

19200

**B.Sc. (NAUTICAL SCIENCE)**

**Term-End Examination**

**December, 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.*  
(iv) *In all you have 10 attempt six questions.*
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**SECTION-A**

**(Electricity)**

1. (a) Define active, reactive and apparent power. 10  
Explain significance of power factor.
- (b) A step up transformer is used on a 440V line 5  
to provide a potential difference of 2200V  
at 5A. The turns on primary side are 75.  
Calculate
- (i) No. of turns on secondary side and  
(ii) Current in the primary coil.

(Attempt *any two* from the following *three* questions) :

2. (a) Define : 5
- (i) RMS value of A.C.
  - (ii) Form factor
  - (iii) farad
  - (iv) henry
  - (v) ohm
- (b) The force per unit length between two long parallel conductors is  $1.5 \times 10^{-4}$  N/m. The conductor spacing is 15cm. If one conductor carries twice the current of the other, calculate the current in each conductor. 5
3. (a) With the help of a neat diagram, explain construction and working of single phase transformer. 5
- (b) The energy stored in a system consisting of two capacitors connected in series and connected across a 2kV line is 4J. When the same two capacitors are in parallel across the same line, energy stored is 18J. Calculate the capacitances of the each capacitors. 5
4. Write short notes on *any two* of the following : 10
- (a) Combination of resistances
  - (b) Conversion of Galvanometer into Voltmeter
  - (c) Self-inductance

**SECTION-B**  
**(Electronics)**

5. (a) Explain CE amplifier using NPN transistor with necessary circuit diagram. 10
- (b) The common base current gain of a transistor is 0.92. If the emitter current is 8mA, what is the value of base current ? 5

(Attempt *any two* from the following *three* questions) :

6. (a) What is amplitude modulation ? Define modulation index, upper side band and lower side band frequency component and band width in case of amplitude modulation. 5
- (b) The carrier and modulating frequencies of an FM transmitter are 1200kHz and 12 kHz respectively. If the maximum frequency deviation is 72kHz, find modulation index, band width, first three upper and lower side band frequencies. 5
7. (a) Explain working of a super-heterodyne receiver with necessary block diagram. 5
- (b) A tuned collector oscillator operates at 2.4 MHz frequency. At what frequency will it work if its tuned circuit capacitance is reduced by 30% ? 5

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

(a) Yagi Antenna

2x5=10

(b) LC tank circuit

(c) Light Dependent Resistor.

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