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B. E. (Eighth Semester) Examination, April-May, 2018

(New Scheme)

(ET &T Engg. Branch)

POWER ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) is each question is compulsory. Attempt any two parts from (b), (c) and (d).*

Unit-I

1. (a) Define input line regulation factor and load regulation factor of regulated power supply.

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(b) Explain with a neat circuit diagram the operation of buck-boost regulator. 7

(c) Explain the zener diode voltage regulator and analyze the operation under the condition of : 7

(i) Fixed Vs variable R_L

(ii) Variable Vs fixed R_L

(d) Explain the working of transistorized series voltage regulator. 7

Unit-II

2. (a) Define holding current and latching current. 2

(b) Explain class C commutation method of SCR. 7

(c) Explain the dynamic turn on characteristics of SCR. 7

(d) A relaxation oscillator using an UJT is to be designed for triggering an SCR.

The UJT has following data :

Intrinsic stand off ratio = 0·72

Peak current = 0·6 mA

Peak voltage = 18 V,

Valley current = 2·5 mA

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Valley v/g = 1·0 V

R_{BB} = 5 kΩ

Normal leakage current with emitter open = 4·2 mA.

The fering frequency is 2 kHz for C = 0·04 μF.

Compute the value of R, R_1, R_2 and V_{BB} 7

Unit-III

3. (a) What do you mean by chopper and where it is used? 2

(b) Explain single phase mid-point cycloconverter with the help of circuit diagram. 7

(c) With the help of neat sketch and waveforms. Explain the working of Jone's chopper. 7

(d) Explain the principle of DC chopper circuit. What purpose do they serve? 7

Unit-IV

4. (a) What is skin effect? 2

(b) Explain the principle of induction heating, enlist merits of induction heating over conventional methods.

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(c) Explain resistance welding. Explain operation of sequence timer used in resistance welding control. 7

(d) A work piece of dielectric material with size 20 cm × 15 cm × 1 cm (thick) is heated using frequency of 20 MHz and applied voltage of 750 V. If relative permittivity of material is 3 and power factor is 0·4. Calculate power developed per unit volume. 7

Unit-V

5. (a) Define sag and swell. 2

(b) Briefly explain with the help of block diagram operation of online and offline UPS. 7

(c) Define the following terms regarding power line disturbances : 7

(i) Brown-out

(ii) Black-out

(iii) Earth potential rise

(d) Write short notes on servo controlled voltage stabilizer. 7

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