This question paper contains 5 printed pages.

3339 *Your Roll No.* .....

B. Tech. (EC) / II **J**

Paper III— ELECTRONICS
(EEC–203)

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Q. No. 1 is compulsory. Answer any four questions from the rest.

1. (*a*) What is the effect of temperature on the reverse saturation current of a diode?

   (*b*) Explain, how transistor can be used as a switch.

   (*c*) Why are MOSFETs more widely used than are the JFETs?

   (*d*) Mention *two* reasons why LC oscillators are preferred over RC oscillators at radio frequencies.

   (*e*) If two stages of a multistage amplifier have gains of 50 and 20, what is the dB voltage gain?

   (*f*) What are the drawbacks of transformer coupled amplifier?

   (*g*) What is the need for complementary symmetry amplifiers? 2×7=14

P. T. O.

2. (*a*) Draw and explain the circuit diagram of a full-wave rectifier using 2 diodes and sketch the waveforms. Derive its ripple factor and efficiency. 8

(*b*) Determine V_o and I_D for the series circuit of fig. 1. 6

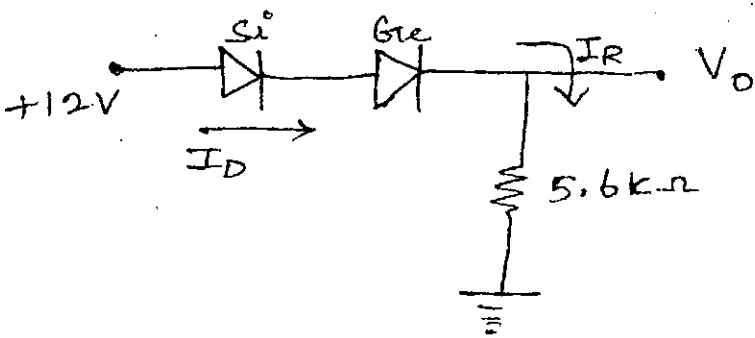

Fig. 1

3. (*a*) Sketch V_o for network of fig. 2 for the input shown in fig. 3.

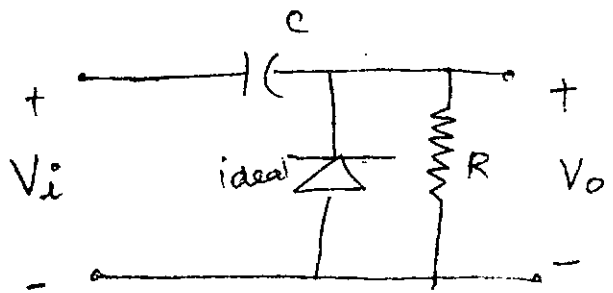

Fig. 2

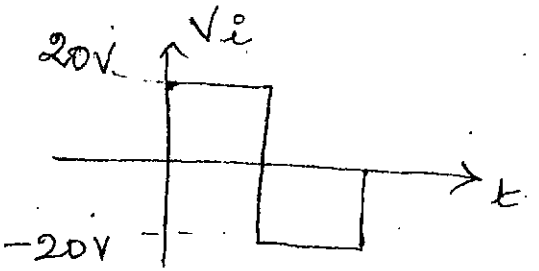

Fig. 3

(*b*) Determine the range of values of V_i that will maintain the Zener diode of fig. 4 in the "ON" state. 8

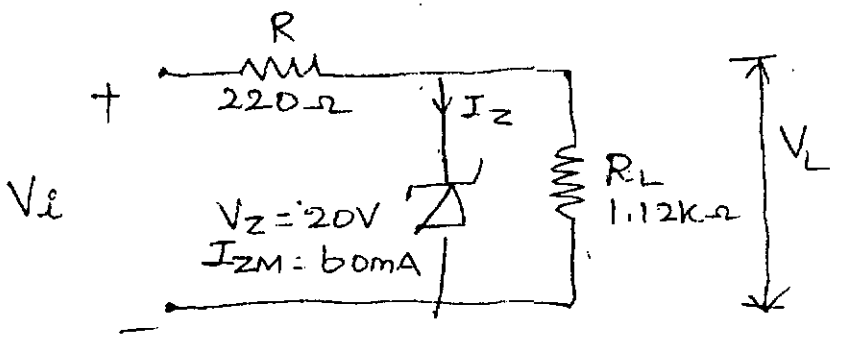

Fig. 4

4. (*a*) Why is biasing needed for a transistor to work as an amplifier? Explain with the help of neat diagram. 7

(*b*) For the circuit shown in fig. 5 determine V_{GS}, I_{DQ} and V_{DSQ}. 7

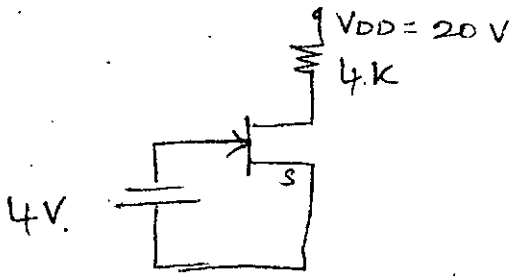

Fig. 5

5. (*a*) For the network of fig. 6, determine Z_i, Z_o, A_V and A_i. 7

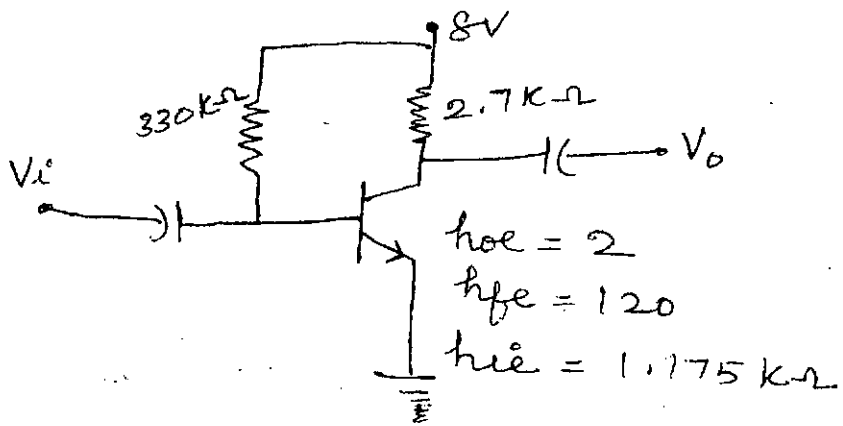

Fig. 6

(*b*) Determine the voltage gain, input and output impedance with feedback for voltage series feedback having $A = -100$, $R_i = 10$ kΩ, $R_o = 20$ kΩ for feedback of $\beta = -0{\cdot}1$. 7

6. (*a*) What do you mean by crossover distortion? Explain how it can be reduced. 7

(*b*) Explain briefly the differential amplifier circuit. 7

7. (*a*) Explain drain and transfer characteristics of Depletion-mode MOSFET. 7

(*b*) Draw and explain Widlar current source and derive the expression for it. 7

8. (*a*) Draw the circuit diagram of a class B push-pull amplifier and explain its operation. 7

(*b*) Derive the conditions of oscillation of tuned collector oscillator with neat circuit diagram. 7

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