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Question Paper Code : 21350

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Second Semester

Electronics and Communication Engineering

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EC 2151/EC 25/10144 EC 205/080290007/EE 1152 – ELECTRIC CIRCUITS
AND ELECTRON DEVICES

(Common to Computer Science and Engineering, Biomedical Engineering, Medical
Electronics Engineering and Information Technology)

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Kirchhoff's voltage law.
2. State Superposition theorem.
3. A series RL circuit, with $R = 10 \Omega$ and $L = 1H$, has a 100 V source applied at $t = 0$. Find the current for $t > 0$.
4. What is the power factor of the circuit under series resonance?
5. Distinguish between intrinsic and extrinsic semiconductors.
6. Mention the two types of junction capacitances.
7. Give the biasing arrangement for an NPN transistor to operate in the active region.
8. Write the equation for drain current of JFET.
9. Draw the two transistor equivalent circuit of SCR.
10. Compare LED and LCD.

PART B — (5 × 16 = 80 marks)

11. (a) (i) For the circuit shown in Fig.1, calculate the value of resistor R, when then total current taken by the network is 1.5 A (8)

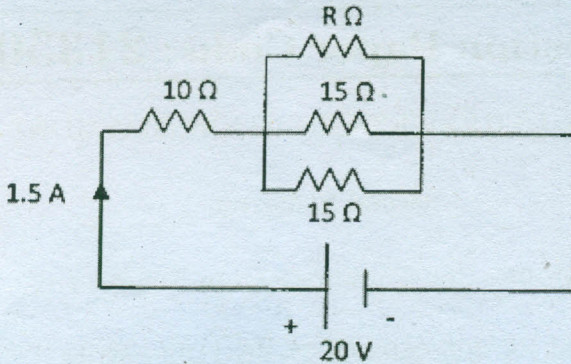


Fig. 1

- (ii) Find the equivalent resistance between the terminals A and B of Fig. 2, using star-delta transformation. (8)

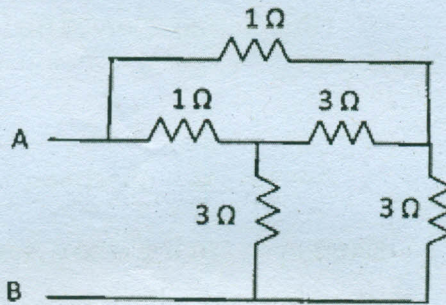


Fig. 2

Or

- (b) (i) State Thevenin's and Norton's theorems. (6)
- (ii) For the circuit shown in Fig. 3, determine the value of R_L to get the maximum power. Also find the maximum power transferred to the load. (10)

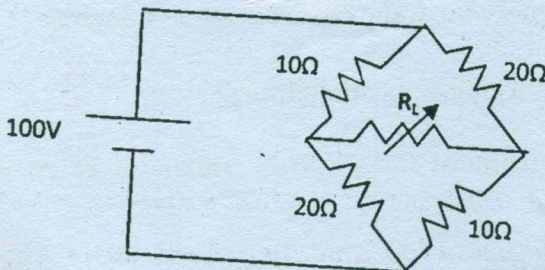


Fig. 3

12. (a) (i) Describe the response of RC circuit to a pulse of duration T and height V_0 . (8)
- (ii) Obtain the expression for the current $i(t)$ from the differential equation $\frac{d^2i(t)}{dt^2} + 10\frac{di(t)}{dt} + 25i(t) = 0$

with initial conditions

$$i(0^+) = 2 \frac{di(0^+)}{dt} = 0 \quad (8)$$

Or

- (b) (i) Derive the expression for resonant frequency of a series RLC circuit. Also define Q factor and bandwidth and give the relation between resonant frequency, Q factor and bandwidth. (10)
- (ii) Determine the quality factor and resonant frequency for the series circuit consisting of $R = 10 \Omega$, $L = 0.1 \text{ H}$ and $C = 10 \mu\text{F}$. (6)
13. (a) (i) Explain the theory of PN junction diode along with its V-I characteristic. (8)
- (ii) Discuss the effect of temperature upon the characteristics of PN junction diode. (8)

Or

- (b) (i) Distinguish between avalanche breakdown and zener breakdown. (8)
- (ii) Draw and explain the characteristics of zener diode. (8)
14. (a) (i) Draw and explain the characteristics of PNP transistor in CB configuration. (8)
- (ii) Compare CB, CE and CC transistor configurations. (8)

Or

- (b) (i) Describe the construction, operation and characteristics of N-channel JFET. (8)
- (ii) Draw the structure of N-channel depletion type MOSFET and explain its operation and characteristics. (8)
15. (a) (i) With energy band diagram, explain the theory and characteristics of tunnel diode. (10)
- (ii) Write notes on varactor diode. (6)

Or

- (b) (i) Describe the construction, operation and characteristics of UJT. (8)
- (ii) Discuss the operation and characteristics of photodiode. Mention the applications of photodiodes and phototransistors. (8)