CBCS SCHEME

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

17ELN15/25

First/Second Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Define the following diode parameters :
i) Static resistance ii) Dynamic resistance iii) Reverse saturation current
iv) Peak Inverse voltage v) Knee voltage. **(05 Marks)**

b. With circuit diagram and neat sketch, explain the common base input and output characteristics for pnp transistor. **(08 Marks)**

c. A full wave rectifier with a transformer secondary voltage 60V – 0 – 60V, supplies a load resistance $R_L = 2k\Omega$. The diode forward resistance R_f is 10Ω. Determine
i) maximum value of current in conducting diodes ii) dc value of current through R_L
iii) output dc voltage and iv) PIV across each diode. **(07 Marks)**

OR

2 a. With a neat circuit diagram and waveforms , explain the working of Bridge rectifier. **(08 Marks)**

b. A 9V reference source is to use a series connected zener diode and a resistor connected to 30V supply. If zener diode with $V_Z = 9V$, $I_{ZT} = 20mA$ is selected , then determine the value of series resistance and calculate the circuit current when the supply voltage drops to 27V. **(05 Marks)**

c. Define Common – base current gain and Common – emitter current gain of transistor. Derive the relationship between them. If a transistor has $I_C = 3mA$, $I_E = 3.03mA$, then find β of transistor. **(07 Marks)**

Module-2

3 a. With circuit diagram and necessary equations, explain the base bias circuit. **(05 Marks)**

b. For the voltage divider bias circuit using silicon transistor, $V_{cc} = 18V$, $R_1 = 33K\Omega$, $R_2 = 12K\Omega$, $R_c = 1.2K\Omega$ and $R_E = 1K\Omega$. Using approximate analysis, determine V_E , V_C , V_B , I_C and V_{CE}. **(08 Marks)**

c. With a neat circuit diagram, derive an equation for output voltage of non inverting amplifier using op - amp. **(07 Marks)**

OR

4 a. For the circuit shown in fig.Q4(a), find the Q – point values and draw the dc load line. The transistor has $V_{BE} = 0.7V$ and $\beta = 50$. **(07 Marks)**

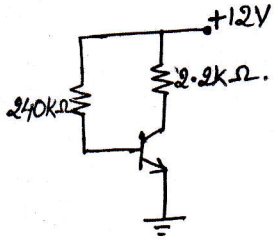

Fig.Q4(a)

b. Mention the characteristics of ideal op – amp. **(05 Marks)**

c. Calculate the output voltage for the circuit shown in fig.Q4(c). **(08 Marks)**

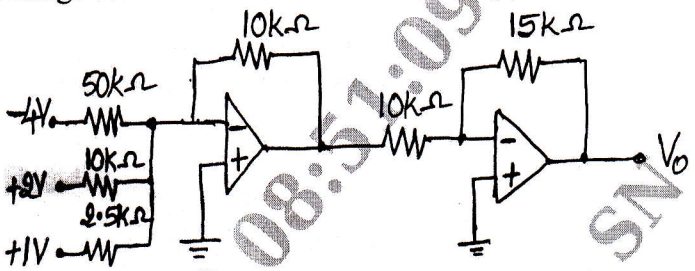

Fig.Q4(c)

Module-3

5 a. Convert the following : i) $(283.728)_{10} = (?)_8$. ii) $(AB.5E)_{16} = (?)_8$. **(06 Marks)**

b. Simplify $Y = \overline{A}BC + A\overline{B}C + ABC$ and then realize using
i) basic gates only ii) NOR gates only. **(08 Marks)**

c. Explain half adder circuit and realize using basic gates. **(06 Marks)**

OR

6 a. Subtract i) $(1011)_2 - (110)_2$ using 1's complement
ii) $(1001)_2 - (1110)_2$ using 2's complement. **(06 Marks)**

b. Draw the symbol and write the truth table of the exclusive – NOR gate and EX – OR gate. Realize the same using basic gates also. **(06 Marks)**

c. Simplify the following Bodean expressions :
i) $Y = A + \overline{A}B + ABC + A\overline{C}$ ii) $Y = (A + \overline{B} + \overline{C})(A + \overline{B} + C)$.
and realize using basic gates. **(08 Marks)**

Module-4

7 a. What is flipflop? Explain the operation of clocked RS flip flop. **(06 Marks)**

b. Explain the operation of NOR gate latch. **(06 Marks)**

c. With a neat block diagram, describe 8051 microcontroller. **(08 Marks)**

OR

8 a. Explain the operation of NAND gate latch. **(05 Marks)**

b. List the salient features of 8051 micro controller. **(07 Marks)**

c. Interface stepper motor to 8051 microcontroller with a neat block diagram. Explain its working principle, full step and half step sequence. **(08 Marks)**

Module-5

9 a. Explain the block diagram of communication system. **(06 Marks)**

b. The total power content of an AM wave is 2.64KW at a modulation index of 80%. Determine the power content of i) carrier ii) each sideband. **(04 Marks)**

c. Write a note on i) thermistor ii) photo electric transducer. **(10 Marks)**

OR

10 a. Give a comparison of AM and FM. **(06 Marks)**

b. With a neat circuit diagram, explain the demodulation of AM signal. **(06 Marks)**

c. Give the classification of transducers. Also mention the desirable properties of a good transducer. **(08 Marks)**

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