Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 80436

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Second Semester

Electronics and Communication Engineering

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)

(Regulations 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. Draw the phasor diagram for a series RL circuit.

4. Draw the frequency response of a single tuned circuit.

5. Draw energy band diagram of semiconductor.

6. Define diffusion capacitance.

7. Define and explain the term 'early effect'.

8. Differentiate between enhancement-type and depletion-type MOSFETs.

9. Mention any two applications of DIAC.

10. What is Photovoltaic effect?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Find the current through each resistor of the circuit shown in Figure. 11(a) using nodal analysis. (10)
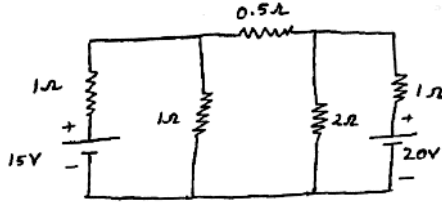

Figure. 11(a)

(ii) State and prove maximum power transfer theorem. (6)

Or

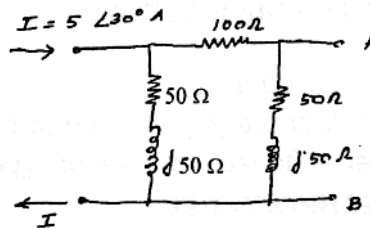(b) (i) Find the Thevenin's equivalent circuit for the network in Figure.11(b) at terminals AB. (10)

Figure. 11(b)

(ii) Explain superposition theorem, assuming a suitable circuit. (6)

12. (a) In the RL circuit shown below Fig. Q. 12(a), the output is taken across the inductor.
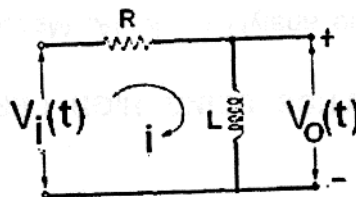

Fig. 12(a)

A pulse input voltage with a pulse width of t_p is applied. Derive the response of the circuit and sketch the output curve. (16)

Or

2

(b)   Derive expressions for impedance, phase angle, voltages and current in a series RLC resonant circuit. Show their variations graphically with respect to frequency. State how will you find the maximum voltages across L and across C.   (16)

13.   (a)   Derive the PN diode current equation from the quantitative theory of diode currents.   (16)

Or

(b)   (i)   Sketch and explain the V-I characteristics of zener diodes.   (8)

(ii)   Explain briefly the following:

(1)   Avalanche breakdown   (4)

(2)   Zener breakdown.   (4)

14.   (a)   Explain with neat diagram the operation of NPN transistor.   (16)

Or

(b)   Describe   construction   and   operation   of   n-channel   depletion   type MOSFET.   (16)

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)

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