

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

December 2016 End Semester Examinations
B.Tech. (Marine Engineering) First Semester

Basic Electrical & Electronics Engineering (UG11T1104/ UG11T2104)

Date : 21.12.2016
Time: 3 Hrs

Maximum Marks: 100
Pass Marks : 50

Part -A

(3 × 10 = 30 Marks)

Answer all the Questions

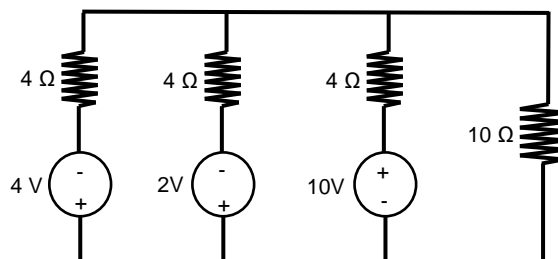
1. a) When will be the maximum power transfer from a battery source to load?
Explain with necessary equations.
- b) What is the inductance of the coil in which a current of 0.1 A increasing at rate of 0.5 A/s represents the power flow of 0.5 watt?
- c) Three equal resistance connected in star take a line current of 10 A when feed from 400 V, 50 Hz source. If the load resistance are connected in delta, the line current would be?
- d) The distance between two peaks measured on X – axis is 2 cm, at 1 ms/div. What is the frequency of the signal?
- e) Differentiate active and passive transducer.
- f) Why does the semiconductor have negative temperature coefficient of resistance?
- g) What is called ripple factor?
- h) What is called drift current?
- i) Prove $I_E = (\beta + 1)I_B$ in transistor.
- j) If a current of 1.6 μA is following through a conductor, the number of electrons crossing a particular cross – section per second will be?

Part -B

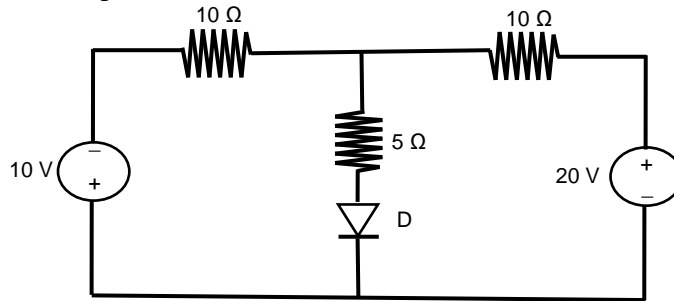
(14 × 5 = 70 Marks)

(Answer any five of the following questions)

2. a) Find the current flowing through the resistance of 10 ohms. (10)



b) Find the Norton's equivalent resistance across the diode in the circuit shown below. (4)



3. a) A series R – L – C circuit having $R = 25 \Omega$, $L = 2 \text{ H}$ and $C = 30 \mu\text{F}$ is connected across an a.c. voltage variable source. At what frequencies will the phase angle of the circuit be 45° lagging? (8)
- b) Show that the neutral current in a three phase star connected balanced load is zero. (6)
4. a) A mild steel closed magnetic circuit has a mean length of 75 mm and a cross-sectional area of 320.2 mm^2 . A current of 0.40 A flows in a coil wound uniformly around the circuit and the flux produced is $200 \mu\text{Wb}$. If the relative permeability of the steel at this value of current is 400 find (a) the reluctance of the material and (b) the number of turns of the coil. (7)
- b) In an ideal transformer with an open – circuited secondary has inductances of $L_1 = 220 \text{ mH}$, $L_2 = 32 \text{ mH}$ and $M = 13 \text{ mH}$. Find the values of primary and secondary voltages when the primary current is increased at the rate of 0.4 KA/s . (7)
5. a) A Schering Bridge network is given with $C_2 = 0.2 \mu\text{F}$, $R_4 = 200 \Omega$, $R_3 = 600 \Omega$, $C_3 = 4000 \text{ pF}$ and the supply frequency is 1.5 kHz, determine when the bridge is balanced (i) Resistance R_x (ii) value of Capacitance C_x (iii) phase angle of unknown arm and (iv) power factor of unknown arm. (8)
- b) With neat sketch explain the working principle of thermocouple. How it is used to measure the temperature? (6)
6. a) Explain in details about the construction and working principle of CRO? (10)
- b) The meter constant of a single – phase 240 V induction watt – hour meter is 400 rev/kWh. What is the speed of the meter disc for a current of 10 A at 0.8 power factor lagging? (4)
7. a) Explain any one method for measurement of flow, with neat sketch. (7)
- b) Write a short note on electron emission. (7)
8. a) How the tunnel diode is differ from normal PN junction diode? Explain the V – I characteristics of tunnel diode. (7)
- b) Why filters are used in rectifier circuits? How the ripples are reduced in case of LC filter? (7)
9. a) Discuss transistor as a switch. Why transistor switch is called as inverter? (7)
- b) With neat sketch explain transistor as CE amplifier (practical amplifier). (7)
