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

June 2017 End Semester Examinations
B. SC (Nautical Science – Second Semester)

(Applied Physics & Electricity – UG21T3202)
(AY 2016 - 17 batch onwards)

Date: 06.06.2017

Maximum Marks : 70

Time: 3 Hrs

Pass Marks : 35

Note: 1. Solve any seven questions. 2. All questions carry equal marks.

Q1.(a) State and explain Faraday's law of electromagnetic induction. (6 Marks)

(b) Two coils, A of 12500 turns and B of 16000 turns, lie in parallel planes so that 60% of flux produced in A links coil B. It is found that a current of 5 Amp in A produces a flux of 0.6 mWb while the same current in B produces 0.8 mWb. Determine (i) mutual inductance and (ii) coupling coefficient. (4 Marks)

Q2. Define and explain the following terms related to AC. (5x2=10 Marks)

- a) RMS value $\frac{1}{\sqrt{2}}$
- b) Average value
- c) Phase angle
- d) Instantaneous value
- e) Peak to peak value

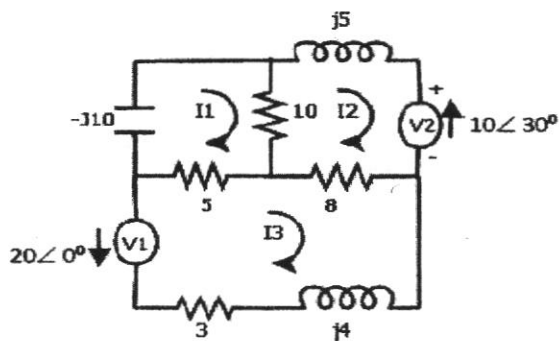
Q3.(a) The arms of an a.c. Maxwell bridge are arranged as follows: AB is a non-inductive resistance of 1,000 Ω in parallel with a capacitor of capacitance 0.5 μF , BC is a non-inductive resistance of 600 Ω CD is an inductive impedance (unknown) and DA is a non-inductive resistance of 400 Ω . If balance is obtained under these conditions, find the value of the resistance and the inductance of the branch CD. (4 Marks)

(b) With sketch explain the working principle of Hay's Bridge and derive the equations. (6 Marks)

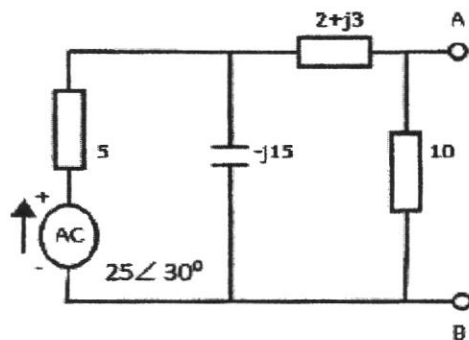
Q4. (a) A delayed full-wave rectified sinusoidal current has an average value equal to half of its maximum value. Find the delay angle θ . (5 Marks)

(b). Calculate the form factor and peak factor for the waveform, which is the output of half wave rectifier, with the equation $i=100\sin 314t$
(5 Marks)

Q5. (a). Write the three mesh current equations in matrix form for network shown below. (5Marks)



(b) Determine the Thevenin's equation circuit with respect to terminal AB of the circuit shown below. (5 Marks)



Q6. a) Explain the principle of operation of AC and DC generators. (5 Marks)

b) Write the constructional details of induction motor with sketch. (5 Marks)

Q7. a) Write Applications of DC series and shunt motors. (5 Marks)

b) Find the load current through 10 ohm resistor using Millman's theorem. All values are in ohm. (5 Marks)

Q8. Define (5x2=10 Marks)

- i. Calibration
- ii. Accuracy
- iii. Precision
- iv. Q factor of coil
- v. Linear Network

Q9. a) Write short note on thermistor and its application. (4 Marks)

b) Draw and explain the working of venturi tube flow sensor. (6 Marks)

Q.No 7(b) Find the load current through 10 ohm resistor using Millman's theorem. All values are in ohm.

