

B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

December, 2013

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) A collision in which there is loss of some kinetic energy is called _____ .
- (b) What type of energy is stored in the spring of a watch ?
- (c) Give one example of transverse wave.
- (d) The twinkling of a star is due to _____ .
- (e) _____ is the hidden heat.

2. Attempt **any two** of the following : **2x5=10**

- (a) When 0.2 kg of a body at 100°C is dropped into 0.5 kg of water at 10°C . The resulting temperature is 16°C . Find the specific heat of the body, specific heat of water is $4.2 \times 10^3 \text{ J/kg/}^{\circ}\text{C}$
- (b) Explain Doppler effect with all possible cases.
- (c) State and establish principle of conservation of energy.

3. Attempt **any two** of the following : **2x5=10**

- (a) Explain the mode of transfer of heat in case of solid.
- (b) Explain the effect of temperature and pressure on velocity of sound in air.
- (c) Define the power of lens. State the unit of power of lens. Find the power of a concave lens of focal length 2m.

4. Attempt **any two** of the following : **2x5=10**

- (a) Define damped and undamped simple harmonic motion.
- (b) Explain propagation of light in optical fiber.
- (c) Assuming the earth to be a uniform sphere of radius 6400km and density 5.5 g./c.c. . Find the value of g on its surface. $G = 6.66 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$.

SECTION - B

5. Attempt all parts : 1x5=5
- (a) Atomic size _____ along a period.
 - (b) The property by virtue of which the fluid offers resistance to flow is called _____
 - (c) Melting of wax is a _____ change.
 - (d) Chloroform is the common name of _____ .
 - (e) Ethanol is highly _____ gas.
6. Attempt any two of the following : 2x5=10
- (a) Define : (i) Pollution
(ii) BOD
 - (b) Define empirical formula. How molecular weight of a compound is related to its vapour density ?
 - (c) Explain coordinate bond with example.
7. Attempt any two of the following : 2x5=10
- (a) Define ionisation energy and also give its trend along a period and group.
 - (b) Explain displacement and decomposition reaction.
 - (c) Give two properties of ethanol with reaction.

8. Attempt **any two** of the following : **2x5=10**

- (a) 20ml of hydrogen measured at 15°C are heated to 35°C. What is the new volume at the same pressure ?
- (b) What are the sources and ill effects of mercury present in river or sea water.
- (c) Give the I.U.P.A.C name of the following compounds.
 - (i) Ethyl alcohol
 - (ii) Acetone
 - (iii) Ethyl methyl ether
 - (iv) Marsh gas
 - (v) Acetylene
