CBCS SCHEME

USN

18ELN14/24

First/Second Semester B.E. Degree Examination, Jan./Feb. 2023
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. Explain the operation of PN junction diode under forward and reverse bias condition. **(08 Marks)**

b. Explain Zener diode as a voltage regulator. **(07 Marks)**

c. In a centre tap FWR, the forward resistance of the diode is 10Ω, the load resistance is 2KΩ, the voltage across half the secondary winding is 220V. Calculate the ripple factor and efficiency. **(05 Marks)**

OR

2 a. With a neat circuit diagram and wave forms, explain the working of centre tapped FWR and device the expression fro ripple factor and efficiency. **(08 Marks)**

b. Write short notes on :
i) Photo diode
ii) Light emitting diode. **(08 Marks)**

c. For the silicon diode shown in Fig.Q2(c). Calculate the current I_F for $R_1 = 4.7K\Omega$.

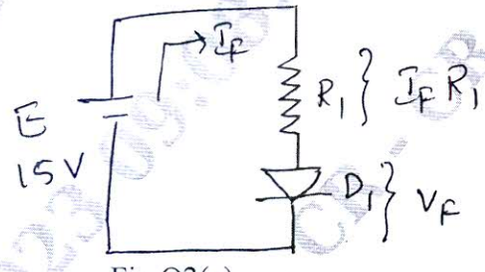

Fig.Q2(c) **(04 Marks)**

Module-2

3 a. Explain the construction and operation of JFET with necessary diagrams. **(08 Marks)**

b. Draw and explain VI characteristics of SCR. **(07 Marks)**

c. For JFET, if I_{DSS} = 9mA, and $VGS_{(off)}$ = –8V(max), calculate the value of I_D for V_{GS} = 0, and V_{GS} = –1V. **(05 Marks)**

OR

4 a. With a neat diagram, explain the two transistor model of SCR. **(06 Marks)**

b. Explain the working of CMOS inverter. **(06 Marks)**

c. Explain the construction of enhancement type MOSFET. **(08 Marks)**

Module-3

5 a. Describe the characteristics of basic op-amp. List its ideal characteristics. **(08 Marks)**

b. Derive the expression for output of inverting amplifier. **(07 Marks)**

c. Design an adder circuit using an op amp to obtain an output voltage of $v_0 = -[3v_1 + 4v_2 + 5v_3]$. **(05 Marks)**

OR

6 a. Derive the expression for output voltage for the following :
i) Integrator ii) Voltage follower. **(08 Marks)**

b. Derive the expression for 3 input inverting summing amplifiers. **(08 Marks)**

c. An op-amp has a differential voltage gain of 100000 and common mode gain of 0.25. Determine the CMRR and express in decibels. **(04 Marks)**

Module-4

7 a. What is amplifier? Explain transistor as an amplifier. **(08 Marks)**

b. Define feedback amplifier. Explain different types of feedback amplifier. Derive the voltage gain for voltage series feedback. **(12 Marks)**

OR

8 a. Explain the operation of Wein-bridge oscillator. Derive the expression for frequency of Oscollation. **(08 Marks)**

b. Explain the working of astable oscillator using I_C = 555 timer. **(07 Marks)**

c. Explain transistor as a switch. **(05 Marks)**

Module-5

9 a. Convert the following :
i) $(186.75)_{10} = (?)_2 = (?)_{16}$
ii) $(11010.01101)_2 = (?)_{10} = (?)_{16}$. **(08 Marks)**

b. Simplify the following expressions and draw the logic circuit using basic gates.
i) $AB + ABC + A\bar{B}C + \bar{A}BC$
ii) $(A + B)(A + C)$. **(06 Marks)**

c. Realize full adder using two half adders. **(06 Marks)**

OR

10 a. What is multiplexer? Explain the working of 4 : 1 multiplexer. **(07 Marks)**

b. What is flipflop? Explain the working of JK flipflop. **(07 Marks)**

c. What is shift register? Explain the working of 4 bit shift register. **(06 Marks)**

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