17215

15162

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory*.

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any TEN : **20**

(a) Define ferromagnetic and ferrimagnetic material. Give one example of each.

(b) Draw B-H curve for hard and soft magnetic material.

(c) List four dielectric materials used for capacitors.

(d) State the necessity of rectifier and filter circuits.

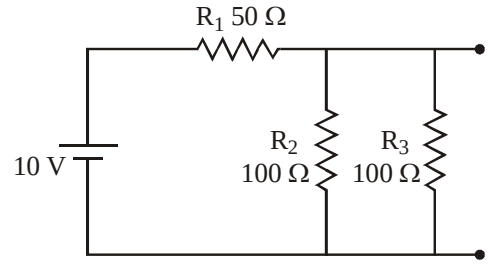
(e) List advantages of bridge rectifier.

(f) Define Kirchoff's voltage law.

P.T.O.

(g) State value of internal resistance of ideal current and ideal voltage source.

(h) Find current through resistor R_3.



(Fig. 1)

(i) Draw symbol and state one application of zener diode and LED.

(j) List applications of Schottky diode and Laser diode.

(k) Write two applications of clipper and two applications of clamper.

(l) Define clipper. Draw circuit of negative shunt clipper.

2. Attempt any FOUR : **16**

(a) Give classification of resistors. List any four materials used for manufacturing of resistor.

(b) With the help of neat diagram, describe working of LDR.

(c) Describe working of variable air gang capacitor.

(d) Using four band colour code, find resistance value for

(i) Brown Red Red Silver

(ii) Yellow Violet Orange Gold

(e) Write difference between iron core inductor and ferrite core inductor.

(f) State and explain operating principle of photodiode.

3. Attempt any FOUR : **16**

(a) Draw and describe construction of LED.

(b) Draw and describe V-I characteristics of P-N junction diode.

(c) Define dynamic resistance of diode. State, how it is calculated using forward characteristics of diode.

(d) Compare zener diode and P-N junction diode.

(e) Draw circuit and describe working of full wave rectifier using centre tapped transformer.

(f) Define given parameters and state their values for bridge rectifier.

(i) Ripple factor

(ii) PIV of diode

4. Attempt any FOUR : **16**

(a) Draw circuit of capacitor filter with bridge rectifier. Draw input and output waveforms.

(b) Explain the working principle of electrolytic capacitor.

(c) Compare inductor filter and capacitor filter.

(d) A bridge rectifier is delivering dc power to load resistance of 1 kΩ. AC voltage of 230 V is given to rectifier through transformer with turn ratio 10 : 1. Find

(i) Peak output current I_m

(ii) DC output current I_{dc}

(Consider diode and transformer as ideal)

(e) Draw the characteristics of tunnel diode, showing operating regions. State two applications of tunnel diode.

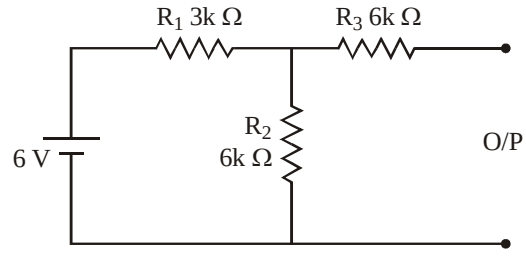
(f) State operating principle of LED. Write material names used to manufacture LED.

5. Attempt any FOUR : 16

(a) Draw and describe working of positive clamper.

(b) Compare linear and non-linear waveshaping networks.

(c) For given circuit (Fig. 2). Find



(Fig. 2)

(i) Open circuit output voltage and output current.

(ii) Short circuit output voltage and output current.

(d) With the help of circuit diagram and waveforms, explain working of RC differentiator.

(e) If three resistors of 10 Ω each are connected in delta connection. Convert it into star connection. Draw circuit diagram for both.

(f) State (i) Norton's theorem.

(ii) Super-position theorem

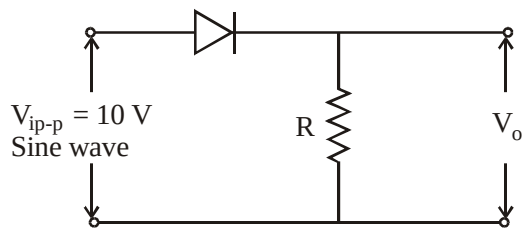
6. Attempt any FOUR : **16**

(a) Draw RC integrator circuit. Write expression for V_o. Draw input and output waveforms for square-wave input.

(b) Draw output waveforms for following circuits :

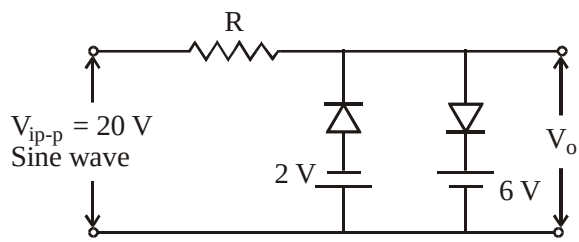
(Consider diodes as Si diodes)

(i)



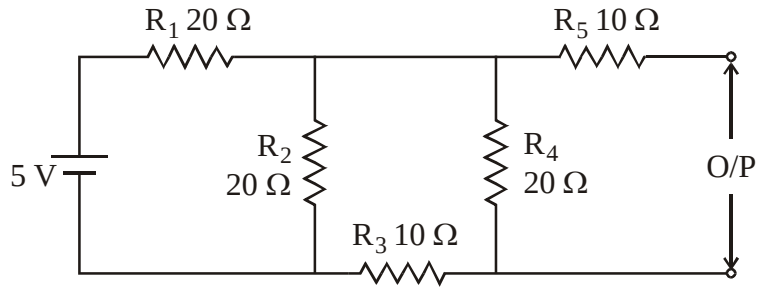
(Fig. 3)

(ii)



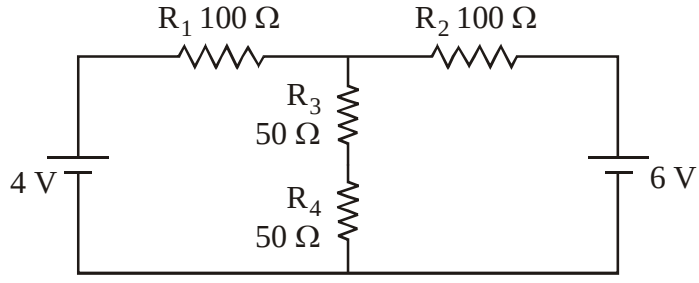
(Fig. 4)

(c) State Thevinin's theorem. Find Thevinin's resistance R_{TH} for given circuit.



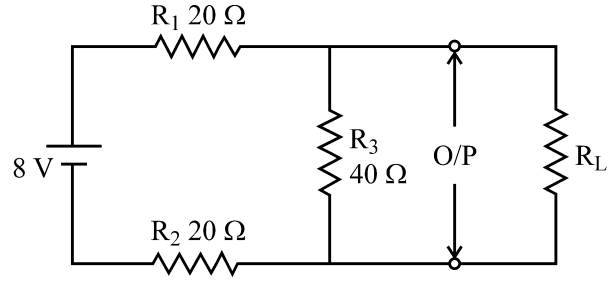
(Fig. 5)

(d) Find current through resistance R_4 using super-position theorem.



(Fig. 6)

(e) For the given circuit,

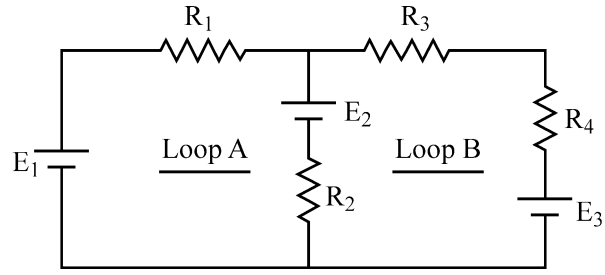


(Fig. 7)

find (i) Load resistance R_L to which maximum power will be transferred.

(ii) Maximum power transferred to load R_L.

(f) Using Maxwell's loop current method, write equations for Loop-A and Loop-B



(Fig. 8)