CBCS SCHEME

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

18ELN14/24

First/Second Semester B.E. Degree Examination, June/July 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 how Zener diode can be used as a voltage Regulator with and without load resistance. **(07 Marks)**

b. Define the following parameters and mention its ideal values for both half wave and bridge rectifier
   i) Ripple factor
   ii) Power conversion Efficiency
   iii) PIV **(07 Marks)**

c. Explain the working of Light Emitting Diode and mention its Applications. **(06 Marks)**

OR

2 a. Draw the circuit diagram of a Full wave bridge rectifier and explain it. **(07 Marks)**

b. Draw the functional block diagram of the 78XX series voltage regulator and mention the function of each block. **(07 Marks)**

c. Write the ideal diode, piecewise Linear model and approximate model of a Diode with VI – characteristics. **(06 Marks)**

Module-2

3 a. Draw the Drain and Transfer Characteristics of N-channel JFET and explain it. **(07 Marks)**

b. Explain the working of CMOS inverter and also mention its Advantages. **(07 Marks)**

c. For JFET, $I_{DSS} = 6mA$, $V_p = -4.5V$, determine drain current at $V_{GS} = -2V$ and $-4V$. **(06 Marks)**

OR

4 a. Draw the characteristics of SCR and explain it. **(07 Marks)**

b. Explain the construction and operation of N-channel Enhancement type MOSFET. **(07 Marks)**

c. Compare FET with BJT and also write the square Law expression for drain current. **(06 Marks)**

Module-3

5 a. Define the following op-amp parameters and mention its ideal values
   i) CMRR ii) Slew rate iii) SVRR/PSRR iv) Input bias current. **(08 Marks)**

b. Design an adder circuit using op-amp to get the output $V_0 = -(0.1V_1 + V_2 + 10V_3)$. Assume $R_f = 10K\Omega$ and V_1, V_2, V_3 are the input voltages. **(06 Marks)**

c. What is differentiator and obtain the expression of output voltage using op-amp. **(06 Marks)**

OR

6 a. What are the op-amp input modes and explain it. **(08 Marks)**

b. For the op-amp circuit shown in Fig Q6(b), find V_0' and V_0

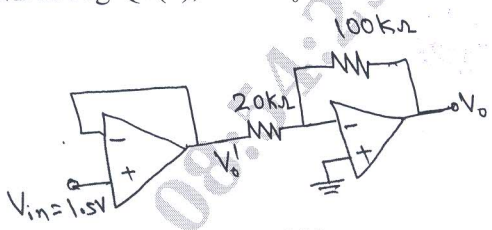

Fig Q6(b) **(06 Marks)**

c. Derive the expression of closed loop voltage gain of a non-inverting amplifier using op-amp. **(06 Marks)**

Module-4

7 a. Explain the operation of BJT can be used as a switch. **(07 Marks)**

b. Mention the properties and advantages of Negative feedback. **(07 Marks)**

c. State Barkhausen condition for oscillator. Write the circuit diagram, equations for sustained oscillation and frequency of oscillation. **(06 Marks)**

OR

8 a. Explain the operation of a Astable Multivibrator using IC-555 Timer and also write the equation of frequency of oscillation. **(07 Marks)**

b. Draw the transistor switch circuit to switch ON/OFF on LED and explain it. **(07 Marks)**

c. Design a wein bridge oscillator to get oscillation frequency of 5KHz. Assume R = 100KΩ and R_1 = 200KΩ. **(06 Marks)**

Module-5

9 a. Mention the differences between Analog and digital signals. Write the waveform for converting analog into digital signal. **(07 Marks)**

b. Convert the following :

i) $(FA876)_{16}$ in to Binary form

ii) $(345.75)_{10}$ into Hexadecimal

iii) $(0.705)_{10}$ into octal **(06 Marks)**

c. What is multiplexer? Implement 8 to 1 multiplexer using basic Gates. **(07 Marks)**

OR

10 a. Implement the following Boolean functions

i) $F = (A + C\overline{D} + \overline{D}\,\overline{E}$ using NAND Gates

ii) $F = (\overline{C} + A)(\overline{C} + B)$ using NOR – Gates **(07 Marks)**

b. Explain the operation of a JK-master slave flip-flop. **(07 Marks)**

c. Draw the block diagram of a cellular mobile radio unit and mention the functions of each block. **(06 Marks)**

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