Bachelor level/ B. Sc. / 6th Semester

Time: 3 hours

Subject: Electronics (PHY461)

Full Marks: 60

Pass Marks: 30

Candidates are required to give their answer in their own words as far as Practicable. The figures in the margin indicate full marks.

Section – A

Attempt all long questions. [4x6 = 24]

1. Describe the comparison of common base, common collector and common emitter amplifiers.
2. Describe with circuit diagrams and characteristics of both enhancement and depletion type MOSFET.
3. What is Differential Amplifier? Analyze it with circuit diagrams and write some applications.

OR

Describe with circuit diagrams and characteristics of Master-Slave JK Flip-flop.

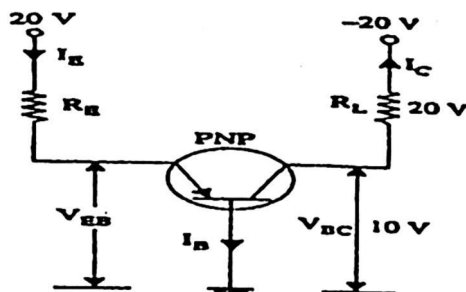4. For the circuit shown in figure 1, find the values of I_C, I_E and R_E which causes $V_{BC} = 10$ V.

Figure:1

Section- B

Attempt all Short questions. [6x4 = 24]

5. For the single stage CE amplifier circuit of a given figure 2, find approximate value of (i) r_{in} (ii) r_L (iii) A_V (iv) A_P. Take transistor $\beta = 100$ and $r_e' = 50$ mV/I_E.
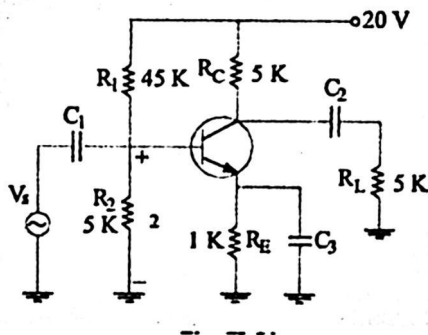

Figure:2

6. Calculate the upper cut off frequency of the CE amplifier shown in a given figure 3. Given the input wiring capacitance $C_{in} = 40$pF, $C_{bc} = 40$pF, $C_b = 40$pF and $\beta = 100$.
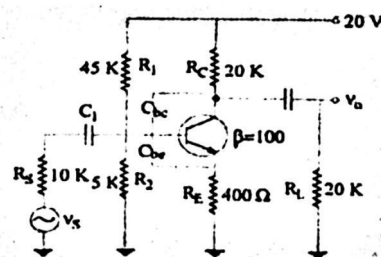

Figure:3

7. An RC-couple amplifier has a mid-frequency gain of 200 and a frequency response from 100 Hz to 20 kHz. A negative feedback network with $\beta = 0.02$ is incorporated into the amplifier circuit. Determine the new system performance.

8. Using superposition theorem, calculate current in each branch of network as shown in figure 4.
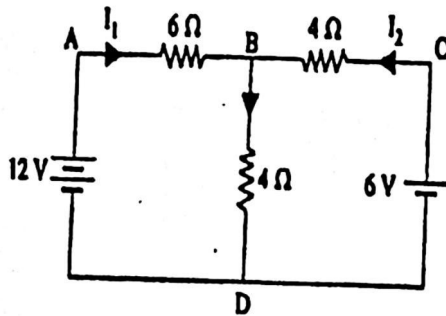

Figure:4

9. (i) Subtract -78 from -43 using 2's complement. (ii) Add +1101 and -1011 using 1's complement method.

10. Define and derive an expression of the frequency L-C oscillator.

OR

State and derive Norton's Theorem.

Section-C

Attempt *Any Six* very short questions.

[6x2 = 12]

11. State the π-Network with name of components of a neat diagram.
12. What is LED? Draw an electric circuit diagram of LED.
13. State and draw the circuit diagram of n-p-n voltage divider bias with names of components.
14. What do you mean by the positive and negative feedback of an amplifier?
15. Distinguishes between the n-channel and p-channel of JFET.
16. Write the characteristics of a power amplifier.
17. Express the truth table of Ex-OR gate.
18. State the laws of Boolean Algebra.

The End