Indian Maritime University

(A Central University, Govt of India)

May-June 2018 End Semester Examinations

B. Tech (Marine Engineering)

Semester-I

Basic Electrical & Electronics Engineering (UG11T2104/1104)

Date: 10.07.2018 Max Marks:100 Marks

Time: 3 Hrs Pass Marks: 50 Marks

Part A (10 × 3 = 30 Marks)
All Questions are compulsory

1. (a) Define resistance.
   (b) Define rms value of an alternating signal.
   (c) Define retentivity.
   (d) Define magnetic flux density.
   (e) What do you understand by three phase balanced load?
   (f) Name the essential torques required for indicating instruments.
   (g) Define work function.
   (h) Differentiate tunnel diode and pn junction diode.
   (i) What is the function of filters in rectifier circuits?
   (j) Why NPN transistor is most widely used?

Part B (5 × 14 = 70 Marks)
Answer any five of the following

2. (a) Eight cells, each with an internal resistance of 0.2 ohms and an e.m.f. of 2.2 V are connected (i) in series, (ii) in parallel. Determine the e.m.f. and the internal resistance of the batteries so formed. (7)

   (b) The dry cells of source e.m.f. 6 V, and internal resistance 2.5ohms is connected in series with load resistance R_L. If the load resistanceR_L is varied from 0 to 5 ohms in 0.5 ohms steps, calculate the powerdissipated by the load in each case and determine the maximum power dissipated. (7)

3. (a) Define self-inductance. Derive the expression for self-induced emf and self-inductance. (7)

   (b) A steel ring of mean diameter 120 mm is uniformly wound with1500 turns of wire. When a current of 0.30 A is passed through thecoil a flux density

of 1.5 T is set up in the steel. Find the relativepermeability of the steel under these conditions. (7)

4. (a) Explain resonance in series LCR circuit and derive the expression for resonance frequency. (7)

   (b) A capacitor C is connected in series with a 40 ohms resistor across a supply of frequency 60 Hz. A current of 3 Aflows and the circuit impedance is 50 ohms. Calculate: (i) the value of capacitance, C, (ii) the supply voltage, (iii) the phase angle betweenthe supply voltage and current. (7)

5. (a) Show that deflection θ is a function of square of current in moving iron instrument. (7)

   (b) A moving-coil instrument has a f.s.d. of 20 mA and a resistance of25 ohms.Calculate the values of resistance required to enable the instrumentto be used (i) as a 0–10 A ammeter, and (ii) as a 0–100 Vvoltmeter. State the mode of resistance connection in each case. (7)

6. (a) State the procedures to determine the balance equations of any a.c. bridge circuit. (7)

   (b) The four diodes used in a bridge rectifier circuit have forward resistances whichmay be considered constant at 1ohm and infinite reverse resistance. The alternating supply voltage is240 V r.m.s. and load resistance is480 ohms. Calculate (i) mean load current and (ii) power dissipated in each diode. (7)

7. (a) What is called Zener diode? How it is differs from pn junction diode? Draw the V – I characteristic curve. (7)

   (b) Write a short note on electron emission. (7)

8. (a) Discuss transistor as switch. (7)

   (b) Draw the symbol of PNP and NPN transistor and specify the leads with current equation. (7)