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B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

June, 2014

BNA-013 : ELECTRICITY AND ELECTRONICS

Time : 2 hours *Maximum Marks : 70*

Note : *(i) Non-programmable scientific **calculator** is allowed.*

*(ii) Attempt **three** questions from each section.*

*(iii) Questions **No. 1** and 5 are **compulsory**.*

SECTION - A
(Electricity)

1. (a) Explain with neat sketch principle, construction and working of AC generator. **10**

(b) A 2000/200 V, 20 kVA transformer has 66 turns in the secondary. Calculate the primary turns and primary and secondary full load currents, neglecting losses. **5**

2. (a) State and explain Faraday's laws of electromagnetic Induction. **5**

(b) A solenoid of length 50 cm is uniformly wound with 500 turns of wire. If a current of 2 A is flowing in it, what is the flux density at its centre ? If the cross-sectional area of the solenoid is 4 cm^2, what is the total magnetic flux set-up at its centre ? **5**

3. (a) Explain R-L-C series circuit in AC circuit. 5

(b) A moving coil meter has a resistance of 2 ohm and gives full scale deflection with 20 mA. Show how it can be used to measure voltage up to 250 V. 5

4. (a) State and explain ohm's law and its limitations. 5

(b) An air cored solenoid has 300 turns its length is 25 cm and its cross section is 3 cm^2. Calculate the self inductance in henry. 5

SECTION - B

(Electronics)

5. (a) Explain the term demodulation with necessary circuit diagram. What are essentials in demodulation ? 10

(b) The antenna current of an AM transmitter is 8 A when only carrier is sent but it increases to 8.93 A when the carrier is sinusoidally modulated. Find the percentage modulation. 5

6. (a) Explain the operation of transistor as an oscillator. 5

(b) For a single stage transistor amplifier, the collector load is R_c = 2 kΩ and the input resistance R_i = 1 kΩ. If the current gain is 50, calculate the voltage gain of the amplifier. 5

7. (a) Draw the circuit of a practical single stage transistor amplifier. Explain the function of each component. 5

(b) An amplifier, when loaded by 2 kΩ resistor, has a voltage gain of 80 and a current gain of 120. Determine the necessary signal voltage and current to give an output voltage of 1 V. What is the power gain of the amplifier ? 5

8. Write short notes on **any two** of the following : 2x5=10

(a) A. M. Radio Receivers

(b) Light Emitting Diode (LED)

(c) Piezo-Electric Crystal