CBCS SCHEME

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18ELN14/24

First/Second Semester B.E. Degree Examination, Jan./Feb. 2021
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 p-n junction diode under forward and reverse biased condition. **(08 Marks)**

b. Write a short note on :
i) Light emitting diode
ii) Photo coupler. **(06 Marks)**

c. Explain the operation of 7805 fixed IC voltage regulator. **(06 Marks)**

OR

2 a. With neat circuit diagram and waveform explain the working of a centre tapped full wave rectifier. **(08 Marks)**

b. Explain briefly the operation of a capacitor filter circuit. **(06 Marks)**

c. For the diode circuit shown in Fig.Q2(c), determine V_0 and I_D.

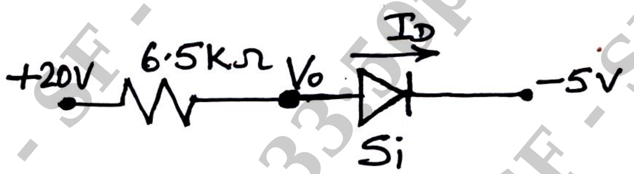

Fig.Q2(c) **(06 Marks)**

Module-2

3 a. Explain the characteristics of N-channel JFET. **(08 Marks)**

b. With neat circuit diagram, explain the working of CMOS inverter. **(08 Marks)**

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

OR

4 a. Draw and explain the operations of SCR using 2 – transistor equivalent circuit. **(08 Marks)**

b. Explain phase controlled application of SCR. **(06 Marks)**

c. Explain the construction and working of P – channel enhancement type MOSFET. **(06 Marks)**

Module-3

5 a. For an op-amp :
i) List the characteristics of an ideal ap-amp
ii) Draw the three input inverting summer circuit and derive the expression for its output voltage. **(08 Marks)**

b. Define the terms :
i) Slew rate
ii) CMRR
iii) Common mode gain AC of op-amp. **(06 Marks)**

c. Design an adder circuit using an op-amp to obtain an output voltage of $-[2V_1 + 3V_2 + 5V_3]$. **(06 Marks)**

OR

6 a. Derive an expression for the output voltage of a non-inverting amplifier. **(06 Marks)**

b. With a neat diagram, explain how an op-amp can be used as a integrator. **(06 Marks)**

c. A non-inverting amplifier circuit has an input resistance of 10KΩ and feedback resistance 60Ω with load resistance of 47KΩ. Draw the circuit. Calculate the output voltage, voltage gain, load current when the input voltage is 1.5V. **(08 Marks)**

Module-4

7 a. Briefly explain how a transistor used as an electronic switch. **(06 Marks)**

b. Explain how 555 timer can be used as an oscillator. **(06 Marks)**

c. Define an oscillator. Derive the equation for Wien bridge oscillator. **(08 Marks)**

OR

8 a. Explain the Barkhausens criteria for oscillations. **(06 Marks)**

b. Draw and explain the operation of a voltage series feedback amplifier and derive an expression for its voltage gain with feedback. **(06 Marks)**

c. Explain the operation of an RC phase shift oscillator. **(08 Marks)**

Module-5

9 a. Convert the following :

i) $(867)_{10} = (?)_2 = (?)_{16}$

ii) $(110111101.01)_2 = (?)_{10} = (?)_{16}$. **(08 Marks)**

b. Simplify the following expressions and draw the logic circuit using basic gates.

i) $Y = \overline{AB} + \overline{AC} + A\overline{B}\,\overline{C} + (\overline{AB + C})$

ii) $Y = A(\overline{ABC} + A\overline{B}C)$. **(06 Marks)**

c. Realize a full adder circuit using 2 half adders. **(06 Marks)**

OR

10 a. Perform the following :

i) Convert $(ABCD)_{16} = (?)_2 = (?)_8$

ii) Convert $(4477.85)_{10} = (?)_{16} = (?)_8$. **(08 Marks)**

b. Draw and explain 4-bit shift register. **(06 Marks)**

c. With a neat block diagram, explain the working of a communication system. **(06 Marks)**

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