Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16 (Autonomous)
End Semester Examination: 2023-24
Faculty: Science and Technology

Program: B.Sc. Code (Gen03) **Semester: III** **SET: B**
Program (Specific): General B.Sc. **Course Type:** Core course
Class: S.Y.BSc (Gen) **Max. Marks:** 35
Name of the Course: Electronics **Time:** 2Hr
Course Code: 23-PHY-232(A)
Paper: II

Instructions to the candidate:

1) *There are 4 sections in the question paper. Write each section on separate page.*
2) *All Sections are compulsory.*
3) *Figures to the right indicate full marks.*
4) *Draw a well labelled diagram wherever necessary.*

SECTION: A

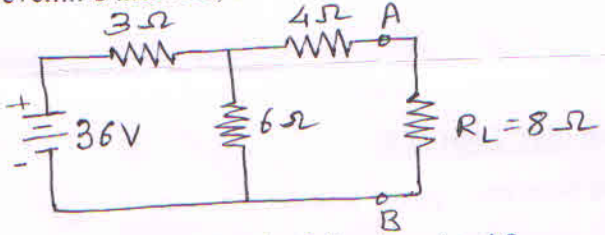
Q1) Answer the following (any 5 out of 7) 5

i) Draw circuit for voltage shunt feedback.
ii) Write two important applications of Unijunction Transistor (UJT).
iii) What is transistor?
iv) State relation between α and β in context with transistor.
v) State Thevenin's theorem.
vi) Find one's complement of 010011001.
vii) Convert $(1111)_2$ to decimal.

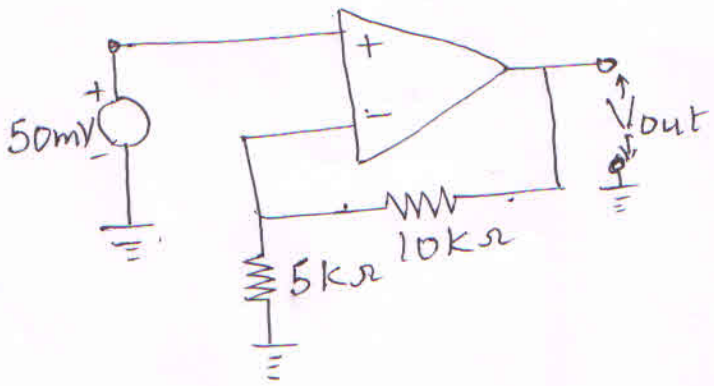
SECTION: B

Q2) Answer the following (any 5 out of 7) 10

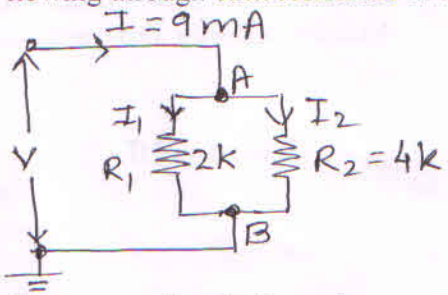
i) Using Thevenin's theorem, calculate current flowing through R_L in following circuit.



ii) What will be the output V_o for the following circuit?



iii) Find the current flowing through each resistance in the following circuit.



iv) What will be the frequency of oscillation when a combination of three resistances each value of 100Ω and three capacitors each of value 0.1μF are connected in phase shift oscillator using IC 741?

v) With the help of a neat diagram, explain the concept of virtual ground.

vi) Write a short note on Ex-NOR gate.

vii) Convert $(01011111011)_2$ to hexadecimal.

SECTION: C

Q3) Answer the following (any 4 out of 6) 12

i) Add the binary numbers.

a) 1011 and 1100 b) 0101 and 1111

ii) Convert $(3A9)_{16}$ to decimal.

iii) What is an oscillator? Give types of oscillators.

iv) Derive the equation for the gain of inverting Op-amp.

v) Explain biasing of common emitter transistor using base resistor method.

vi) Explain the construction of Unijunction Transistor (UJT).

SECTION: D

Q4) Answer the following (any 2 out of 4) 8

i) State and prove Maximum power transfer theorem.

ii) Explain the use of transistor as a switch with circuit diagram.

iii) Explain op-amp as subtractor with circuit diagram.

iv) State and prove De-Morgan's theorem.

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