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BNA-012

B.Sc. (NAUTICAL SCIENCE)

00310

Term-End Examination

June, 2014

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) The angular speed of a flywheel starting from rest reaches a speed of 240 rpm in 4 s. Its angular acceleration would be _____.

(b) A body which absorbs all the radiations of any wavelength falling on it is called as _____.

(c) Loudness of sound is measured in _____.

(d) A mass attached to a spring vibrates back and forth. At the equilibrium position, the _____ reaches a maximum.

(e) When an object is placed at the focus of a concave mirror, the image will be formed at _____.

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

(a) Describe briefly the effect of pressure on melting point of solids and boiling point of liquids.

(b) State the characteristics of simple harmonic motion.

(c) An object of height 2 cm when placed at a distance of 16 cm from a concave mirror which produces a real image 3 cm high. What is the focal length of the mirror ? Find the position of the image.

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

(a) Draw a ray diagram to find the position of image when the object is placed between f and 2f of a convex lens.

(b) What is the effect of temperature, pressure and salinity on velocity of sound in sea-water ?

(c) A cricket ball of mass 0.5 kg strikes a bat normally with a velocity of 30 m/s and rebounds with a velocity of 20 m/s in opposite direction. Calculate the impulse of the force exerted by the ball on the bat.

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

(a) Describe the change in acceleration due to gravity with height.

(b) Explain Ingen-Housz's experiment for the comparison of thermal conductivities of solids.

(c) A harmonic oscillation is represented by $Y = 0.26 \cos(4000t + \pi/6)$ where Y and t are in mm and seconds respectively. Deduce

(i) amplitude
(ii) frequency
(iii) angular frequency
(iv) period
(v) initial phase

SECTION - B

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

(a) _____ of an element is defined as the combining capacity of an element.

(b) The _____ configuration is a process in which the distribution of electrons is performed in several electronic sub-shells of an atom.

(c) Give one example of double covalent bond.

(d) The natural process which contributes to CO in the atmosphere are _____ and _____.

(e) Write down the first member of alkene series.

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

(a) What is BOD ? Explain briefly the end products of the process.

(b) On analysis, an organic compound was found to contain C = 54.54%, H = 9.09% and rest oxygen. If the molecular formula mass is 88. Find molecular formula of the given compound.

(c) What is a chemical bond ? Differentiate between electrovalent and covalent compound with examples.

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

(a) What are the hazards of inorganic cargoes carried on board vessel with respect to flammability and reactivity ?

(b) Explain with examples :

(i) Homogeneous reaction and Heterogeneous reaction.

(ii) Combination and Decomposition reaction.

(c) Give two properties and application of ethene.

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

(a) Define the term pollution. Explain briefly about land pollution.

(b) A sample of gas is found to occupy a volume of 900 cm^3 at 27°C. Calculate the temperature at which it will occupy a volume of 300 cm^3.

(c) Give the IUPAC name of the following compounds :

(i) Methyl bromide

(ii) Formaldehyde

(iii) Methyl alcohol

(iv) Dimethyl ether

(v) Dimethyl ketone