Indian Maritime University

(A Central University, Govt of India)
B Sc (Nautical Science)
June 2018 End Semester Examinations
Semester-II
UG21T3202 - Applied Physics & Electricity

Duration:3 Hrs   Max Marks:70 Marks
Date: 07.06.2018   Pass Marks:35 Marks

PART-A

QUESTION NO.1 IS COMPULSORY

(5×2=10 Marks)

1.a)Define coefficient of coupling.

b)Define resonant frequency.

c) StateKirchoff voltage law.

d) State Thevenin's theorem.

e) Define Active power.

PART-B

ATTEMPT ANY SIX QUESTIONS OUT OF EIGHT.

(6×10=60 Marks)

2.a)State the faraday's laws of electromagnetic induction.   (5 Marks)

b)A solenoid of length 1 m and 0.05 m diameter has 500 turns. If a current of 2A passes through the coil, calculate (i) the coefficient of self induction of the coil and (ii) the magnetic flux linked with a the coil.   (5 Marks)

3. a)Define power factor, quality factor and band width of an ac circuit.   (5 Marks)

b)An AC voltage represented by e = 310 sin 314 t is connected in series to a 24 Ω resistor, 0.1 H inductor and a 25 µF capacitor. Find the value of the peak voltage, rms voltage, frequency, reactance of the circuit, impedance of the

circuit and phase angle.   (5 Marks)
(5 Marks)

4. a)Explain Schering bridge network and arrive at the expression of unknown
      resistance and unknown capacitance.   (5 Marks)
   b)The four arms of a Hay's a.c bridge are arranged as follows:

   AB is a coil of unknown impedance.

   BC is a non-reactiveresistor of 1000Ω.

   CD is a non-reactive resistor of 833Ωin series with a standard capacitor of
   0.38μF.
   DA is a non-reactive resistor of 16,800Ω.

   If the supply frequency is 50 Hz. Determine the inductance and the resistance at
   the balance condition.   (5 Marks)
5.a)State and explain Nortons theorem.   (5 Marks)

   b)   For the network shown below,determine the current in the 0.8Ω resistor using
Thevenins theorem.   (5 Marks)
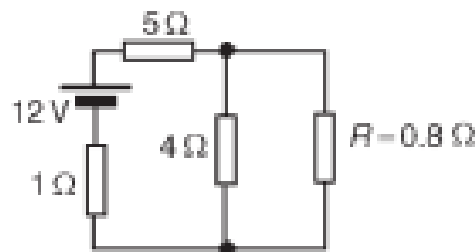
(a)

6.a)Explain thermo electric effect.   (5 Marks)

   b)An ac 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} T.
      find the maximum value of the emf induced.   (5 Marks)
7.a)Explain how thermistor works, in finding the temperature coefficient of
      resistance.   (5 Marks)

   b) Define Accuracy and calibration.   (5 Marks)

8. a)Explain with principle, construction and working of DC generator.   (5 Marks)

b) In a desauty bridge network, arm1 contains a 2 KΩnon inductive resistor, arm 3 contains a loss free 2.4 µF capacitor and arm 4 contains a 5KΩ non inductive resistor. When the bridge is balanced. Determine the value of the capacitor contained in arm 2.   (5 Marks)

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

a)Millman theorem.   (5 Marks)

b) Transducers.   (5 Marks)

c) Capacitors in series and Parallel.   (5 Marks)

d) Series type DC motor.   (5 Marks)