

00285

B.Sc. (NAUTICAL SCIENCE)**Term-End Examination****June, 2012****BNA-013 : ELECTRICITY AND ELECTRONICS***Time : 2 hours**Maximum Marks : 70*

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- Note :* (i) *Non - programmable scientific calculator is allowed.*
(ii) *Attempt three questions from each section.*
(iii) *Question No. 1 and 5 are compulsory.*
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SECTION-A**(Electricity)**

1. (a) Explain with neat sketch principle, construction and working of A.C. Generator. **10**
- (b) A 25 kVA, single phase transformer has 500 turns on primary and 50 turns on secondary. The primary is connected to 3000 volts, 50 Hz supply. Find the full load primary and secondary currents and secondary E.M.F. **5**
2. (a) Define the following terms : **4×1¼=5**
- (i) RMS value of AC
(ii) Average value of AC
(iii) Form factor
(iv) Frequency

- (b) A parallel plate capacitor has a composite dielectric media consisting of relative permittivities 3, 4 and 5 with thickness 0.5, 0.6 and 0.8 mm respectively. Area of each plate is 1000 cm^2 . Find the capacitance. 5
3. (a) Explain principle and working of moving coil galvanometer. 5
- (b) The equivalent inductance of two series connected coil is 0.8 or 0.2 Henry depending on the relative directions of currents of the coil. If self inductance of one of coil is 0.4 Henry then determine : 5
- (i) Mutual inductance
- (ii) Coefficient of coupling
4. (a) State and explain Ohm's Law. What are its limitations ? 5
- (b) A copper coil has a resistance of 12.7Ω at 18°C and 14.3Ω at 50°C . Find : 5
- (i) Temperature coefficient of resistance at 0°C
- (ii) Resistance of coil at 0°C

SECTION-B
(Electronics)

5. (a) What is amplitude modulation ? Draw diagram of AM radio broadcast transmitter and explain its working. 10
- (b) The antenna current of an AM transmitter is 8 amperes when only the carrier is sent, but it increases to 8.93 A, when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8 5
6. (a) How does a transistor acts as an amplifier ? Explain with the help of some example 5
- (b) A transistor is connected in Common Emitter (CE) configuration in which collector supply is 8V and the voltage drop across resistance R_c connected in the collector circuit is 0.5 V. The value of $R_c = 800 \Omega$. If $\alpha = 0.96$, determine : 5
- (i) Collector - emitter voltage
- (ii) Base current.
7. (a) Explain working of a radio transmitter with block diagram. 5
- (b) In a broad cast super heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the intermediate frequency is 455 kHz. Calculate 5
- (i) The image frequency and its rejection ratio at 1000 kHz and
- (ii) The image frequency and its rejection ratio at 25 MHz.

8. Write short notes on *any two* of the following :

(a) Yagi Antenna

2x5=10

(b) LC tank circuit

(c) Need for Modulation
