Open Test - 2075 (Mangsir)

Class: XI(Science)

Time: 3 Hrs

English

Magic of words

Set A

Answer these questions

1. Why does the heart of the poet leap up when he sees a rainbow in the sky? (My heart leaps Up…………)   5
2. Do you agree with the idea of Barbara Holland about having single rather than multiple numbers of children? Why? Why not? Give reason. (Speaking of Children)   5
3. Explain, "The cup is a detail, a small uncharred finger from the mid-century bonfire". (Look at a teacup)   5
4. Give a physical description of yourself so that your pen friend can easily recognize you when she/he meets you.   5
5. To what extent does fashion determine your health and happiness?   5

Meaning into words

1. Add an explanation to each of the remarks below saying what is happening.   5
   Eg: Don't go out in your sandals: It's pouring with rain.
   i) Don't switch the radio off:

   ii) Pass me a paper handkerchief:
   iii) I'm afraid you can't use that room just now:
   iv) There is no need to warry about the children:
   v) We need to have our root repaired:

2. Suppose you are staying at your friend's house for the weekend. Make five different requests to him/her using the prompts given below.   5

   Could you………………?
   Would you mind…... ing……….?
   I don't suppose you could, …………. Could you?
   Do you think you could, ………...?
   …………………. Could you?

3. Ask each other questions as in the example. Give any two explanations for each.   5
   Ex. A: Why are your eyes all read?
      B: I've been crying
      C: I've been peeling onions.

Ask Why

   i) Your hair is wet
   ii) Your hands are shaking
   iii) Your face is red
   iv) You have got blood on your hand
   v) There is sawdust on the floor

4. Change the following sentences into passive.   5
   i) Two policemen are questioning the man?
   ii) Is anyone using this room.
   iii) They built the house in the 19th century.
   iv) Students were playing cricket.
   v) Somebody guards the prisoner.

5. Give a description of your locality so that your new guest can easily find your home/residence.

Physics

Mechanics
Short answer question

1. Why a cricketer lowers his hand while catching a ball?
2. Find the angle of projection at which the horizontal range and the maximum height of a projectile are equal.

Long answer question
1. Show that the path followed by a projectile fired at an angle α with a horizontal is parabolic and derive general expression for time of flight, horizontal range and maximum height.
2. State the principle of conservation of linear momentum. Show that collision between two moving bodies in which no external force act, the conservation of linear momentum may be deduced directly from Newton's laws of motion.
3. What do you mean by cold welding? Show that angle of repose is equal to angle of friction.

Numerical

1. An iron block of mass 10 kg rests on a wooden plane inclined at 30° to the horizontal. If it is found that the least force parallel to the plane which causes the block to slide up the plane be 100 N. calculate the coefficient of sliding friction between wood and iron.

2. An airplane is flying with velocity 90.0 m/s at an angle of 23.0 above the horizontal. When the plane is 114 m directly above a dog that is standing on level ground, a suitcase dropout luggage compartment. How far from the dog will the suitcase land? You can ignore air resistance.

Mechanics II

Short question   [2 marks]

1. Two vectors $\vec{A}$ & $\vec{B}$ are such that $\vec{A} - \vec{B} = \vec{C}$ & $A - B = C$. Find the angle between them.
2. A vectors B defined as $\overrightarrow{E_1} = 2\hat{\imath} + 3\hat{\jmath} - \widehat{4k}$ what B the magnitude of the X & Y-component of $\overrightarrow{E_1}$
3. Explain the significance of banking of a curried road.
4. A plane has to tilt slightly if it has to change its direction why?
5. What will happen to the value of acceleration due to gravity if the earth stops roating about its axis?

Long Question

1. What B the escape velocity? Show that the escape velocity of a body B $\sqrt{2gR}$, where symbol have their usual meaning.

Numerical

1. What is the period of revolution of a satellite of mass m that orbits the earth in circular path of radius 7800 km about 1500 km above the surface of the earth?

Optics & Electrostatics

Short Question

1. Why does diamond sparkle?
2. A coin placed at the bottom of a beaker containing water seems to be raised why?
3. A charged conical conductor loses its charge earlier than a similarly charged sphere. Why?

Long Question

1. What is lateral shift? Deduce lateral shift in terms of thickness of a glass slab and the angle of incidence of light.

Numericalls

1. What is apparent position of an object below a rectangular block of glass 6 cm thick if a layer of water 4 cm thick is on top of the glass? Refractive index of glass and water be $^3/_2$ and $^4/_3$ respectively?

Heat

1. What are the effects of heat?
2. Steam at 100°C burns more than water at 100°C. How?
3. Why is baby wrapped tightly with warm clothes than an adult man in winter.

Long

1. Define latent heat of fusion of ice. Describe a method to determine it by method of mixture.

Numericalls

1. How much heat is required to convert 5 kg of ice at -10°C into steam at 100°C?

[Given: Specific heat capacity of ice (Si)=2100 J kg^{-1}°C^{-1}, specific latent heat of ice (Li)=336000 J kg^{-1} and specific heat capacity of water (Sw)=4200 kg^{-1}°C^{-1}]

Chemistry

1. Describe aluminothermite process.
2. Why is ionization energy of oxygen less than that of nitrogen?
3. How Ionization potential and electron affinity does vary among periods and groups?
4. Write a short note on disadvantages of Mendeleev's periodic table
5. Define ionization energy. How do nuclear charge and size of atom influence the magnitude of the ionization energy?
6. What happens when gas obtained by heating slaked lime and ammonium chloride is passed through copper sulphate solution?
7. Draw Lewis structure of N_2O_5 and N_2O.
8. Why water is excellent solvent for polar substance?
9. What is activated charcoal? Give its use.
10. CO is used as reducing agent but CO_2 is not? Why?
11. Write short notes on Atomic Spectra with its types.
12. What is Quantum mechanical model of Atom.
13. Explain terms:
    i) Isotopes   ii) Isobars   iii) Isotones
14. State De-broglie hypothesis
15. State Heisenberg uncertainty principle.
16. What happened mercurous nitrate paper is placed in a jar full of ammonia gas?
17. Write the manufacture of HNO_3 by catalytic oxidation of ammonia?
18. Give the action of nitric acid with zinc and iron.
19. Why is it necessary to prepare sodium extract for the detection of foreign elements in organic compounds?
20. Differentiate between electrophile and nucleophile.
21. Write the isomers of C_2H_6O and give their IUPAC names.
22. What experimental evidences led Rutherford to conclude that?
    i) The nucleus of the atom contains most of the atomic mass.

Zoology

Short Questions   4×3=12

1. Write a short note on liver.
2. Describe the Miller-Urey experiment on origin of life.
3. Describe the erythrocytic stage of malarial parasite.
4. Describe the sporogony of malarial parasite.

Long Questions.

1. Describe the alimentary canal of frog.   7.5
2. Describe Oparin and Haldane's concept of origin of life.   8

3. Describe the sexual reproduction of malarial parasite with well labeled diagram.   7.5
4. Describe the schizogony cycle of *Plasmodium vivax* with well labeled diagram.   8

Botany

Biodiversity

1. What is phyllotaxy? Explain its types   3
2. What is fasciculate root?   1
3. Explain the modification form of adventitious root.   3
4. What is a leaf? Describes the types of leaves with examples. 8
5. What is caudax stem?   1
6. What is underground stem explain with examples.   1
7. What do you mean by roots?   1

Biota & Environment

1. Define trophic level?   1
2. What is detritus?   1
3. Give an example of a positive interaction.   1
4. Give any two examples of secondary consumers of a pond ecosystem? Write about the biotic components of a pond ecosystem.   7.5

5. Explain ecological pyramids with reference to the number's biomass and energy with figures.   7.5

Cell Biology/Cell Division

1. What is cellular totipotency?   1
2. What is cytokinesis?   1
3. Why meiosis is a reductional division?   1
4. Write the significance of mitosis?   3
5. Write changes occurring during interphase of cell cycle.   3
6. Elaborate mitotic cell division with necessary diagrams.   7.5

Mathematics

1. If $A \subseteq B$, Prove that $\bar{B} \subseteq \bar{A}$
2. For any two real numbers x and y, prove that $|x+y| \leq |x|+|y|$.
3. Show that 1 is a root of the equation (b-c) x^2+(c-a) x+(a-b) =0. Also, find the other root.
4. Determine the equation of the straight line passing through the point (-1,3) and x-intercept is thrice the y-intercept.
5. Find the derivatives of: $3x^2+5x+7$
6. Find the limits as the points specified:

$$f(x)=\begin{cases} 5x + 2 \; for \; x \geq 2 \\ 7x - 2 \; for \; x < 2 \end{cases} \text{ at } x=2$$

7. Evaluate: $\lim\limits_{x \to \pi/2} \dfrac{Cosx}{\frac{\pi}{2}-x}$

4 Marks

1. Define union of the two sets let A, B, C, are the subsets of a universal set U, prove that A-(B∪C) = (A-B)-C
2. If x be any real number and a is positive real number then |x|<a implies -a<x<a and conversely.

3. If the roots of the equation $lx^2 + nx + n = 0$ be in the ratio p: q, prove that

$$\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$$

4. If the quadratic equation $ax^2 + bx + c = 0$ and $bx^2 + cx + a = 0$ have a common root, then prove that either a+b+c-0 or a=b=c.

5. Find the derivative from the first principle of: $(3x - 2)^{1/2}$

6. Find $\frac{dy}{dx}$ for the following implicit function: $x^3y^6=(x+y)^9$

6 marks:

1. State-De-moiver's theorem. Using De-moiver's theorem, find the fourth roots of $-\frac{1}{2} + i\frac{\sqrt{3}}{2}$

2. Prove that:

$$\begin{vmatrix} x^2 + 1 & xy & xz \\ xy & y^2 + 1 & yz \\ xz & yz & z^2 + 1 \end{vmatrix} = \begin{vmatrix} 1 + x^2 & x^2 & x^2 \\ y^2 & 1 + y^2 & y^2 \\ z^2 & z^2 & 1 + z^2 \end{vmatrix} = 1 + x^2 + y^2 + z^2$$

3. State and prove De-Morgan's law for any two non-empty sets in the set theory.

Computer

1. Subtract $(1100)_2$ from $(1111)_2$ 1's and 2's complement method. 5
2. What is CPU? Explain its function.   5
3. Differentiate between NAND and NOR gate.   5
4. What is a "bus" in computer architecture? Explain with a diagram.   5
5. What is memory? Explain its types in detail.   10
6. Show with reference to a block diagram, the structure of a digital computer system and the inter-connection of various units. Explain the functions of various units briefly.   10
7. What is denary number system? Convert $(DAD)_{16}$ into base 8 number system.   5
8. Write short notes on: 5
   a. Hard disk   b. Microprocessor

Best of Luck