WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Examination, 2019

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.

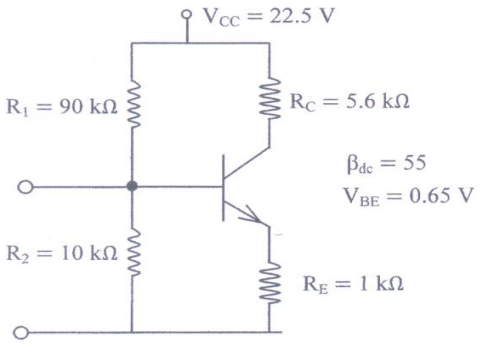
1. Answer any ***five*** questions from the following: 2×5 = 10
   (a) Define PIV in connection with a diode rectifier.
   (b) What is a clipping circuit?
   (c) Find the value of the current limiting resistance R_s, if a $\frac{1}{4}$ watt, 5.6 volt zener diode is connected to a 12 V supply.
   (d) What are the factors that affect the bias stability of a transistor?
   (e) What is thermal runaway in connection with transistor biasing?
   (f) Name the four feedback topologies.
   (g) What are the Barkhausen Criterion of oscillation?
   (h) What is Darlington connection?

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

2. (a) Explain how the dc output voltage of a full wave rectifier is improved when a capacitor filter is used. 3
   (b) Explain the significance of percentage voltage regulation. 2

3. Using *h*-parameter model of a transistor amplifier, derive expressions for current gain and input impedance in CE-mode without considering the resistance of the source. $2\frac{1}{2}+2\frac{1}{2}$

4. Find the Q-point (V_{CE}, I_C) of the following emitter-bias circuit 5



5. (a) Draw the circuit diagram of a two-stage RC-coupled amplifier. 2
   (b) Derive an expression of voltage gain in the mid frequency range. 3

6. (a) Explain with the help of a block diagram the working principle of a feedback amplifier. Find out an expression of voltage gain with feedback. 1+2
   (b) What are the advantages of negative feedback? 2

7. (a) Draw the circuit diagram of a class-B push-pull amplifier. 2
   (b) Explain its working principle. 3

8. (a) Draw the circuit diagram of a RC phase shift oscillator. 2
   (b) How is oscillation produced in this circuit? 1
   (c) Derive the condition of sustained oscillation. 2

9. (a) Draw a neat sketch of an emitter follower. 1
   (b) Why is it so called? 1
   (c) Write down the expressions for input resistance and voltage gain. $1\frac{1}{2}+1\frac{1}{2}$

10. (a) Explain the operation of an enhancement type MOSFET. 3
    (b) What is the difference between enhancement type and depletion type MOSFET? 2

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