

WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Examination, 2021-22

ELSACOR05T-ELECTRONICS (CC5)

Time Allotted: 2 Hours

Full Marks: 40

 $2 \times 5 = 10$

2+3

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.

GROUP-A

- 1. Answer any *five* questions from the following:
 - (a) Give two differences between an ideal diode and a practical diode.
 - (b) Differentiate between the centre-tapped full wave and bridge rectifiers.
 - (c) Write one application each of a clamper and a clipper circuit.
 - (d) Which types of bias would you apply to set a BJT in the following regions?
 - (i) Active region, (ii) Saturation region.
 - (e) What is the physical significance of a DC load line, drawn over a set of BJT output characteristics?
 - (f) Why the hybrid parameters are so called?
 - (g) Give two applications of Darlington pair connection.
 - (h) How the negative feedback can enhance the bandwidth of an BJT amplifier?

GROUP-B

Answer any *six* questions from the following $5 \times 6 = 30$

- 2. (a) What are the disadvantages of a Zener diode Regulator circuit?
 - (b) Find the efficiency of a centre-tapped full wave rectifier, assuming that the diode forward resistance is negligible compared to the load resistance of the circuit.
- 3. (a) If a sinusoidal input is given to the input of the circuit given below, what will be 3+2 the output? Draw the input and output waveform.



(b) What is ripple factor? How it gets reduced using a filter?

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- 4. (a) Sketch the output characteristics of CE configuration of a junction transistor and 3+2 indicate the different regions.
 - (b) What is thermal runaway?
- 5. Assuming the value of $\beta = 100$, find the emitter current of the BJT of the 5 following circuit.



- 6. Draw the frequency response of Common Emitter BJT amplifier. Find the value of 2+3 mid-band voltage gain using *h*-parameter model of the CE transistor amplifier.
- 7. Determine the range of values of V_i that will maintain the Zener diode of the 5 figure below in the "ON" state.



[Given: $R = 220 \Omega$, $V_z = 20 V$, $I_{z \max} = 60 \text{ mA}$, $R_L = 1.2 \text{ k}\Omega$]

- 8. (a) State Barkhausen criterion for sustained oscillation. 2+3
 (b) Draw and explain the working principle of a phase shift oscillator.
- 9. (a) What is CMOS? 1+(2+2)(b) Explain the working principle and give two applications of CMOS.

2+3

- (b) Explain the working principle and give two applications of envi
- 10.(a) What are the advantages of negative feedback?
 - (b) How is the input impedance of a voltage series feedback amplifier changed using negative feedback, calculate with the circuit diagram?
- 11. Draw the circuit diagram of a class B *npn* Push-Pull power amplifier using 2+3 transformer coupled input and explain the operation.
 - **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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