CBCS SCHEME

USN | | | | | | | | | | |

First/Second Semester B.E. Degree Examination, June/July 2024
Basic Electronics

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Illustrate the working of p-n junction diode under forward and reverse bias conditions with the help of circuit and V-I characteristics. **(08 Marks)**

   b. With neat circuit diagram and waveform explain the working of center-tap full wave rectifier and derive the expression for average load current. **(08 Marks)**

   c. Determine the range of (V_i) in which zener diode as shown below conducts.

Fig.Q.1(c)

(04 Marks)

OR
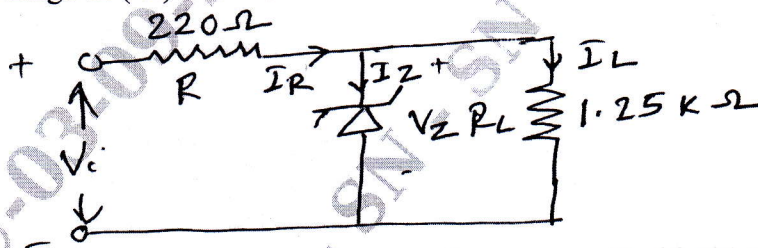
2 a. Explain the operation of zener diode as a voltage regulator with load and without load by using necessary circuit diagram. **(08 Marks)**

   b. Illustrate the operation of Light Emitting Diode (LED) and photo coupler. **(06 Marks)**

   c. A diode circuit shown below has E = 2V, R = 20Ω. By assuming V_f = 0.3V, calculate 'I_f' for i) r_d = 0   ii) r_d = 0.5Ω. **(06 Marks)**
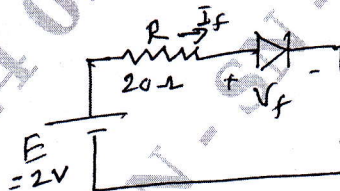

Fig.Q.2(c)

Module-2

3 a. Describe the differences between JFET and transistor. **(06 Marks)**

   b. A certain JFET has an I_{GSS} of -2nA for V_{GS} = -20V. Determine the input resistance. **(04 Marks)**

   c. Explain the construction and operation of JFET with necessary diagram. **(10 Marks)**

OR

4 a. What is MOSFET? Explain D-MOSFET and E-MOSFET transfer characteristics. **(08 Marks)**

   b. Describe the operation of a CMOS inverter. **(06 Marks)**

   c. Illustrate with diagram the operations of SCR using 2-transistor equivalent circuit. **(06 Marks)**

Module-3

5 a. Explain the working of Opamp non-inverting amplifier and obtain the expression for its voltage gain. **(08 Marks)**

   b. Define the following terms:
      i) Common mode gain
      ii) CMRR
      iii) Slew rate. **(06 Marks)**

   c. Find the output (Vo) voltage of the following op amp circuit. **(06 Marks)**
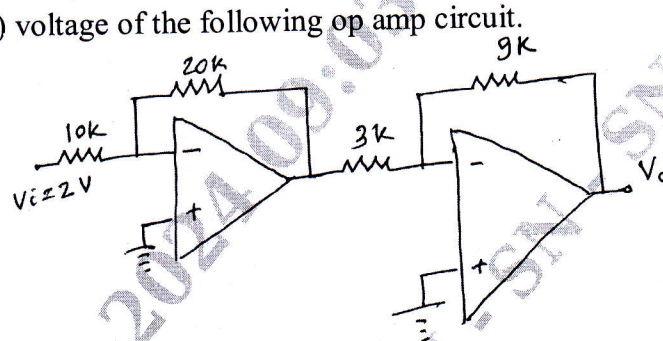

Fig.Q.5(c)

OR

6 a. Derive the output voltage for three input inverter summer circuit. **(08 Marks)**

   b. Explain the working of integrator and derive the expression for its output voltage. **(06 Marks)**

   c. Construct an adder circuit using op-amp to give the output voltage
   $V_0 = -(4V_1 + 6V_2 + 5V_3)$ **(06 Marks)**

Module-4

7 a. Define amplifier. Explain with neat circuit diagram and necessary equation how the transistor acts as a amplifier. **(08 Marks)**

   b. Construct an electronic switch using transistor and explain its operation with necessary equation. **(06 Marks)**

   c. Explain the Barkhausen's criteria to build oscillations. **(06 Marks)**

OR

8 a. Define feedback amplifier. Derive the expression for voltage gain (A_f) for voltage series feedback amplifier with relevant diagram. **(06 Marks)**

   b. Illustrate the operation of RC phase shift oscillator with neat circuit diagram and relevant equation. **(08 Marks)**

   c. Explain with neat diagram the astable operation of IC555 timer. **(06 Marks)**

Module-5

9 a. Solve the following:
      i) $(7354)_{10} = (?)_{16} = (?)_2$
      ii) $(FA27E) = (?)_2 = (?)_8$ **(06 Marks)**

   b. State and prove Demorgan's theorem using two variables. **(08 Marks)**

   c. Construct full adder using two half adders with relevant Boolean expressions. **(06 Marks)**

OR

10 a. What is decoder? Explain the working of 3:8 decoder with neat diagram. **(06 Marks)**

   b. Illustrate the working of a clocked SR flipflop with logic diagram and truth table. **(08 Marks)**

   c. Explain the GSM system with neat block diagram. **(06 Marks)**

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