00551

No. of Printed Pages : 3

BNA-013

B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

December, 2015

BNA-013 : ELECTRICITY AND ELECTRONICS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt* ***three*** *questions from each section. Question no.* ***1*** *and* ***5*** *are* ***compulsory.*** *Non-programmable scientific calculator is allowed.*

SECTION A

1. (a) With the help of a neat diagram, explain the principle, construction and working of D.C. Generator. *10*

(b) A 50 kVA, single phase transformer has 500 turns on the primary and 100 turns on the secondary. The primary is connected to 2100 V, 50 Hz supply. Calculate : *5*

(i) The secondary voltage for open circuit

(ii) The current flowing through the two windings on full load

(iii) The peak value of flux

2. (a) State and explain Kirchhoff's laws with example. 5

(b) Using node voltage method, find the current in 3 Ω resistance for the network shown in Figure 1. 5

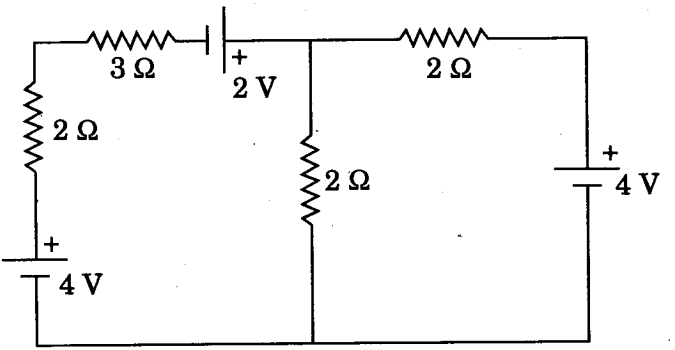

Figure 1

3. (a) What do you mean by an ideal ammeter ? How do you convert a given galvanometer into an ammeter ? Explain briefly. 5

(b) A moving coil meter has a resistance of 2 Ω and gives full scale deflection with 10 mA. Show how it can be used to measure voltage up to 250 V. 5

4. (a) Discuss the concept of self and mutual inductance. 5

(b) In a given R – L circuit R = 2·5 Ω and L = 0·2 H. Find the current through the circuit and power factor, if an alternating voltage v = 230 $\angle 30°$ V having frequency 50 Hz is applied across the circuit. 5

SECTION B

5. (a) What is the need of modulation ? Explain the modulation index, upper and lower side band frequencies in case of amplitude modulation. *10*

(b) Explain the circuit operation of full wave bridge rectifier with proper waveshapes. *5*

6. (a) What is a transistor ? Explain input and output characteristics of an NPN transistor in a common base configuration. *5*

(b) The current gain of a transistor in a common base arrangement is 0·95. Find the voltage gain and power gain, if the load resistance of the output circuit is 500 kΩ and input resistance is 100 Ω. *5*

7. (a) Write a short note on electromagnetic waves. *5*

(b) The pulse repetition frequency (PRF) of a pulsed radar is 750 Hz. Find the maximum range in kilometers that the radar can detect a target. Also determine the range in miles (nmi). *5*

8. Write short notes on any ***two*** of the following : *2×5=10*

(a) LDR

(b) Temperature Measurement

(c) Transducers
