

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 out 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, $V_{CC} = 18V$, $R_1 = 33K\Omega$, $R_2 = 12K\Omega$, $R_E = 1.2K\Omega$ and $R_C = 1K\Omega$. 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

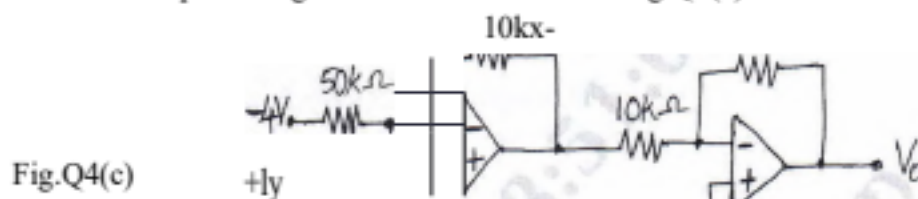
- 4 a. For the circuit shown in fig.Q4(a), find the Q — point values and draw the dc load line. The transistor has $V_{BE} = 0.7V$ and $\beta = 50$. (07 Marks)

Fig.Q4(a)



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- 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)



Module-3

- 5 a. Convert the following : i) $(283.728)_{10} = (?)_8$. ii) $(AB.5E)_{16} =$ (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) $(1011)_2 - (110)_2$ 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 Boolean expressions :
i) $Y = A + B + ABC + AC$ ii) $Y = (A + B)(A + C)$
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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