

B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

00565

December, 2014

BNA-013 : ELECTRICITY AND ELECTRONICS

Time : 2 hours

Maximum Marks : 70

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

SECTION A

(Electricity)

1. (a) Explain the working principle of DC generator with a neat sketch and also give expression for generated EMF. 10
- (b) Define transformer. Compare core type and shell type transformers. 5
2. (a) Explain moving coil galvanometer with a neat sketch. 5
- (b) A moving coil meter has a resistance of 2Ω and gives full scale deflection with 20 mA. Show how can it be used to measure voltage up to 250 V. 5

3. (a) Write short notes on any *three* of the following : 3×2=6
- (i) Heating effect of electric current
 - (ii) Self and mutual inductance
 - (iii) Power triangle
 - (iv) Kirchoff's current law
 - (v) Ohm's law
- (b) Explain law of resistance. 4
4. (a) Explain the magnetic effect of electric current with reference to magnetic field due to long solenoid. 4
- (b) Define the following terms and give formulae : 3×2=6
- (i) Electrical power
 - (ii) Temperature coefficient of resistance
 - (iii) Form factor

SECTION B
(Electronics)

5. (a) Define amplification. Explain the working of common emitter amplifier with a neat diagram. 8
- (b) Explain the need for modulation. 4
- (c) Derive the relation between current gains α and β . 3
6. (a) Explain the working of AM radio transmitter giving a neat block diagram. 4
- (b) Define the following terms : $3 \times 2 = 6$
- (i) Modulation index of FM wave
- (ii) Skip distance
- (iii) Bandwidth of AM wave
7. (a) Write short notes on the following : $3 \times 2 = 6$
- (i) Light Emitting Diode
- (ii) Light Dependent Resistor
- (iii) Damped and Undamped oscillations
- (b) Explain piezoelectric effect and its application in oscillator circuit. 4
8. (a) Explain the working of pulse radar giving a neat block diagram. 5
- (b) Explain the working of loop and dipole antenna. $2 \frac{1}{2} + 2 \frac{1}{2}$