B.Sc. DEGREE EXAMINATION APRIL 2024
BRANCH III - PHYSICS
SIXTH SEMESTER

COURSE   : MAJOR – CORE
PAPER   : ELECTRONICS II
SUBJECT CODE : 19PH/MC/EL63
TIME   : 3 HOURS   MAX. MARKS :100

SECTION – A

ANSWER ALL QUESTIONS: **(25 MARKS)**

I. CHOOSE THE CORRECT ANSWER: **(10 X 1 = 10)**

1. Dependent sources in network theory are also known as ____.
   a) Voltages sources   b) Controlled sources   c) Feedback sources
2. A node is referred to as a ____ node if there are only two circuit elements connected to it.
   a) Simple node   b) Register node   c) Direct node
3. Which among the below assertions is not a relevant property of CE amplifier?
   a)High current gain   b) High input resistance   c) High output resistance
4. What should be the level of input resistance to allow the occurrence of source loading in common base amplifier configuration?
   a) low   b) high   c) moderate
5. Comparing the size of BJT and FET, choose the correct statement?
   a) BJT is larger than the FET b) BJT is smaller than the FET c) Both are of same size
6. Which type of material is the channel of a unijunction transistor made up of?
   a) PN type   b) It doesn't affect the working   c) N type
7. A Differential Amplifier amplifies
   a) Input signal with higher voltage b) Input voltage with smaller voltage c) None of the Mentioned
8. Determine the output from the following circuit
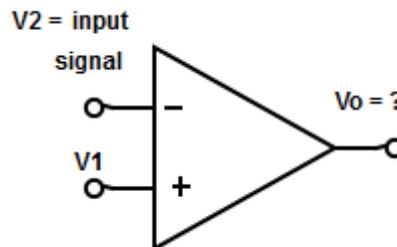
   a) 180º in phase with input signal b) 180º out of phase with input signal c) Same as that of input signal
9. The equivalent weight of LSB in a four-bit variable resistive divider D/A converter is
   a) 1/4   b) 1/16   c) 1/15
10. In a binary ladder (R-2R),D/A converter ,the input resistance for each input is
    a) R   b) 2R   c) 3R

## II. FILL IN THE BLANKS: (5 X 1 = 5)

11. According to Kirchhoff's Voltage Law (KVL), the algebraic sum of the voltages in a loop or mesh equals _____

12. The configuration in which input impedance of transistor amplifier is lowest is

    _____

13. The value of current when the gate to source voltage is less than the pinch off voltage

    _____

14. The input voltage of an ideal op-amp. It's one of the inputs and output voltages are 2v and 12v (Gain=3) _____

15. The maximum deviation between actual and ideal converter output after the removal of error is_____

## III. ANSWER BRIEFLY: (5 X 2 =10)

16. State voltage division rule.
17. Draw the symbols of JFET and MOSFET
18. Draw the circuit diagram of an OPAMP integrator
19. What are a load line and operating point?
20. Define accuracy and resolution of a D/A converter

SECTION – B

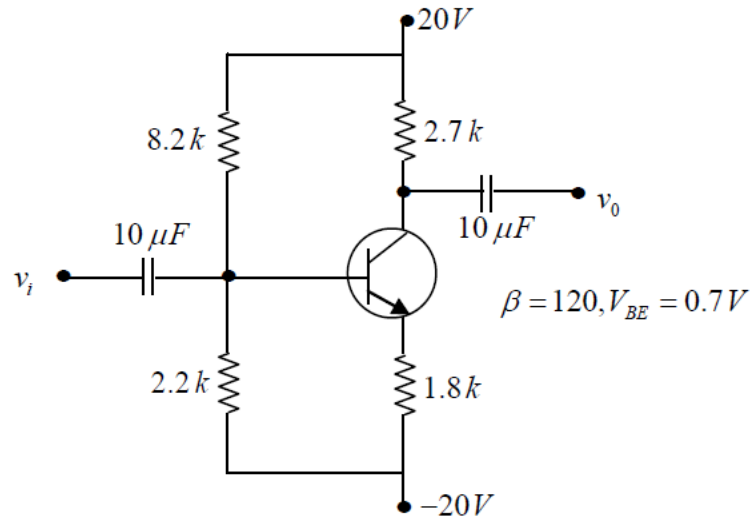## ANSWER ANY FIVE QUESTIONS: (5 X 6 = 30)

21. Find the current through 6 Ω resistor using Norton's theorem for the circuit shown in Figure
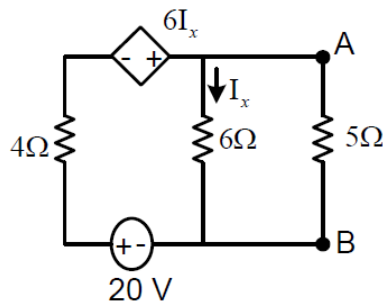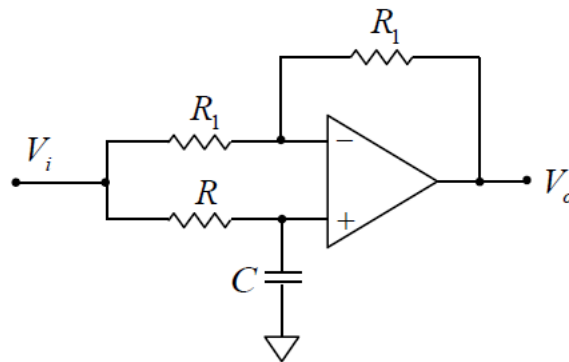

22. Using Superposition theorem find current across each element for the circuit shown in figure below
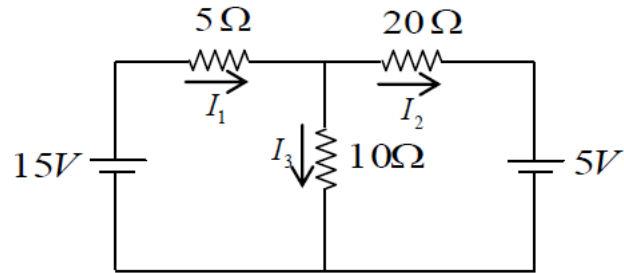
23. Determine the Dc level of V_c and V_B for the network shown in figure below

$$\beta = 120, V_{BE} = 0.7V$$
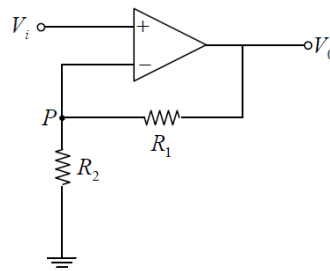
24. Consider the Op-Amp circuit shown in figure.

If $V_i = V_1 sin\ \omega t$ and $V_0 = V_2\ sin(\ \omega t + \phi)$, then find (a) magnitude of the gain (b) the phase angle (ϕ) at $\omega \rightarrow 0$ and $\omega \rightarrow \infty$

25. Differentiate between JFET and Bipolar Transistors.
26. With diagram, Explain the R-2R Ladder type D/A converter.
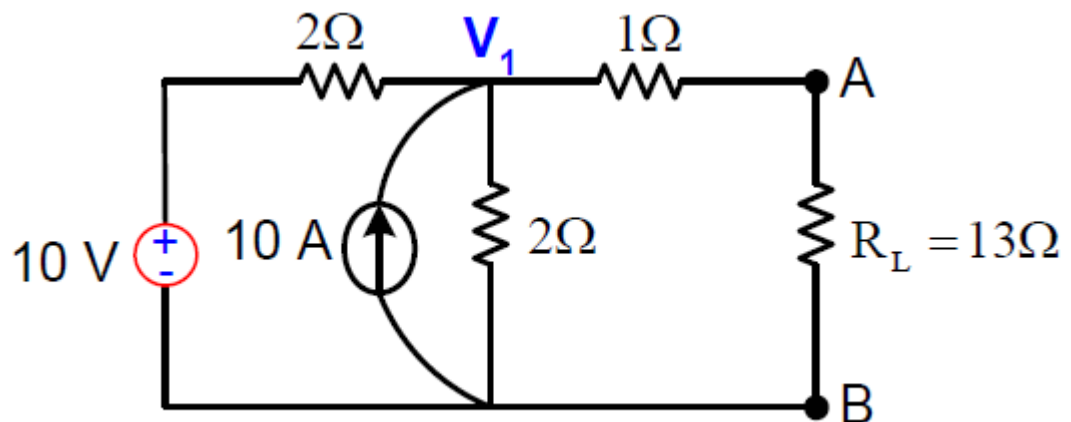27. In an ideal Op-Amp circuit shown below $v_i = V_1 \sin \omega t$

a) Find the amplitude of v_0.
(b) Find the peak value of current through R_1
(c) Find the peak value of current through R_2
(d) Find the peak value of potential at P.

SECTION - C   (3 X 15 = 45)

Answer any THREE Questions:

28. State Thevenin's theorem. For the circuit shown in Figure and the current through RL using

Thevenin's theorem.

29. With a neat diagram, explain the working of a single stage CE amplifier. Draw the frequency response curve and discuss the results,

30. Discuss the characteristics of UJT and explain its action as a relaxation oscillator, with a neat circuit diagram.

31. Using an OPAMP based analog circuit, solve the simultaneous equation
$$2x + y = 5 , x - y = 5.$$

32. With necessary theory, Explain the weighted resistor type D/A converter.

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