USN

ELN15/25

First/Second Semester B.E. Degree Examination, Dec.--21tr9/Jan.2020
Basic Electronics

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question rout 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 RL = 2ka The diode forward resistance Rf. is 1012. Determine
i) maximum value of current in conducting diodes ii) dc value of current through RE
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 Vz = 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 lc = 3mA, IE = 3.03mA, then find i3 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,, = 18V , R 1 = 33K51 12K11 , R_e = 1.2K0 and RE = I Ka Using approximate analysis, determine VE , Vc VB , Ic and Vcj. **(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 Vr = 0.7V and 13 = 50. **(07 Marks)**

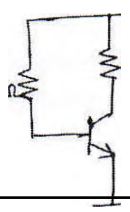

Fig.Q4(a)

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)**

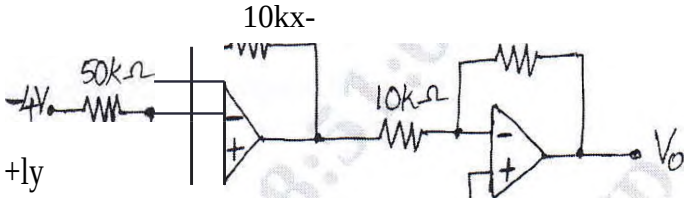

Fig.Q4(c)

Module-3

5 a. Convert the following : i) (283.728) $_{1}$0 = (?)8. ii) (AB.5E) $_{i6}$ = **(06 Marks)**

b. Simplify Y = A BC + ABC + 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 — (I 10)2 using l'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 + B + ABC + AC7 ii) Y = (A + 13) (A + 173 + 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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