# INDIAN MARITIME UNIVERSITY

## Time Bound Assignment September/October 2020

## B Sc (NS) Arrear Examinations

## Applied Physics and Electricity
## UG21T3202

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| Date: 09/10/2020 | Maximum Marks: 70 |
| Time: 3 Hrs | Pass Marks: 35 |

**Part A**
**(Question 1 is compulsory)**
**(5 x 2 = 10 marks)**

Q1. a) Define induced emf.

b) Define root mean square value of alternating voltage.

c) State maximum power transfer theorem.

d) State the balance conditions of AC bridge.

e) State thermoelectric effect.

**Part B**

**(Attempt any 6 questions out of the following 8 questions)**
(6 x 10 = 60 marks)

Q2. a) Define statically induced emf. Discuss its types with proper diagram. **(5 marks)**

b) The number of turns in two coupled coils are 600 and 1500, respectively. When a current of 5A flows in coil 2, the total flux in this coil is 0.075 mWb and the flux linking with the first coil is 0.45 mWb. Calculate $L_1$, $L_2$, M and K. **(5 marks)**

Q3. a) What is static electricity? State its hazards and precautions.

**(5 marks)**

b) A series circuit having pure resistance of 40Ω, pure inductance of 50.07 mH and a capacitance is connected across a 400V, 50 Hz ac supply. This R,L,C combination draws a current of 10 A. Calculate (i) Power factor of the circuit and (ii) capacitor value. **(5 marks)**

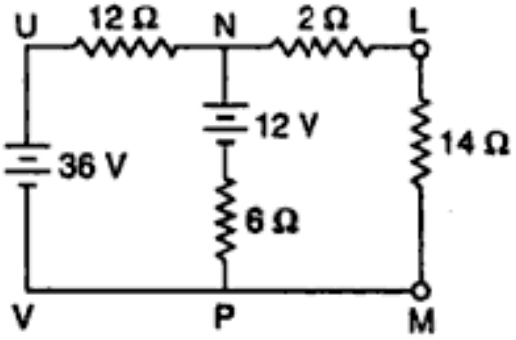
Q4. a) Explain Hay's bridge with a neat circuit diagram. Derive its balance condition. **(5 marks)**

b) The arms of an AC bridge are arranged as follows: AB is a non-inductive resistance of 1000 Ω in parallel with a capacitor of 0.5 μF, BC is a non-inductive resistance of 600 Ω, CD is an unknown non-inductive impedance and DA is a non-reactive resistance of 400 Ω. If the bridge is balanced, find the components of the branch CD.

**(5 marks)**

Q5. a) State Norton's theorem and explain it with the help of an example. **(5 marks)**

b) Calculate the power dissipated in the 14Ω resistor connected across the terminals L and M of the given circuit.




**(5 marks)**

Q6. a) Explain principle and working of an DC generator with the help of a neat diagram. **(5 marks)**

b) A 4-pole lap wound DC shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 220 turns each of 0.04Ω resistance. Calculate the terminal voltage, when running at 900 rpm if the armature current is 50 A. **(5 marks)**

Q7. a) What are the different methods of measuring pressure? Explain any one in detail with diagram. **(5 marks)**

b) Explain the principle and working of a venturi tube for measurement of flow. **(5 marks)**

Q8. a) Discuss the classification of DC motors with schematic diagram.

**(5 marks)**

b) The four impedances of an ac bridge as shown in the figure are Z1 = 500 < 40° Ω, Z2 = 100< 20° Ω, Z3 = 45 < 20° Ω, Z4 = 30 < 30° Ω. Find out whether the bridge is balanced or not.

**(5 marks)**

Q9. Write note on **any two** of the following: **(5 x 2 = 10 marks)**

a) Heating effect of current

b) Resonance in RLC Series circuit

c) Superposition theorem

d) Transducer

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