WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Examination, 2020, held in 2021

ELSACOR05T-ELECTRONICS (CC5)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

SECTION-A

1. Answer any ***five*** questions from the following: 2×5 = 10

   (a) In a half wave rectifier circuit, the V_{max} of the applied input ac voltage is 12 V. Find the V_{DC} and V_{RMS}.

   (b) Why the emitter region of a transistor is more heavily doped than the base region?

   (c) When operated as a switch, which regions does a BJT switches between?

   (d) What is the necessity of using a filter in a rectifier?

   (e) What do you mean by Peak Inverse Voltage of a P-N junction diode?

   (f) A 4.7 V 0.25 Watt Zener diode is used as a voltage regulator. Calculate the value of resistor required in series with the Zener diode, if the maximum input voltage is 6 V.

   (g) Draw the circuit diagram of a bridge rectifier circuit.

   (h) Define the current amplification factor α and β of a transistor and write the relation between them.

SECTION-B

Answer any *six* questions from the following 5×6 = 30

2. (a) Draw the different current components in a *n-p-n* transistor, biased in active mode of operation. 2

   (b) Derive the relationship $I_c = \beta I_b + (1+\beta) I_{co}$, where the symbols have their usual meanings. 3

3. What is ripple factor? How can it be removed or minimized using a Π type filter? 2+3

4. (a) Make a comparative study of *Q*-point stability in the fixed bias and self-bias circuit. 3

   (b) Draw the equivalent circuit diagram of a small-signal low frequency CE transistor amplifier. 2

5. Draw the circuit and explain the operation of a shunt capacitor filter with waveforms. 5

6. A silicon *n-p-n* transistor with α = 0.995 and I_{co}= 15 nA, operates in the CE configuration. What is the collector current for a base current of 20 μA? 5

7. What do you mean by Base width Modulation and punch through effect in bipolar junction transistor? 5

8. Write a short note on Darlington Pair. 5

9. Deduce the Hybrid Parameters for a BJT in CE Mode from the concept of Two-Port Network. 5

10. What are the load and line regulation characteristics of a Zener diode? Write two disadvantages of Zener diode regulator. 3+2

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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