

# Holiday Homework

Class-XI

Sub:Physics

1. Give the location of the centre of mass of a (i) sphere, (ii) cylinder, (iii) ring, and (iv) cube, each of uniform mass density. Does the centre of mass of a body necessarily lie inside the body?
2. In the HCl molecule, the separation between the nuclei of the two atoms is about  $1.27 \text{ \AA}$  ( $1 \text{ \AA} = 10^{-10} \text{ m}$ ). Find the approximate location of the CM of the molecule, given that a chlorine atom is about 35.5 times as massive as a hydrogen atom and nearly all the mass of an atom is concentrated in its nucleus.
3. Find the components along the x, y, z-axes of the angular momentum  $l$  of a particle, whose position vector is  $r$  with components  $x, y, z$  and momentum is  $p$  with components  $p_x, p_y$  and  $p_z$ . Show that if the particle moves only in the x-y plane the angular momentum has only a z- component.
4. State, for each of the following physical quantities, if it is a scalar or a vector: volume, mass, speed, acceleration, density, number of moles, velocity, angular frequency, displacement, angular velocity.
5. Pick out the two scalar quantities in the following list:  
force, angular momentum, work, current, linear momentum, electric field, average velocity, magnetic moment, relative velocity.
6. A cyclist starts from the centre O of a circular park of radius 1 km, reaches the edge P of the park, then cycles along the circumference, and returns to the centre along QO as shown in Fig. If the round trip takes 10 min, what is the (a) net displacement, (b) average velocity, and (c) average speed of the cyclist?
7. A jet airplane travelling at the speed of  $500 \text{ km h}^{-1}$  ejects its products of combustion at the speed of  $1500 \text{ km h}^{-1}$  relative to the jet plane. What is the speed of the latter with respect to an observer on the ground?
8. A drunkard walking in a narrow lane takes 5 steps forward and 3 steps backward, followed again by 5 steps forward and 3 steps backward, and so on. Each step is 1 m long and requires 1 s. Plot the x-t graph of his motion. Determine graphically and otherwise how long the drunkard takes to fall in a pit 13 m away from the start.
9. 1. The sign of work done by a force on a body is important to understand. State carefully if the following quantities are positive or negative:  
(a) Work done by a man in lifting a bucket out of a well by means of a rope tied to the bucket,  
(b) Work done by gravitational force in the above case,

- (c) Work done by friction on a body sliding down an inclined plane,
- (d) Work done by an applied force on a body moving on a rough horizontal plane with uniform velocity,
- (e) Work done by the resistive force of air on a vibrating pendulum in bringing it to rest.

**10 Fill in the blanks**

- (a) The volume of a cube of side 1 cm is equal to.....m<sup>3</sup>.
- (b) The surface area of a solid cylinder of radius 2.0 cm and height 10.0 cm is equal to .....(mm)<sup>2</sup>.
- (c) A vehicle moving with a speed of 18 km h<sup>-1</sup> covers ..... m in 1 s.
- (d) The relative density of lead is 11.3. Its density is ..... g cm<sup>-3</sup> or ..... kg m<sup>-3</sup>.

② A system absorbs 500 J of heat and does work of 50 J on its surroundings. Calculate the change in internal energy.

③ A gas absorbs 2000 J of heat and expands against an internal pressure of 2 atm from volume of 0.5 L to 10.5 L, what will be the change in internal energy.

④ State first law of thermodynamics.

⑤ A certain gas initially at room temperature undergoes expansion in volume from 4.0 L to 20.0 L at constant T. Calculate the work done by the gas if it expands (a) against vacuum (b) against constant pressure 1.2 atm.

⑥ Calculate the work of expansion of 2 moles of an ideal gas when it expands isothermally and reversibly from  $10 \text{ m}^3$  to  $20 \text{ m}^3$  at 300 K.

⑦ Calculate the amount of work done when 5 moles of an ideal gas expands isothermally & reversibly from a pressure of 10 atm to 2 atm at 300 K.

- 8) A system does 200 J of work and at the same time absorbs 150 J of heat. What is the change in internal energy?

$$\Delta H = \Delta U + \Delta n_g RT$$

- 9) When liquid benzene is oxidised at constant pressure at 300 K, the change in enthalpy is  $-3728 \text{ kJ}$ . What is the change in internal energy at the same T.
- 10) Explain the following.  
• open system, isolated system, extensive property, intensive property.
- 11) Calculate the value of  $\Delta U$  for the following reaction.



- 12) The enthalpy of formation of methane at constant pressure and 300 K is  $-78.84 \text{ kJ}$ . What will be the enthalpy of formation of methane at constant volume?



- 13) Enthalpy of combustion of carbon to carbon dioxide is  $-393.5 \text{ kJ mol}^{-1}$ . Calculate the heat released upon the formation of 66 g of  $\text{CO}_2$  from carbon and oxygen.

1. A sample of Calcium phosphate  $\text{Ca}_3(\text{PO}_4)_2$  contains 8 mol of O atoms. The number of mole of Ca atoms in the sample is.  
 (a) 4 (b) 1.5  
 (c) 3 (d) 8
2. Ratio of masses of  $\text{H}_2\text{SO}_4$  and  $\text{Al}_2(\text{SO}_4)_3$  each containing 32 grams of S is \_\_\_\_\_  
 (a) 0.86 (b) 1.72  
 (c) 0.43 (d) 2.15
3. Which has maximum number of atoms of oxygen  
 (a) 10 ml  $\text{H}_2\text{O}(l)$   
 (b) 0.1 mole of  $\text{V}_2\text{O}_5$   
 (c) 12 gm  $\text{O}_3(g)$   
 (d)  $12.044 \times 10^{22}$  molecules of  $\text{CO}_2$
4. Mass of one atom of the element A is  $3.9854 \times 10^{-23}$ . How many atoms are contained in 1g of the element A?  
 (a)  $2.509 \times 10^{22}$  (b)  $6.022 \times 10^{23}$   
 (c)  $12.044 \times 10^{23}$  (d) None of these
5. The number of atoms present in 0.5 g-atoms of nitrogen is same as the atoms in  
 (a) 12 g of C (b) 32 g of S  
 (c) 8 g of oxygen (d) 24g of Mg
6. How many moles of magnesium phosphate  $\text{Mg}_3(\text{PO}_4)_2$  will contain 0.25 mole of oxygen atoms:  
 (a) 0.02 (b)  $3.125 \times 10^{-2}$   
 (c)  $1.25 \times 10^{-2}$  (d)  $2.5 \times 10^{-2}$
7. 64 g of an organic compound has 24 g carbon and 8 g hydrogen and the rest is oxygen. The empirical formula of the compound is :  
 (a)  $\text{CH}_4\text{O}$  (b)  $\text{CH}_2\text{O}$   
 (c)  $\text{C}_2\text{H}_4\text{O}$  (d) None of these
8. Two elements X (atomic mass = 75) and Y (atomic mass = 16) combine to give a compound having 75.8% of X. The formula of the compound is:  
 (a)  $\text{X}_2\text{Y}_3$  (b)  $\text{X}_2\text{Y}$   
 (c)  $\text{X}_2\text{Y}_2$  (d) XY
9. A definite amount of gaseous hydrocarbon was burnt with just sufficient amount of  $\text{O}_2$ . The volume of all reactants was 600 ml, after the explosion the volume of the products [ $\text{CO}_2(g)$  and  $\text{H}_2\text{O}(g)$ ] was found to be 700 ml under the similar conditions. The molecular formula of the compound is:  
 (a)  $\text{C}_3\text{H}_8$  (b)  $\text{C}_3\text{H}_6$   
 (c)  $\text{C}_3\text{H}_4$  (d)  $\text{C}_4\text{H}_{10}$
10. Mole fraction of ethyl alcohol in aqueous ethyl alcohol ( $\text{C}_2\text{H}_5\text{OH}$ ) solution is 0.25. Hence percentage of ethyl alcohol by weight is :  
 (a) 54% (b) 25%  
 (c) 75% (d) 46%
11. 74 gm of sample on complete combustion gives 132 gm  $\text{CO}_2$  and 54 gm of  $\text{H}_2\text{O}$ . The molecular formula of the compound may be  
 (a)  $\text{C}_5\text{H}_{12}$  (b)  $\text{C}_4\text{H}_{10}\text{O}$   
 (c)  $\text{C}_3\text{H}_6\text{O}_2$  (d)  $\text{C}_3\text{H}_7\text{O}_2$
12. Weight of oxygen in  $\text{Fe}_2\text{O}_3$  and  $\text{FeO}$  is in the simple ratio of  
 (a) 3 : 2 (b) 1 : 2  
 (c) 2 : 1 (d) 3 : 1
13. A person needs on average of 2.0 mg of riboflavin (vitamin  $\text{B}_2$ ) per day. How many gm of butter should be taken by the person per day if it is the only source of riboflavin? Butter contains 5.5 microgram riboflavin per gm.  
 (a) 363.6 gm (b) 2.75 mg  
 (c) 11 gm (d) 19.8 gm
14. The oxide of a metal contains 30% oxygen by weight. If the atomic ratio of metal and oxygen is 2 : 3, determine the atomic weight of metal.  
 (a) 12 (b) 56  
 (c) 27 (d) 52
15. When a mixture of 10 mole of  $\text{SO}_2$ , 15 mole of  $\text{O}_2$  was passed over catalyst, 8 mole of  $\text{SO}_3$  was formed. How many mole of  $\text{SO}_2$  and  $\text{O}_2$  did not enter into combination?  
 (a) 2 moles of  $\text{SO}_2$ , 11 moles of  $\text{O}_2$   
 (b) 3 moles of  $\text{SO}_2$ , 11.5 moles of  $\text{O}_2$   
 (c) 2 moles of  $\text{SO}_2$ , 4 moles of  $\text{O}_2$   
 (d) 8 moles of  $\text{SO}_2$ , 4 moles of  $\text{O}_2$
16.  $\text{C}_6\text{H}_5\text{OH}(g) + \text{O}_2(g) \rightarrow \text{CO}_2(g) + \text{H}_2\text{O}(l)$   
 Magnitude of volume change if 30 ml of  $\text{C}_6\text{H}_5\text{OH}(g)$  is burnt with excess amount of oxygen, is  
 (a) 30ml (b) 60ml  
 (c) 20ml (d) 10ml
17. Mass of sucrose  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$  produced by mixing 84 gm of carbon, 12 gm of hydrogen and 56 lit.  $\text{O}_2$  at 1 atm & 273 K according to given reaction, is  
 $\text{C}(s) + \text{H}_2(g) + \text{O}_2(g) \rightarrow \text{C}_{12}\text{H}_{22}\text{O}_{11}(s)$   
 (a) 138.5 (b) 155.5  
 (c) 172.5 (d) 199.5

**Q1. MULTIPLE CHOICE QUESTIONS**

- A. Storage of 1 Megabyte is equivalent of \_\_\_\_\_ Kilobyte.  
1024 KB b) 1064 KB c) 1000 KB d) 1028 KB
- B. Which of the following is/are the universal logic gates?  
a) OR and NOR b) AND c) NAND and NOR d) NOT
- C. Actual instructions in flowcharting are represented in \_\_\_\_\_  
a) Circles b) Boxes c) Arrows d) Lines
- D. Gate NAND can be simplified as :  
a) AND followed by OR  
b) AND followed by NOT  
c) NOT followed by AND  
d) OR followed by AND
- E. Execution of statements in \_\_\_\_\_ construct depends on the condition test.  
a. Selection  
b. Iteration  
c. Repetition  
d. Sequential
- F. Which of the following operations on a string will generate an error?  
(a) "PYTHON"\*3 (b) "PYTHON" + "20"  
(c) "PYTHON" + 10 (d) "PYTHON" + "LANGUAGE"
- G. Which of the following functions will return the last three characters of a string s ?  
a) s[3: ] b) s[ : 3] c) s[-3: ] d) s[ : -3]
- H. Read Only Memory (ROM) is a \_\_\_\_\_ memory.  
a) Non-volatile b) Volatile c) a & b d) None
- I. Which of the following is not an operating system?  
a) Windows b) Linux c) Oracle d) DOS
- J. Language translator is a type of application software(T/F)

K. A system software that converts the whole high level language program into machine code at once is known as compiler (T/F)

L. The algorithm should be written after writing the code (T/F)

M. The 'None' literal is used to indicate absence of a value (T/F)

### SHORT ANSWER TYPE

A) Given the lists  $L=[2, 7, 8, 6, 9, 17, 91, 56, 33]$  Write output of  
`print(L[5 : 7])`  
`print(L[-7:-2])`  
`print(L[::-1])`

B) Subhasree is unable to understand why the following python code snippet is giving an error  
`L=(10,"hello",34.5)`  
`L[0]=20`  
`print(L)`

C. Discuss the role of utility software in the context of computer performance

D. Write the four different functions of Operating System.

E. What is the difference between a flowchart and pseudocode .

F. What is a string slice? How is it useful

G. State DeMorgan's laws of Boolean algebra and verify them using truth table

H. Draw a logical circuit diagram of the Boolean expression:

$X = A'BC (A+D)'$ .

### Case Study Based Question-1

Compiler and interpreter are used to convert high level language programs into machine language. The only difference is that a compiler reads the whole program at a time to convert it into machine code whereas, interpreter does it line by line or statement by statement. The machine code received from compiler is stored in the hard disk. When you want to re-execute the compiled program, you need not recompile it again rather the same machine code is used for processing. On the other hand, on using the interpreter, the high level program need to be converted as many times as you want to execute it.

Read the above description and answer the following questions:

(i) Name the two language translators.

(ii) which one is faster, a compiler or an interpreter?

(iii) Why should you convert a high level language into a machine language?

(iv) Which of the language processor executes the program line by line?

(v). which of the language processor executes the program in one go?

**Case Study Based Question-2:** Variable is a name that used to refer to memory location. Python variable is also known as an identifier and used to hold value. In Python, we don't need to specify the type of variable because Python is a infer language and smart enough to get variable type. Variable names can be a group of both the letters and digits, but they have to begin with a letter or an underscore.

(i) Which of the following is correct way of declaring and initialising a variable, X with value 5?

a) `int x`

X=5

b) int x=5

c) X=5

d) Declare x=5

ii) Which of the following will give error?

a) a=b=c=1

b) a,b,c=1

c) a,b,c=1, python, 1.5

d) None of the above

Which of the following is a valid variable?

a) var@

b) 32var

c) class

d) abc\_a\_c

### **LONG ANSWER TYPE.**

A. Write a menu driven program to implement a simple calculator in python. The program reads two integer values and provides choice for the user to perform Addition, Subtraction, multiplication, and division operations on those values. The program continuously gives choice for the user to perform the above operations till the user select exit option.

B. Removal all characters from a string except integers.

C. Write a program to find the factorial of a given number.

D. Find the length of each word in a given string



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कक्षा 11वीं- विषय -हिंदी(2024-25)

प्रश्न -1. आरोह, वितान के जितने अध्याय पढ़ा दिए गए हैं, उसको कक्षा कार्य कॉपी में पूर्ण करना है।

प्रश्न -2. अभिव्यक्ति और माध्यम के संचार माध्यम से लेकर कथा पट कथा तक का अध्याय शरदकालीन अवकाश गृहकार्य काफी में पूर्ण करना है

परियोजना कार्य -project work

प्रश्न -3. भारतीय गायिकाओं में बेजोड़ लता मंगेशकर के जीवन चरित्र को A4 साइज पेपर में चित्रात्मक तरीके से प्रस्तुत कीजिए