistive load.

6. Discuss the steady state analysis of principle of single phase voltage source bridge inverter.

SECTION-C

7. Discuss in detail a RL load connected to a single-phase rectifier circuit

8. Describe the principle of a dc-dc buck converter operation. Derive the expression of its output voltage.

9. Using appropriate diagrams describe the working of a single-phase half-wave inverter.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.