

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

May/June 2016 End Semester Examinations  
B.Tech. (Marine Engineering) – 2009 batch onwards

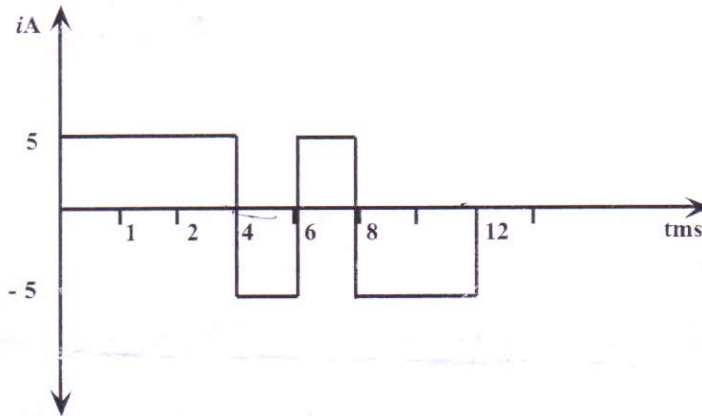
Semester I - Basic Electrical & Electronics Engineering - (UG11T1104 / UG11T2104)

Date :16.6.2016  
Time: 3 Hrs

Max. Marks: 100  
Pass Marks: 50  
(3 X 10 = 30 Marks)

Part - A  
Compulsory Question

1. a) Figure is the graph of the current into a circuit element. Find the charge transferred by this current, assuming that the element is initially uncharged.



- b) What is wattless current? Explain the following statement: “ use of a choke coil is more economical than resistance in controlling current in an ac circuit.”
- c) For certain BJT,  $B=50$   $I_{CEO} = 3 \mu A$  and  $I_C = 1.2mA$ . Find  $I_B$  and  $I_E$ .
- d) Define form factor and peak factor
- e) List the advantages of bipolar junction transistors.
- f) Define a network and a node.
- g) What is called magnet? How it is classified
- h) Define Impedance.
- i) What is called semiconductor? How it is classified.
- j) What is Zener Diode? Draw the characteristics curve for a zener diode and label it.

Part -B (5 x 14 = 70 Marks)  
Answer Any Five of the Following

- 2) a) Distinguish between
  - (i) apparent power (ii) active power (iii) reactive power in A.C circuits. (7)
- b) A 300V (line) 3-phase supply feeds star connected load consisting of non inductive resistors of  $15\Omega$ ,  $6\Omega$  and  $10\Omega$  connected to the R, Y and B lines respectively. The sequence is RYB. Calculate the voltage across each resistor. (7)

- 3) a) Show how two wattmeter are used to measure 3 – phase power, justify with neat sketch. (7)
- b) A permanent magnet moving coil has full scale deflection current of 50 mA and  $2 \Omega$  resistance. How the instrument can be converted to:
- (i) 0 – 5 A range ammeter
- (ii) 0 – 100 V range voltmeter. (7)
- 4) a) Differentiate between transition and diffusion capacitance of a p-n junction diode. (7)
- b) Write a short note on Thermionic emission and Field emission. (7)
- 5) a) A full wave rectifier uses two diodes, the internal resistance of each diode may be assumed to be constant at  $25 \Omega$ . The transformer r.m.s. secondary voltage from center tap to each end of the secondary is 50 V and load resistance is  $975 \Omega$ . Find the mean load current and the r.m.s. value of load current. (7)
- b) Explain the principle of signal generation. (7)
- 6) a) Discuss Kirchoff's Current law and Voltage law with neat sketch and necessary equations. (7)
- b) Explain briefly about electro static induction with neat sketch. (7)
- 7) a) Draw hysteresis loop and explain briefly the various parts on it. (7)
- b) Two 200 turn, air cored solenoids, 25 cm long have a cross sectional area of  $3 \text{ cm}^2$  each. The mutual inductance between them is  $0.5 \mu\text{H}$ . Find the self inductance of the coils and the coefficient of coupling. (7)
- 8) a) What is called transducer? How it is classified? What are the basic requirements of a transducer? (2 + 1 + 4)
- b) A 230 V single phase energy meter has a constant load current of 10 A at unity power factor. If the aluminum disc in the meter is meter makes 1200 revolutions in 3 hours, calculate the energy meter constant in revolutions per kwh. (7)
- 9) a) What is called transducer? How it is classified? What are the basic requirements of a transducer? (2 + 1 + 4)
- b) A 230 V single phase energy meter has a constant load current of 10 A at unity power factor. If the aluminum disc in the meter is meter makes 1200 revolutions in 3 hours, calculate the energy meter constant in revolutions per kwh. (7)

\*\*\*\*\*

$$\frac{1200}{230 \times 10 \times 3}$$