00001

B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

December, 2012

BNA-012 : APPLIED SCIENCE

Time : 2 hours　　　　　　　　　*Maximum Marks : 70*

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

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

SECTION-A

1.　Attempt all parts :　　　　　　　　　　5x1=5

　　(a)　What is the S.I unit of density ?

　　(b)　On which characteristics of sound does
　　　　pitch depends ?

　　(c)　Heat from the sun reaches the earth's
　　　　surface by the process of _____ .

　　(d)　Energy can neither be _____ nor
　　　　_____ .

　　(e)　Dioptre is the unit of _____ .

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

   (a) Derive and state the effect of temperature and pressure on velocity of sound in air ?

   (b) With the help of a neat sketch, explain propagation of light in optical fibre.

   (c) Define calorimetry and latent heat.

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

   (a) Explain the working of a astronomical telescope with ray diagram.

   (b) Discuss elastic and inelastic collision.

   (c) A copper block of mass 2.5 kg is heated in a furnace to a temperature of 500°C and then placed on a large ice block. What is the maximum amount of ice that can melt ? (specific heat of copper = 0.39 $Jg^{-1}K^{-1}$, latent heat of fusion of water = 335 J/g)

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

   (a) Explain construction and working of a siren.

   (b) Explain simple harmonic motion with example.

   (c) A body weighs 63 N on the surface of the earth. What is the gravitational force on it due to the earth at a height equal to half the radius of the earth.

SECTION-B

5. Attempt all parts : 5x1=5

   (a) Atomic number of an atom is represented by letter _____ .

   (b) The gas released during effervesence formation is _____ .

   (c) Loss of electron is a/an _____ reaction.

   (d) Molecular weight is equal to twice the _____ .

   (e) _____ takes place on iron metal.

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

   (a) What is a chemical bond ? Explain the type of bond formed between sodium atom and chlorine atom.

   (b) Give a chemical equation for
      (i) Exothermic reaction
      (ii) Decomposition reaction

   (c) Write three uses of alcohol and ether.

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

   (a) A compound has molecular formula C_5H_{10}. What is its empirical formula ?

   (b) What is air pollution ? How oxides of sulphur and nitrogen causes acid rain ?

   (c) What is the relevance of gas laws to LPG carrier ?

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

   (a) Give the construction and working of the storage cell.

   (b) Define :

       (i) Pollutant

       (ii) Physical and chemical change.

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

       (i) Marsh gas

       (ii) Acetone

       (iii) Ethyl Alcohol

       (iv) Ether

       (v) Formaldehyde

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