BNA-012

00620

B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

December, 2010

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) Name two physical phenomena produced by atmospheric refraction.

(b) What is the relation between frequency and wavelength of a wave motion?

(c) Energy possessed due to its position is called _____ .

(d) What is the S.I.unit of temperature?

(e) Latent heat of fusion of ice is _____ .

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

(a) Explain the characteristics of sound.

(b) Explain mirage and looming.

(c) There is a layer of ice one cm thick over the surface of pond. The temperature above ice is $-3°C$. Calculate the rate of cooling of water in the pond per m^2. Given K for ice=0.008 units.

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

(a) The focal length of the objective and the eye piece of a telescope are 84cm and 3cm respectively. Calculate the magnification and length of the telescope tube.

(b) Define

(i) Moment of inertia.

(ii) Radius of gyration.

(c) Explain with graph the anomalous expansion of water.

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

(a) Explain Doppler's effect. A source produces a note of frequency 'n' and is moving towards a stationary observer with a uniform speed 'a'. show that the apparent pitch is :

$$n' = n\left[\frac{v}{v-a}\right]$$

(b) Explain damped and undamped oscillations.

(c) A 70 kg boy stands 1 m away from a 60 kg boy. Calculate the force of gravitational attraction between them.

Given $G=6.66\times10^{-11}$ Nm^2/kg^2.

SECTION - B

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

(a) How is molecular weight related to vapour density?

(b) $C + O_2 \rightarrow CO_2 + 394.2$ kJ

Above reaction is an example of an _____ reaction.

(c) Lowest temperature at which liquid just starts flowing is called _____ .

(d) Oxide of which elements are responsible for acid rain.

(e) Alcohol is the common name for _____ .

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

(a) Discuss the effect of pressure on melting and boiling point.

(b) Define the following:

(i) Displacement reaction.

(ii) Decomposition reaction.

(iii) Homogenous reaction.

(iv) Pollutant.

(v) Endothermic reaction.

(c) Calculate the molecular formula of a compound with vapour density 30 having 40% carbon and 6.67% of hydrogen.

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

(a) What are the hazards of alcohol with respect to flammability, toxicity, reactivity and solubility ?

(b) What are water pollutants? Discuss the ill effects of Cadmium, Arsenic and Lead.

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

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

(a) Define the following :

(i) Flash point.

(ii) Viscosity.

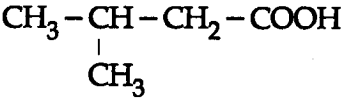
(iii) Flammability.

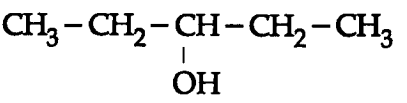
(iv) Solubility.

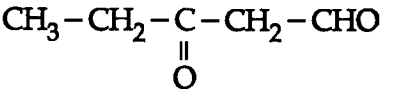
(v) Ionic bond.

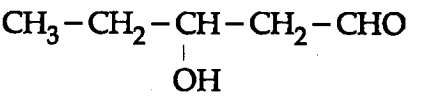
(b) 100 ml. of nitrogen gas collected at 27°C and 720 mm Hg pressure is cooled to −73°C under pressure of 800 mm Hg. pressure. What is the volume occupied by it ?

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

(i) 

(ii) 

(iii) 

(iv) 

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