INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

END SEMESTER EXAMINATIONS-JUNE/JULY 2019

B.Sc (Nautical Science)

Semester-II

APPLIED PHYSICS AND ELECTRICITY (UG21T4202)

Date: 27.06.2019 **Max.Marks : 70**

Time: 3 Hrs **Pass Marks : 35**

Note: Question No. 1 is compulsory

Answer any 6 Questions from remaining 8 questions (each of 10 marks)

Scientific calculator is permitted if required.

PART-A

(5×2=10)

1.a) State faradays law of electromagnetic induction.

b) Define resonant frequency.

c) Write down the balance condition for an a.c bridging circuit.

d) State Maximum power transfer theorem.

e) Define Transducers.

PART-B

(Attempt any six questions out of eight)

(6×10=60)

2.a)Define self-induction. Obtain an expression for the self-inductance of a solenoid. (5)

b) Calculate the mutual inductance between two coils when a current of 4A changing to 8A in 0.5 second in one coil, induces an emf of 50 mV in the other coil. (5)

3. a)Draw the circuit diagram of series RLC circuit and phasor diagram, arrive at the voltage obtained across the series combination. (5)

b)A pure resistance of 50 ohms is in series with a pure capacitance of 100 microfarads. The series combination is connected across 100V,50 Hz supply. Find a) impedance b) current c)power factor. (5)

4.a)Arrive at the value of unknown capacitance using desauty bridge network. (5)

b) In a Schering bridge network ABCD,

AB- a standard capacitor C_1

BC- a capacitor C_2 in parallel with a resistor R_2

CD- a resistor R_3

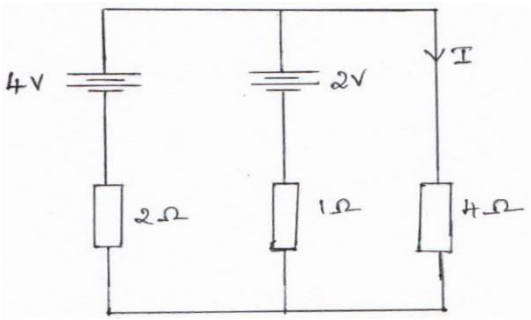
DA- the capacitor C_x in series with a resistor R_x

Derive the equations for R_x and C_x, when the bridge is balanced. Evaluate R_x and C_x, if at balance.

Given:C_1=1 nF, R_2=100Ω, R_3=1KΩ and C_2 =10nF. (5)

5.a)State and explain Thevenins Theorem. (5)

b)solve using Norton's Theorem. (5)



6.a)Explain with neat diagram,principle,construction and working of DC generator. (5)

b) An a.c generator consists of a coil of 10,000 turns and of area 100 cm^2.The coil rotates at an angular speed of 140 rpm in a uniform magnetic field of 3.6×10^{-2} Find the maximum value of the emf induced. (5)

7.a)What is thermistor and how it is applied as a heat sensor. (5)

b) Explain the Venturitube working for measurement of flow. (5)

8.a)Explain the heating effect of electric current. (5)

b) A four arm bridge ABCD consists of

AB-fixed resistor R1

BC-a variable resistor R2 in series with a variable capacitor C2.

CD- a fixed resistor R3.

DA –a coil of unknown resistance R and inductance L.

Determine the values of R and L, if at balance, R_1= 1KΩ, R_2 = 2.4 KΩ, C_2=4000 pf, R_3= 1KΩ

And the supply frequency is 1.6 kHz. (5)

9. Write short notes on any two. (2 ×5 =10)

a) Power factor and quality factor.

b) Thermoelectric effect.

c) Transducers.

d) Millman theorem.