

SEM-2-4 (RC 16-17)

F.E. (Semester – II) (RC 2016-17) Examination, Nov./Dec. 2018 FUNDAMENTALS OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Duration : 3 Hours

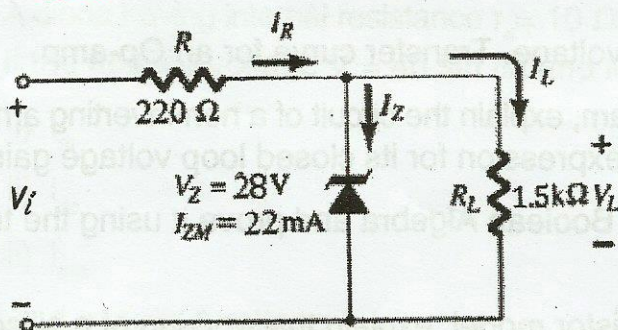
Total Marks : 100

- Instructions :**
- 1) Answer **five** questions. At least **two** from Part – A, **two** from Part – B, and **one** from Part – C.
 - 2) **Assume** suitable data if necessary.
 - 3) Figures to the **right** indicate **full** marks.

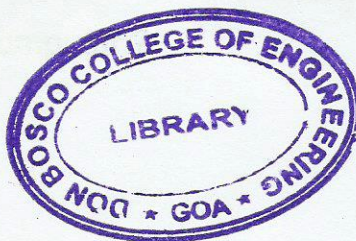
PART – A

Answer **any two** questions from the following :

1. a) With the help of neat sketch explain forward biasing of PN junction diode. 5
b) Draw the V/I characteristics of a Silicon Diode and explain the term Threshold voltage. 5
c) Differentiate between Avalanche and Zener breakdown. 5
d) Over what range of input voltages will the Zener diode circuit shown in figure below maintain 28 V across a 1.5 K load, assuming that series resistance $R = 200 \Omega$ and Zener current rating is 22 mA ? 5



2. a) Derive the relationship between α_{dc} and β_{dc} . 5
b) With the help of a neat circuit diagram explain the output characteristics of a npn BJT connected in CB configuration. 5
c) With respect to biasing circuits of a Bipolar junction transistor, explain the concept of thermal runaway. 5

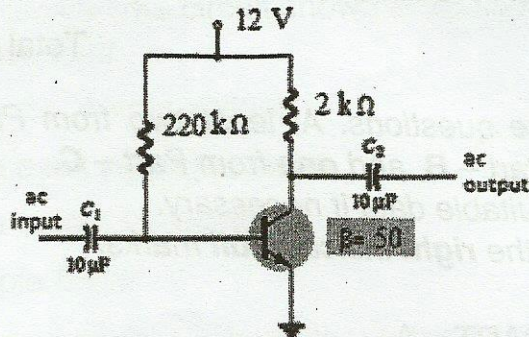


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d) For the fixed bias network shown below, determine the following :

5

a) I_{BQ} b) I_{CQ} c) V_{CEQ} d) V_{BC} e) I_{CSAT} 

3. a) Derive an expression for the rectification efficiency of a half wave rectifier.

5

b) Explain the construction and working of a light emitting diode.

5

c) With the help of a neat diagram explain the construction of N-channel JFET.

5

d) What are the various ways in which transfer characteristics of a JFET can be plotted ?

5

PART – B

Answer any two questions from the following :

4. a) Draw and explain the ideal voltage. Transfer curve for an Op-amp.

5

b) With the help of a neat diagram, explain the circuit of a non-inverting amplifier using op-amp and give the expression for its closed loop voltage gain.

5

c) State the associative law in Boolean Algebra and prove it using the truth table method.

5

d) With the help of a two-transistor model, explain the working of a silicon controlled rectifier.

5

5. a) With the help of neat diagrams, explain the construction, working and characteristics of a thermistor.

5

b) With the help of neat sketches explain the construction, working and characteristics of LVDT.

5





- c) What is a printed circuit board ? What are the advantages of having a PCB over point to point soldered circuit ? 5
- d) With the help of waveforms, explain the basic concept of frequency modulation. 5
6. a) Two square waves, A of 1 KHz and B of 2 KHz frequency are applied as input to the following logic gates. Draw the output waveform in each case. 5
- i) NOR gate.
- ii) XNOR gate.
- b) What do you mean by slew rate of an Op-amp ? What is the need for feedback in an op amp ? 5
- c) Explain the working principle of strain gauge. 5
- d) With the help of diagram explain the process of photolithography used for image transfer of artwork onto the board. 5

PART – C

Answer **any one** question from the following :

7. a) A diode having internal resistance $r_d = 10 \Omega$ is used for half-wave rectification. If the applied voltage $V = 40 \sin \omega t$ and load resistance $R_L = 810 \Omega$, find : 5
- i) I_m
- ii) I_{dc}
- iii) I_{rms}
- iv) d.c. output voltage
- v) efficiency of rectification.
- b) With the help of a neat diagram explain the construction of CMOS. 5
- c) What are the various ways in which a silicon controlled rectifier can be turned off ? 5
- d) How is a PLC different from a computer ? 5

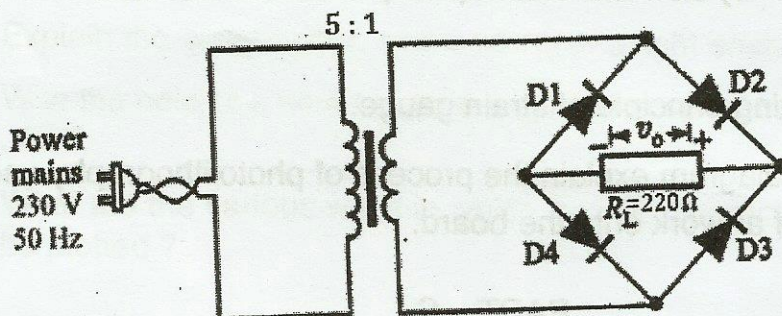


8. a) In the bridge type circuit shown in figure below, the diodes are assumed to be ideal. Find :

5

- i) the d.c. output voltage
- ii) the peak inverse voltage
- iii) the output frequency
- iv) ripple factor.

Assume primary to secondary turns ratio to be 5:1.



b) Differentiate between Emitter, Base and Collector.

5

c) With the help of logic diagrams, explain why NAND gate is called a universal gate.

5

d) Explain the following steps involved in the manufacturing of a single-sided printed circuit board :

5

i) Etching

ii) Coating.