16172

3 Hours / 100 Marks   Seat No.

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

(2)   Figures to the right indicate full marks.

(3)   Assume suitable data, if necessary.

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

Marks

1.   **Attempt any TEN :**   **2 × 10 = 20**

(a)   What is magnetic material ? State it's two applications.

(b)   Define Inductor. Draw its symbol.

(c)   What is dielectric material ? Enlist dielectric material used in capacitor.

(d)   State any Four applications of PN junction diode.

(e)   Draw symbol of (i) Tunnel diode (ii) LED

(f)   Calculate equivalent resistance IFRI and R_2 resistors are connected in parallel

$R_1 = 10 \, \Omega, R_2 = 5 \, \Omega$

(g)   Define (i) Open circuit (ii) Short circuit

(h)   State Kirchhoff's voltage law.

(i)   State the need of Rectifier circuits.

(j)   State types of filters.

(k)   What is need of wave shaping circuit ?

(l)   Draw RC differentiator circuit.

2. **Attempt any FOUR :** 4 × 4 = 16

   (a) Write down the colour code for following resistor :

     (i) 150 Ω ± 5%   (ii) 4'6 kΩ ± 20%

   (b) With help of constructional diagram, explain working of LDR.

   (c) State any Four specifications of capacitor and explain any two in details.

   (d) With help of constructional diagram, explain working of slug tunned inductor.

   (e) Draw and explain V-I characteristics of a P–N junction diode.

   (f) Calculate the value of capacitor with the help of colour code.

     (i)   Orange, Orange, Blue

     (ii) Yellow, Violet, Yellow

3. **Attempt any FOUR :** 4 × 4 = 16

   (a) Define static and dynamic resistance of diode.

   (b) Compare avalanche and zener breakdown.

   (c) Draw construction of Schottky diode and state it's four applications.

   (d) Which material is used for manufacturing of following LED ?

     (i)   Infrared LED   (ii) Red or Green LED

     (iii) Red or Yellow LED   (iv) Blue LED

   (e) Draw circuit diagram and waveforms for centre-tap full wave rectifier.

   (f) With help of circuit diagram and waveform, explain shunt capacitor filter.
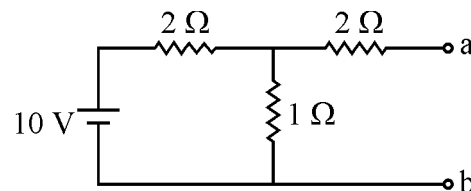
4. **Attempt any FOUR :** 16

   (a) Define : (i) Efficiency (ii) TUF of Rectifier

   (b) With help of constructional diagram, explain working of air-gang capacitor.

    (c)   Compare half wave rectifier and full wave rectifier.

    (d)   With help of circuit diagram and waveform, explain working of CLC or π filter.

    (e)   Write working principle of photodiode and state it's two applications.

    (f)   Give four applications of LASER diode.

5.   **Attempt any FOUR :**   **4 × 4 = 16**

    (a)   Compare linear and nonlinear waveshaping circuits.

    (b)   Draw circuit diagram of RC Integrator and explain its working.

    (c)   Compare : (i) Active n/w and passive n/w

                          (ii) Bilateral n/w and unilateral n/w

    (d)   Define : (i) Clipper (ii) Clamper

    (e)   State and explain Thevenin's theorem.

    (f)   Using Morton's theorem find Morton's equivalent circuit of following :

6.   **Attempt any FOUR :**   **4 × 4 = 16**

    (a)   With help of circuit diagram and waveform, explain working of positive series clipper.

    (b)   Compare Integrator and differentiator.

    (c)   State and explain superposition theorem.

(d) Three resistances of 8 Ω each are connected in delta. Find equivalent star connected network.

(e) Calculate the value of resistance R in the branch AB so that maximum power is transfered to the load of the following circuit :
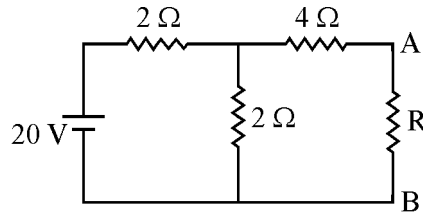
(f) Using thevenin's theorem find load current I_L.

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