Reg. No. : ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

## Question Paper Code : 97133

B.E./B.Tech. DEGREE EXAMINATION, DECEMBER 2015/JANUARY 2016.

Second Semester

Electronics and Communication Engineering

EC 2151/EE 1152/080290007 — ELECTRIC CIRCUITS AND ELECTRON DEVICES

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

(Regulations 2008)

Time : Three hours                                    Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   State Kirchoff's laws.

2.   State Superposition theorem.

3.   What is the time constant of RC and RL circuit?

4.   Draw the frequency response of double tuned circuit.

5.   Differentiate intrinsic and extrinsic semiconductors.

6.   Draw the VI characteristics of zener diode.

7.   What are the operating modes of BJT with reference to biasing applied to emitter base and collector base junctions?

8.   What is the drain current equation in the saturation region of JEET?

9.   Draw VI characteristics of tunnel diode and mark important operating regions.

10.  List applications of photoconductive and photovoltaic cells.

11. (a) (i) Find the equivalent impedance of the circuit shown in fig. 11 (a) (i).

(12)
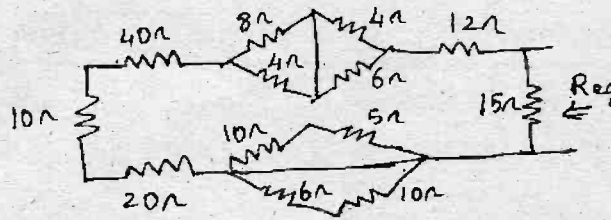
Fig. 11 (a) (i)

(ii) State Thevenin's theorem. (4)

Or

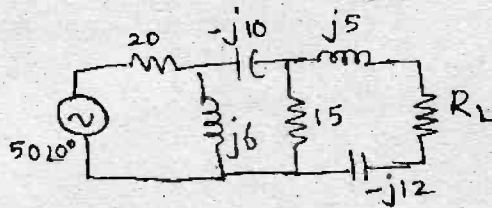(b) (i) Find the load impedance for circuit shown in fig. 11 (b) (i) for maximum power transfer.

Fig. 11 (b) (i)

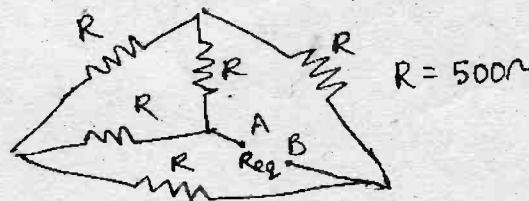(ii) Find the impedance of the circuit shown in fig. 11 (b) (ii) using Star-delta conversion.

$R = 500\Omega$

Fig. 11 (b) (ii)

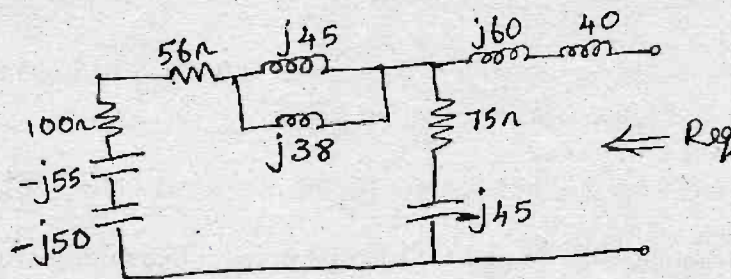12. (a) (i) Find the equivalent impedance of the circuit given in fig. 12 (a) (i).

Fig. 12 (a) (i)

97133

(ii) A sine wave of $V(t) = 60 \sin 20t$ is applied to a 10 Ω resistor in series with a coil. The reading of voltmeter is 35 V and 15 V across $R$ and $L$ respectively. Calculate power and reactive volt ampere in the coil and power factor of the circuit.

Or

(b) Derive the resonant frequency of series and parallel RLC circuit and briefly explain their characteristics.

13. (a) (i) Draw and explain the energy band structure of PN junction diode.
(8)

(ii) Derive forward and reverse biased current through PN junction diode.
(8)

Or

(b) (i) Derive the space charge capacitance of PN diode.
(8)

(ii) Briefly explain Avalanche and Zener breakdown.
(8)

14. (a) (i) Explain the common emitter configuration of BJT with its equivalent circuit.
(10)

(ii) Compare CB, CE and CC configurations of BJT.
(6)

Or

(b) Derive drain current equation of enhancement mode N-Channel MOSFET in various operating regions.

15. (a) Explain the operation and characteristics of SCR with its two transistor equivalent circuit.

Or

(b) Write short notes on the following.

(i) Laser
(5)

(ii) CCD
(5)

(iii) Photodiode and phototransistor.
(6)