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**[5216]-5**

**F.Y. B.Sc. (Computer Science) EXAMINATION, 2017**

**ELECTRONICS SCIENCE**

**Paper I**

**(ELC-101 : Principles of Analog Electronics)**

**(2013 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 80**

**N.B. :—** (i) All questions are compulsory.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

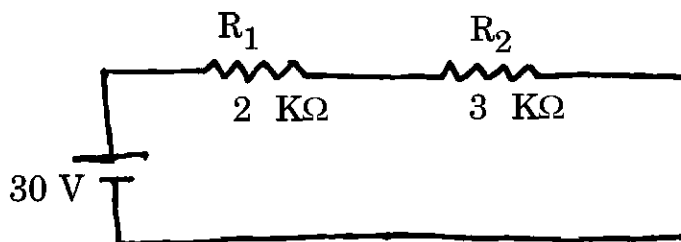
1. Attempt all of the following :

[8×2=16]

(a) List different types of switches.

(b) What is the difference between series clipper and parallel clipper ?

(c) Find out the voltage across each resistor in the following circuit.  
Verify KVL.

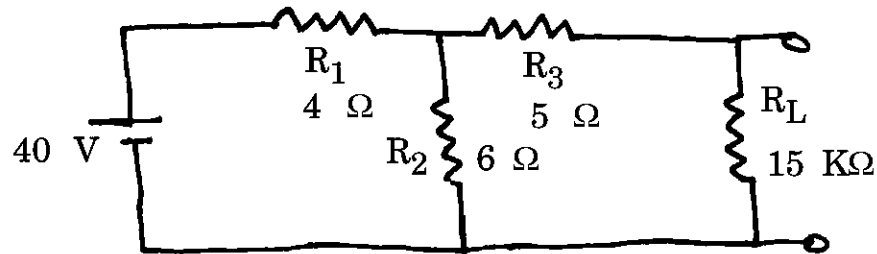


P.T.O.

- (d) What are the biasing conditions of transistor to work as class A Amplifier.
- (e) Draw frequency response of ideal Low Pass and High Pass Filter.
- (f) Draw symbols for NPN transistor and UJT.
- (g) Define the terms Pinchoff voltage and amplification factor for JFET.
- (h) List values for input impedance, bandwidth, CMRR and output impedance for op-amp 741.

2. Attempt any *four* of the following : [4×4=16]

- (a) Explain classification of resistors.
- (b) Find the Norton's equivalent circuit in the following circuit.

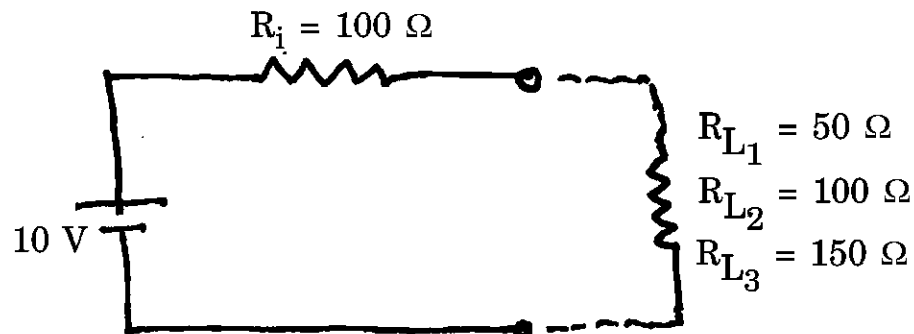


- (c) Draw block diagram of power supply and give function of each block.
- (d) Explain voltage divider biasing technique for BJT.

- (e) With neat diagram explain working of P-channel JFET.
- (f) Draw the circuit diagram of op-amp as adder and derive the expression for its output voltage.

3. Attempt any *four* of the following : [4×4=16]

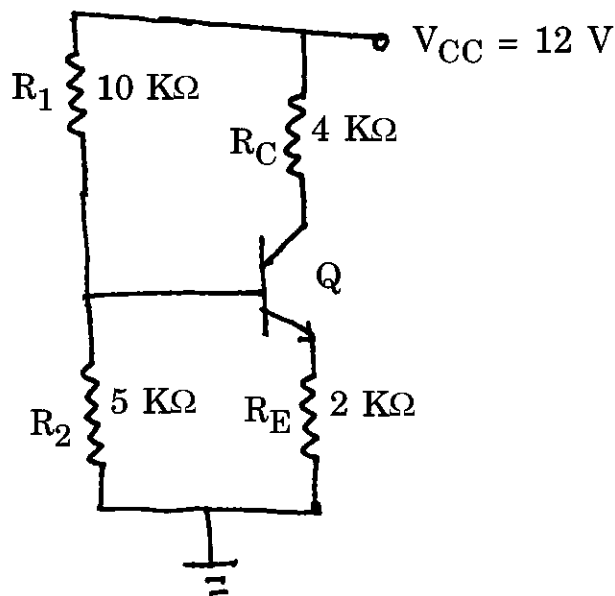
- (a) Define the following parameters related to op-amp :
  - (i) Input impedance
  - (ii) CMRR
  - (iii) Slew rate
  - (iv) Input off-set current.
- (b) Explain working of UJT.
- (c) Differentiate between JFET and MOSFET.
- (d) Explain working of photo diode.
- (e) Verify maximum power transfer theorem for given circuit.



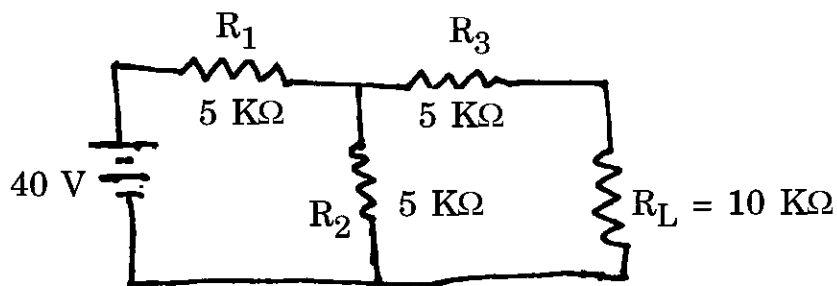
- (f) Draw symbols for step up and step down transformer. Obtain turns ratio of transformer, if  $V_S = 20 \, \text{V}$  and  $V_P = 250 \, \text{V}$ .

4. Attempt any *four* of the following : [4×4=16]

(a) Draw dc load line for given circuit. Assume a silicon transistor.



- (b) Explain JFET as a voltage variable resistor.
- (c) Draw the circuit diagram of op-amp as Non-inverting amplifier and derive the expression for its output voltage.
- (d) With neat diagram explain working of electromagnetic relay.
- (e) Draw the Thevenin's equivalent circuit for given circuit.

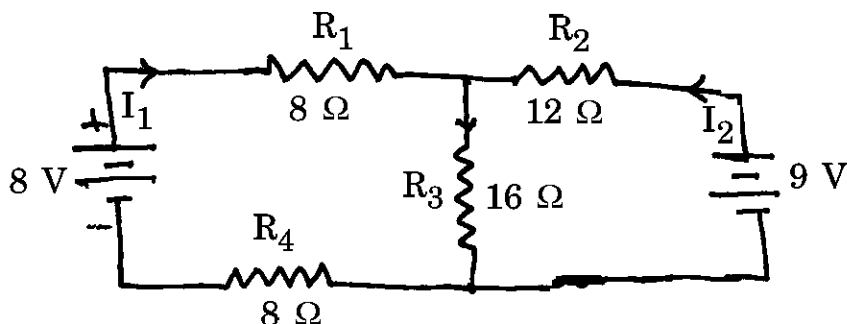


- (f) Explain working of positive clamper circuit.

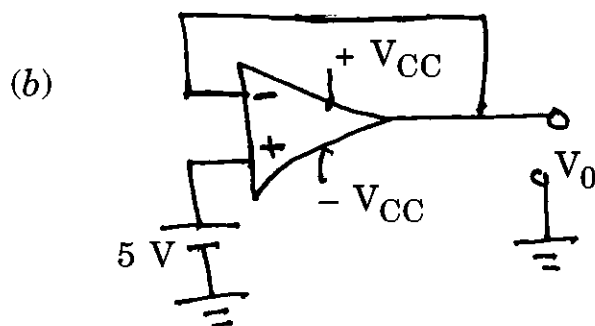
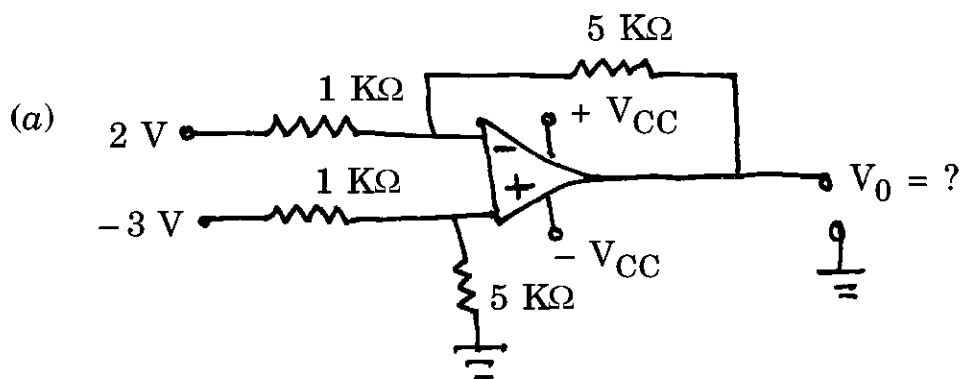
5. Attempt any *two* of the following : [8×2=16]

(A) (i) What are the different types of connectors ? Give *one* application of each.

(ii) Determine the current through  $R_3$  in the following circuit using Kirchhoff's Laws.



(B) (i) Identify the following circuits and find the output voltage.



- (ii) Differentiate between CC, CB and CE configuration of transistor.
- (C) (i) Derive the expression for the charging current of a capacitor and plot the graph of charging current versus time.
- (ii) Explain how transistor act as a switch.