B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

December, 2011 00112

BNA-012 : APPLIED SCIENCE

Time : 2 hours *Maximum Marks : 70*

Note : *(i) This question paper consists of **two** sections. **Section A** and **Section B**.*

*(ii) Use of non-programmable scientific calculator is **allowed**.*

*(iii) Attempt **all** questions.*

SECTION - A

1. Attempt ***all*** parts : **5x1=5**

(a) What is the unit of power ?

(b) _____ waves are formed in water.

(c) _____ is a mode of transfer of heat by actual motion of matter.

(d) Any motion that repeats itself at regular intervals of time is called _____.

(e) Give one example of atmospheric refraction.

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2. Attempt *any two* parts : **2x5=10**

(a) Define principle of calorimetry. 20 gm of steam at 100° C is passed into a mixture of 10 gm of ice and 100 gm of water at 0° C. Find the resultant temperature.

(b) A person clapped his hands near a cliff and heard the echo after 5s. What is the distance of the cliff from the person if the speed of the sound, v is 346 m/s ?

(c) Define : (i) Moment of Inertia

(ii) Kinetic energy

3. Attempt *any two* parts : **2x5=10**

(a) Explain different modes of transference of heat.

(b) What are the characteristics of sound ? Define them.

(c) A concave lens has focal length of 15 cm. At what distance should the object from the lens be placed so that it forms an image at 10 cm from the lens ? Also find the magnification produced by the lens.

4. Attempt *any two* parts : **2x5=10**

(a) Why does the sun appears reddish early in the morning ?

(b) On an average a human heart is found to beat 75 times in a minute. Calculate the frequency and period.

(c) Calculate the mass of earth using the following data :

$g = 9.81\ m/s^2$

$R_E = 6.37 \times 10^6\ m$

the distance between earth and moon is

$R = 3.84 \times 10^8\ m.$

and the time period of the moon's revolution is 27.3 days.

SECTION - B

5. Attempt *all* parts : **1x5=5**

(a) _____ is represented by letter 'Z'.

(b) What type of bond is formed between metal and non - metal ?

(c) Give one example of physical change.

(d) Methane is commonly known as _____.

(e) Acid rains are formed by the Oxides of _____ and _____ .

6. Attempt *any two* parts : **2x5=10**

(a) What is COD ? Which chemical substance is generally used in its measurement ?

(b) A compound contains 4.07 % Hydrogen, 24.27% Carbon and 71.65% Chlorine. Its molar mass is 99. Calculate it's molecular and empirical formula.

(c) Define hydrogen bonds. Arrange the following bonds in increasing order of polarity : Ionic bond, covalent bond, hydrogen bond.

7. Attempt *any two* parts : **2x5=10**

(a) What are the hazards of cargoes with respect to toxicity and corrosivity ?

(b) Explain with example.

(i) Exothermic and endothermic reactions.

(ii) Physical and chemical changes.

(c) Give two properties and applications of methane.

8. Attempt *any two* parts : **2x5=10**

(a) Define pollutants. What are the different types of water pollution ? Explain Briefly.

(b) On a ship sailing in Pacific ocean when temperature is 23.4° C, a balloon is filled with 2L air. What will be the volume of the balloon when the ship reaches Indian ocean where temperature is 26.1° C ?

(c) Give the I.U.P.A.C name of the following compounds :

(i) Acetone

(ii) Acetaldehyde

(iii) Ethyl alcohol

(iv) Diethyl ether.

(v) Chloroform.