INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

End Semester Examinations – December 2018
B. Tech (Marine Engineering)
Semester: I
Basic Electrical & Electronics Engineering (UG11T2104)

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Date: 04.01.2019   Maximum Marks: 100
Time: 3 Hrs   Pass Marks: 50

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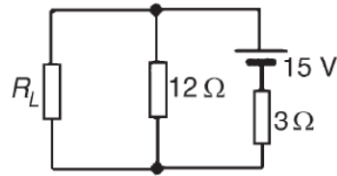### All Questions are compulsory

1. (a) Define voltage.

   (b) Define leakage flux.

   (c) Find the rms value of the signal $v(t) = 10 \sin(5t) + 10 \cos(2t) + 5\sin(t)$

   (d) What is called magnet? Classify it.

   (e) Show the relationship between V_{ph} & V_L and I_{ph} & I_L in three phase star and delta connected loads.

   (f) Define energy meter constant.

   (g) Draw a simple ac bridge and mention the condition for bridge balance.

   (h) What is called diffusion current?

   (i) Define zener breakdown.

   (j) What is called transistors? Draw the symbol of PNP and NPN transistors with current directions.

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

2. (a) A 5 µF capacitor is connected in series with a parallel combination of two capacitors of value 2 µF and 3 µF respectively. Determine the apacitance of the combination. If a voltage of 25 V is maintained across the series – parallel combination. Determine the charge and voltage across each capacitor.   (7 Marks)

   (b) Find the value of the load resistor R_L shown in Figure that gives maximum power dissipation and determine the value of this power.
                                                         (7 marks)

3. (a) Define energy. Derive the expression for energy stored in inductor.

(7 Marks)

(b) Two coils have a mutual inductance of 0.2 H. If the current in one coil is changed from 10 A to 4 A in 10 ms, calculate (i) the average induced e.m.f. in the second coil, (ii) the change of flux linked with the second coil if it is wound with 500 turns.   (7 Marks)

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

(b) Three identical coils, each of resistance 10 Ω and inductance 42 mH are connected (a) in star and (b) in delta to a 415 V, 50 Hz, 3-phase supply. Determine the Line and Phase currents in each case. (7 Marks)

5. (a) Explain the principle of operation of dynamometer type wattmeter.

(7 Marks)

(b) Two wattmeter's connected to a 3-phase motor indicate the total power input to be 12 kW. The power factor is 0.6. Determine the readings of each wattmeter.   (7 Marks)

6. (a) With neat sketch of the Wein bridge, derive the expression for the frequency of a given signal.   (7 Marks)

(b) Explain how p & n type semiconductors are made?   (7 Marks)

7. (a) Define α and β in transistor and show that $\alpha = \dfrac{\beta}{\beta+1}$ (7 Marks)

(b) Write a short note on tunnel diode.   (7 Marks)

8. (a) Show that $I_E = (\beta + 1)I_B$.   (4 Marks)

(b) Explain input and output characteristics of common emitter configuration, with neat sketch.   (10 Marks)

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