Class 6th Autumn Holidays Homework

1. Prepare MDP TERM-1 & Learner's Diary.

2. Complete your notebook work.

Sanskrit

1.एकतः दश पर्यन्तं त्रिषुलिंगेषु संस्कृत संख्या लिखत -

(एक से लेकर दस तक की संस्कृत संख्या तीनों लिंगो में लिखिए) (पृष्ठ -70-71)

2.इकारान्त पुँल्लिङ्ग मुनि शब्दस्य शब्दरूपाणि लिखत-

(इकारान्त पुँल्लिङ्ग शब्द "मुनि" के शब्द रूप लिखिए (पृष्ठ -91)

3. चिन्त् (सोचना) धातोः धातुरूपाणि चतुर्लकारेषु लिखत-

चिन्त् (सोचना) धातु के चारों लकारों मे धातु रूप लिखिए) (पृष्ठ -97-98)

4.स्व परिवारविषये दश संस्कृत सरलवाक्यानि लिखत -

(अपने परिवार के बारे में दश सरल संस्कृत वाक्य लिखिए)

Art

1. Draw five different types of flowers in A3 size sheet and colour it using any colour (water colours or crayon colours).

2. Draw a beautiful landscape on A4 size sheet and paint it using water colours.

Craft

1. Make five different types of flowers using origami papers or colourful sheets.

2. Make face mask of any two animal or bird.

Class 7th Autumn Holidays Homework

1. Prepare MDP TERM-1 & Learner's Diary.
2. Do the notes and Questions answers of the lesson-
   Vegetation and Wildlife.
3. Complete your notebook work.

Art

1. Draw five different types of flowers in A3 size sheet and colour it using any colour (water colours or crayon colours).

2. Draw a beautiful landscape on A4 size sheet and paint it using water colours.

Craft

1. Make five different types of flowers using origami papers or colourful sheets.

2. Make face mask of any two animal or bird.

Sanskrit

1. **विद्याविषयाधारितं श्लोकत्रयं संकलित्वा अर्थसहितं स्वअभ्यास पुस्तिकायां लिखत -**

   (विद्या विषय पर आधारित कोई तीन संस्कृत श्लोक संकलित करके अर्थ सहित अपनी अभ्यास पुस्तिका में

   लिखिए)

2. **ऋकारान्त पुँल्लिङ्ग शब्द "पितृ" इतस्य शब्दरूपाणि लिखत-**

   (ऋकारान्त पुँल्लिङ्ग शब्द "पितृ" के शब्द रूप लिखिए)**पृष्ठ-96**

3. **'पा')पिब्(धातो: धातुरूपाणि पञ्चलकारेषु लिखत -**

('पा')पिब्(धातु के पांचों लकारों मे रूप लिखिए) (पृष्ठ-104-105)

4. **संस्कृतस्य दशप्रसिद्धपुस्तकानां नामानि लिखित्वा तेषां लेखकानां नामानि अपि लिखत -**

   (संस्कृत की कोई दस प्रसिद्ध पुस्तकों के नाम लिखकर उनके लेखकों के नाम भी लिखिए)

Class 8th Autumn Holidays Homework

1. Prepare MDP TERM-1 & Learner's Diary.

2. Complete your notebook work.

Art

1. Draw five different types of flowers in A3 size sheet and colour it using any colour (water colours or crayon colours).

2. Draw a beautiful landscape on A4 size sheet and paint it using water colours.

Craft

1. Make five different types of flowers using origami papers or colourful sheets.

2. Make face mask of any two animal or bird.

Artificial Intelligence

1. Write the application of AI (Any 5)
2. Explain:
   a) Google Assistant
   b) Computer vision
   c) Amazon Alexa
3. Explain any five real life examples of Artificial Intelligence (50 words on each example).
4. The future of Artificial Intelligence (50-60 words).

NOTE: - DO All Work in Fair Notebook.

Sanskrit

1. **इष् धातो: धातुरूपाणि पञ्चलकारेषु लिखत -**

('इष्')इच्छा करना(धातु के पांचों लकारों मे रूप लिखो) (पृष्ठ-130-131)

2. **नकारान्त पुँल्लिङ्ग शब्द 'राजन्' इतस्य शब्दरूपाणि लिखत-**

(नकारान्त पुँल्लिङ्ग शब्द '' 'राजन्' शब्द के शब्दरूप लिखो) (पृष्ठ--128)

3. **एकपञ्चाशतत: शतम् पर्यन्तं संस्कृत संख्या लिखत-**

(51 से 100 तक की संख्या को संस्कृत मे लिखो) (पृष्ठ-131-132)

4. **आर्यभट्रस्य विषये दश संस्कृतसरलवाक्यानि लिखत -**

   (आर्यभट्ट के बारे मे दस सरल संस्कृत वाक्य लिखो)

Hindi

1. भारत की खोज इस पूरक पाठ्यपुस्तक के आधार पर दिए गए विषय पर टिप्पणी लिखिए।

क (चाणक्य ख (हडप्पा ग (सम्राट अशोक

2.सरकारी अस्पताल के डॉक्टर और एक नागरिक के बीच संवाद लेखन कीजिए।

3. कोरोना से जीवन में आए बदलाव पर अनुच्छेद लिखिए।

4. 10उपसर्ग और 10 प्रत्यय का उपयोग करते हुए नए शब्द लिखिए।

Class 9th Autumn Holidays Homework

Artificial Intelligence

NOTE: - Revise all the lessons and complete the work given below.

1. What is Artificial intelligence and all 3 domains
2. Supervised Learning and unsupervised learning
3. Neural networks and Deep learning
4. Learning based approach and rule-based approach
5. Reinforcement Learning
6. Revise Variables, data types, expression and arithmetic operators in python
7. Complete all pending work in your notebook.

हिंदी

प्रश्न1 . निम्नलिखित संकेत बिंदुओं के आधार पर 100 शब्दों में शीर्षक सहित एक लघु कथा लिखिए-

एक बूढ़ा किसान था। उसके चारों पुत्र आपस में झगड़ा करते थे। किसान बहुत दुखी था। उसने एक दिन अपने चारों पुत्रों को बुलाया ,दुखी मन से कहा ," आपस में झगड़ा करना नहीं करना चाहिए और तुम लोगों को मिल जुल कर रहना चाहिए। "पिताजी की बातें सुनकर चारों पुत्र वहाँ से चले गएँ। पर लड़ाई-झगड़े का सिलसिला जारी रहा ,फिर एक दिन उस बूढ़े किसान ने एक उपाय सोचा..................

प्रश्न2 . निम्नलिखित विषयों पर 250 शब्दों का अनुच्छेद लिखिए।

1. नई शिक्षा नीति2020

संकेत बिंदु - नई शिक्षा नीति 2020 का परिचय,भाषाई विविधता को बढ़ावा और संरक्षण,पाठ्यक्रम और मूल्यांकन , निष्कर्ष

2. जी-20

संकेत बिंदु - प्रस्तावना,G20 की स्थापना ,G20 का सांगठनिक परिचय ,2023 के G20 शिखर सम्मेलन की महत्ता , उपसंहार

प्रश्न3 . अर्थ के आधार पर वाक्य के आठों) 8 (भेदों को लिखकर उनके दो-दो उदाहरण लिखें।प्रश्न4 . अलंकार के सभी भेदों के दो - दो उदाहरण लिखकर कंठस्थ कीजिए।

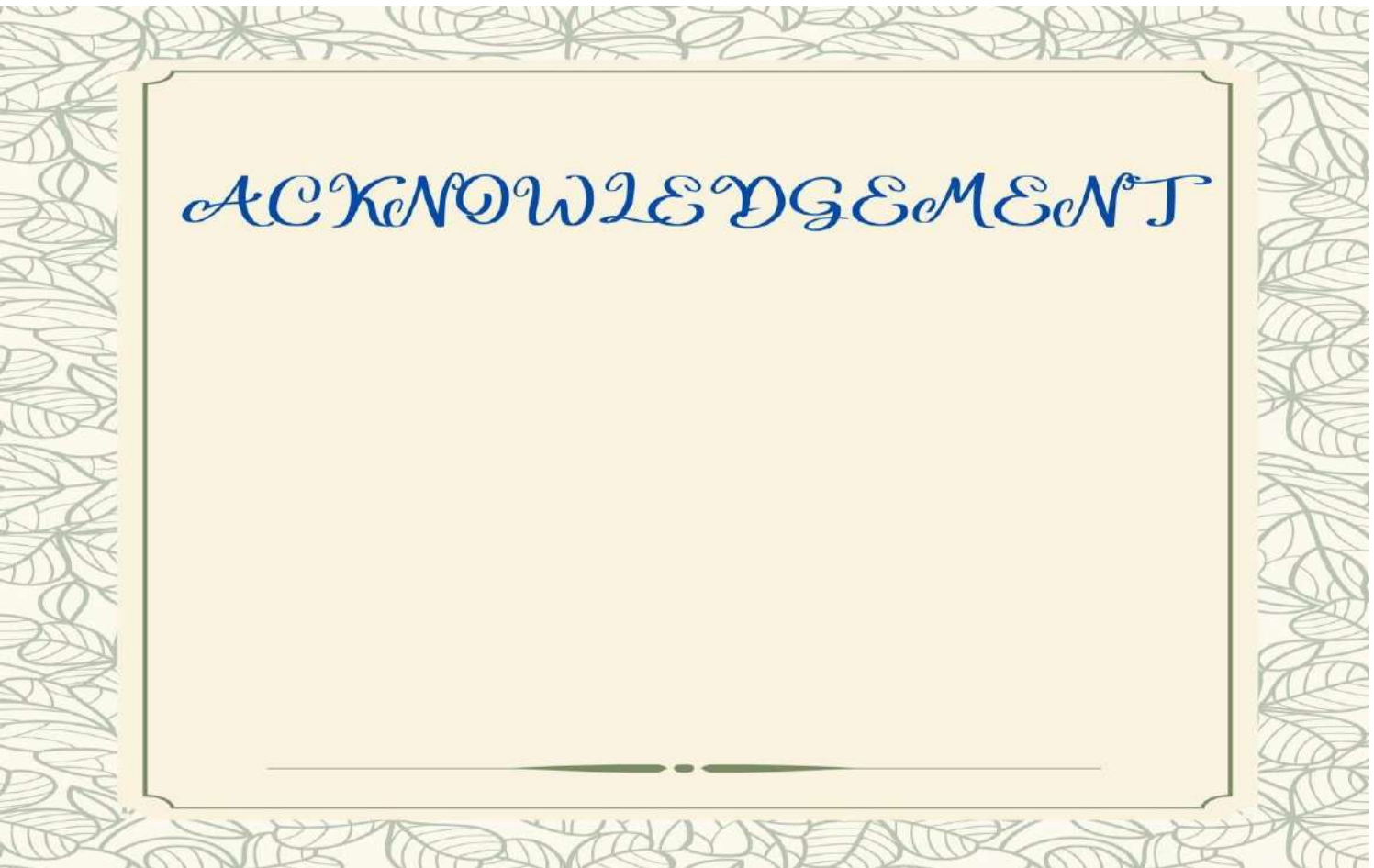प्रश्न5 . आप किसी एक कविता /कहानी की रचना स्वयं से करें।

English

NAME OF THE SCHOOL
2021-22

STUDENT PORTFOLIO

NAME_____
CLASS & SEC. IX/X_____
ROLLNO._____

ACKNOWLEDGEMENT

PART-A

GENERAL INFORMATION

YOUR NAME

✏️ **Class & Section_____**

👩‍🏫 **Class Teacher_____**

Roll No._____

CBSE Regi.No._____

📞 **Contact No._____**

🏠 **Address _____**

Linguistic Proficiency

Language	Speaking	Reading	Writing
English			
Hindi			

MY HOBBIES

1._Hobby_____

(brief description)_

_____

_____

_____

___

2._Hobby_____

(brief description)_

_____

_____

_____

_____

3._Hobby_____

(brief description)_

_____

_____

_____

I WANT TO BE.....

Your area of interest as a professional...

1.

Reason:- _____

_____

_____

_____

2.

Reason:- _____

_____

_____

_____

3.

Reason:- _____

_____

_____

_____

My Strengths

1._____

BRIEF DESCRIPTION

_____
_____
_____
_____

2._____

BRIEF DESCRIPTION

_____
_____
_____
_____

3.._____

BRIEF DESCRIPTION

_____
_____
_____
_____

MY LIMITATIONS/
I NEED TO IMPROVE UPON

1._____

BRIEF DESCRIPTION

_____
_____
_____
_____
_____
_____

1._____

BRIEF DESCRIPTION

_____
_____
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1._____

BRIEF DESCRIPTION

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1._____

BRIEF DESCRIPTION

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_____

GAMES I LOVE TO PLAY

1._____

BRIEF DESCRIPTION:

2._____

BRIEF DESCRIPTION:

3._____

BRIEF DESCRIPTION:

ACHIEVEMENTS:

MY PARTICIPATION IN SCHOOL

S.NO.	ACTIVITY	TOPIC/DESCRIPTION	RANK(IF ANY)

PART-B

ACADEMIC

RECORDS

My thoughts on the subject

ONE AREA I CAN IMPROVE UPON AND HOW.

MOST LIKED TOPICS/ CHAPTER INENGLISH

S. No	Topics I like the most	Brief Description
1		
2		
3		
4		
5		

Other Achievements

(Olympiads /competitions /contests etc)

S.No.	Name of Competition	Achievement if any	Brief Description
1			
2			
3			
4			
5			

My wish/ desire

/expectation

S.No	I want to do in the subject	Brief Description
1		
2		
3		

Teacher's Remark

S.NO.	REMARK
1.	
2.	
3.	
4.	
5.	

STUDENT SIGN_____

TEACHER SIGN_____

Add these Three Activities in your portfolio.

 1. Write a paragraph on the Mythological Background Behind Dusshera.

2. Write an article on any of the matches you liked in ICC WORLD CUP 2023 .

3. Write a self composed poem.

Maths

1. DO PRACTICE PT-2 QUESTIONS PAPER

2. COMPLETE YOUR NOTE BOOK TILL CHAPTER- 7

SECTION -B

1. Determine which of the following polynomials has (x + 1) a factor: x^3+x^2+x+1

2. Factorize:$x^3–2x^2–x+2$

3. Draw the graph of the linear equation 3x + 4y = 6. At what points, the graph cuts Xand Y-

axis?

4. Show $\sqrt{5}$ on number line.

5. Points A (5, 3), B (–2, 3) and D (5, –4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C.

6. Without plotting the points, indicate the quadrant in which they will lie, if

(i) ordinate is 5 and abscissa is – 3

(ii) abscissa is – 5 and ordinate is – 3

(iii) abscissa is – 5 and ordinate is 3

(iv) ordinate is 5 and abscissa is 3

7. If two lines intersect, prove that the vertically opposite angles are equal.

8. Bisectors of interior ∠B and exterior ∠ACD of a Δ ABC intersect at point T. Prove that ∠ BTC = ½ ∠ BAC.

9. ABC is an isosceles triangle in which AC = BC. AD and BE are respectively two altitudes to sides BC and AC. Prove that AE = BD.

10.. ABC is a right triangle with AB = AC. Bisector of ∠A meets BC at D. Prove that BC = 2 AD.

Art

1. Draw a still life on A4 size sheet by arranging a composition using two or more objects which are easily available at your home.

2. Draw a folk art painting of your choice on A4 size sheet. Example - Warli art.

Work Education

1. Make eight electric safety symbol in a chart paper and colour them with appropriate colours and decorate the chart.

2. Make a working switch board with 4 socket for switch and one indicator.

Craft

1. Make five different types of flowers using origami papers or colourful sheets.

2. Make face mask of any two animal or bird.

Science

Chemistry

Take the printout and paste in your chemistry note book

ASSERTION REASONS (CHEMISTRY)

Directions: In each of the following questions, a statement of Assertion is given, and a correspondingstatement of Reason is given just below it. Of the statements, given below, mark the correct answeras:

 (a) Both assertion and reason are true, and reason is the correct explanation of assertion.

 (b) Both assertion and reason are true, but reason is not the correct explanation of assertion.

 (c) Assertion is true, but reason is false.

 (d) Assertion is false, but reason is true.

 Q.1. Assertion : A gas can easily be compressed by applying pressure.

Reason : Since the inter-particle spaces between gases are very large, they can decrease byapplying pressure.

 Q.2. Assertion : Gases exert pressure on the walls of the container.

 Reason : The intermolecular force of attraction is very strong in

 gases.

 Q.3. Assertion : It is easier to cook food at sea level as compared to higher

 altitudes.Reason : The boiling point of water increases at high altitudes.

 Q.4. Assertion : When a solid melts, its temperature remains the same.

Reason : The heat gets used up in changing the state by overcoming the forces of attraction betweenthe particles.

 Q.5. Assertion : The solids do not diffuse in air.

Reason : The particles are loosely packed in solids.

Q.6.Assertion : The boiling point of water is 100 C.

Reason : The boiling point of water increases at higher altitudes.

Q.7. Assertion : The conversion of a solid directly into a gas is known as sublimation.

Reason : Naphthelene does not leave residue when kept open for sometime.

Q.8. Assertion : Ice floats on water.

Reason : Liquids have lower density than solids.

Q.9.Assertion : Camphor burns with a lot of residue.

Reason : Camphor undergoes sublimation.

Q.10.Assertion : The rate of evaporation increases with increase in temperature.

Reason: Increase in temperature decreases the kinetic energy of the particles.

Q.11.Assertion : Liquids diffuses more easily as compared to gases.

Reason : Intermolecular forces are greater in liquids than in gases.

Q.12. Assertion : Steam is better the boiling water for heating purposes.

Reason : Steam contains more heat in the form of latent heat than boiling

water. Q.13. Assertion : Gases diffuses more easily as compared to liquids.

Reason : Intermolecular forces are greater in solids

Q.14. Assertion : There is a change in the temperature of the substance when there it undergoes achange in state through it is still being heated.

Reason : The heat supplied is either absorbed as a latent heat of fusion or a latent heat ofvapourisation.

Q.15. Assertion : When Sugar and Salt are kept in a container, they take the shape of the

container. Reason : Sugar is liquid.

CHAPTER 2

Q.1. Assertion : When a beam of light is passed through a colloidal solution placed in a dark placethe path of the beam becomes visible.

Reason : Light gets scattered by the colloidal particles.

Q.2. Assertion : A mixture of benzoic acid and naphthalene can be separated by crystallization fromwater.

Reason : Benzoic acid is soluble in hot water but naphthalene is insoluble in hot water.

Q.3. Assertion : A solution of table salt in a glass of water is

homogeneous. Reason : A solution having different composition

throughout is homogeneous.

Q.4. Assertion : A mixture of sugar and benzoic acid can be separated by shaking with

ether. Reason : Sugar is insoluble in water.

Q.5. Assertion : In sublimation, a substance changes directly from solid to vapour without passingthrough

liquid state and vice-versa.

Reason : Distillation involves two processes i.e., vaporisation and condensation.

Q.6. Assertion : True solution exhibits Tyndall

effect. Reason : Particles are very large in size.

Q.7. Assertion : Colloidal solutions are stable and the colloidal particles do not settle

down. Reason : Brownian movement counters the force of gravity acting on colloidal

particles.

Q.8. Assertion : A solution of table salt in a glass of water is

homogeneous. Reason : A solution having different composition

throughout is homogeneous.

Q.9. Assertion : Impure benzoic acid can be purified by

sublimation.Reason : Benzoic acid sublimes on heating.

Q.10. Assertion : Tyndall effect is an optical

property.Reason : Electrophoresis is an electrical

property.

Q.11. Assertion : A mixture of acetone and methanol can be separated by fractional
distillation.

Reason : The difference between their boiling points is very less.

Q.12. Assertion : Chloroform and benzene form a pair of miscible liquids and they are
separated byfractional

distillation.

Reason : Boiling point of benzene is less than that of chloroform.

Q.13. Assertion : A mixture of camphor and ammonium chloride cannot be separated by

sublimation.Reason : Camphor on heating sublimes, ammonium chloride does not.

Q.14. Assertion : A mixture of glucose and m-dinitrobenzene can be separated by shaking
it withether.

Reason : Glucose is soluble in water.

Q.15. Assertion : Hot water is used for separation of benzoic acid from

naphthalene.Reason : Whenever a crystal is formed it tends to leave out the

impurities.

CHAPTER 3

Question 1.

Assertion: The number of particles present in one mole of a substance is fixed.

Reason: The mass of one mole of a substance is equal to its relative atomic mass in

grams.Question 2.

Assertion: Atoms always combine to form molecule and ions.

Reason: Atoms of most element are not able to exist

independently.Question 3.

Assertion: Atomicity of ozone is three while that of oxygen is

two. Reason: Atomicity is the number of atoms constituting a

molecule.Question 4.

Assertion: 1 amu equals to 1.66 x 10-24 g.

Reason: 1.66 x 10-24 g equal to 1/12th mass of a C-12

atom.Question 5.

Assertion: On burning magnesium in oxygen, the mass of magnesium oxide formed is equal to thetotal mass of magnesium and oxygen

Reason: In a chemical substance, the elements are always present in a definite

proportion.Question 6.

Assertion: 1 mole of and H2 each O2 occupy 22.4 L at standard temperature and pressure.

Reason: Molar volume for all gases at the standard temperature and pressure has the differentvalues.

Question 7.

Assertion: Molecular weight of oxygen is

16.Reason: Atomic weight of oxygen is

16.Question 8.

Assertion: Atomic mass of aluminium is 14.

Reason: An atom of aluminium is 27 times heavier than 1/12th of the mass of carbon-12

atom.Question 9.

Assertion: The number of moles of He in 52 g of He is 13.

Reason: The number of moles of an atom is the ratio of its given mass to its molar

mass.Question 10.

Assertion: The valency of aluminium is 3 and oxygen is 2.

Reason: The chemical formula of aluminium oxide is

Al3O2.Question 11.

Assertion: A molecule is the smallest particle of an element or a compound which is capable of freeexistence.

Reason: The number of atoms present in one molecule of the substance is called its atomicity.

Question 12.

Assertion: Protons cannot be transferred from one atom to

another.Reason: Protons are present deep inside the atom in its

nucleus.

Question 13.

Assertion: Water molecules always contain hydrogen and oxygen in the ratio 1:8.

Reason: Water obeys law of constant proportions irrespective of source and method of

preparation.Question 14.

Assertion: Relative atomic mass of the atom of element is the average masses

of theatom as compared to the mass of one carbon-12 atom.

Reason: Carbon-12 isotope is the standard reference for measuring atomic

masses.Question 15.

Assertion: A sodium ion has positive charge.

Reason: Sodium ion has more protons than a neutral

atom.Question 16.

Assertion : In water, the ratio of mass of hydrogen to the mass of oxygen is always 1:8 whatever thesource of water.Reason : According to law of constant proportion, the elements are always present in definiteproportion by mass in a chemical substance.

Question 17.

Assertion : Ions are always positively charged.

Reason : Ions are formed by losing or gaining of

electrons.Question 18.

Assertion : One mole of SO_2 contains double the number of molecules present in one mole

of O_2Reason : Molecular weight of SO_2 is double to that of O_2

Question 19.

Assertion : When 12 g of $CaCO_3$ is decomposed, 4.6 g of residue is left and 4.4 g of escapes.Reason : Law of conservation of mass is followed.

Question 20.

Assertion : Pure water obtained from different sources such as river, well, spring, sea etc. alwayscontains hydrogen and oxygen combined in the ratio of 1 : 8 by mass.

Reason : A chemical compound always contains same elements combined in different fixedproportion by mass.

Question 21.

Assertion : Law of conservation of mass holds good for all the reactions.

Reason : I states that energy can neither be created nor destroyed in a chemical

reaction.Question 22.

Assertion : Atomicity of oxygen is 4.

Reason : 1 mole of an element contains 6.023×10^{23}

atoms.Question 23.

Assertion : Atomicity of O_3 is 2.

Reason : 1 mole of an element contains 6.023×10^{23}

atoms.Question 24.

Assertion : 52g of He contains $13 \times 6.023 \times 10^{23}$ atoms.

Reason : 1 mole of an element contains 6.023×10^{23}

atoms.Question 25.

Assertion: Atoms can neither be sub-divided, created nor destroyed.

Reason: This postulate of Dalton's theory is the result of law of constant proportion.

Question 26.

Assertion: Carbonates are polyatomic ions.

Reason: The carbonate ion consists of one carbon atom and three oxygen atoms and carries anoverall charge

Question 27.

Assertion : Number of gram-molecules of SO_2Cl_2 in 13.5 g of sulphur chloride is

0.1.Reason : Gram molecular mass is equal to two gram molecule.

Question 28.

Assertion : The total number of electrons present in 16 g of methane gas is $6.022 \times$

10^{23}

Reason : 1 mole of an element contains 6.023×10^{23} atoms.

Question 29.
Assertion : All noble gases are monoatomic.

Reason : Noble gases are highly stable and

unreactiveCHAPTER 4

Q.1. Assertion: For noble gases, valency is

zero.Reason: Noble gases have 8 valence

electrons.

Q.2. Assertion: Thomson's atomic model is known as 'raisin pudding' model.

Reason: The atom is visualized as a pudding of positive charge with electrons (raisins) embeddedin it.

Q.3. Assertion: The mass of the total number of protons and neutrons is a measure of the approximate mass of an atom.

Reason: The mass of an electron is negligible.

Q.4. Assertion: Electrons moving in the same orbit will lose or gain energy.

Reason: On jumping from higher to lower energy level, the electron will gain energy

Q.5. Assertion: Isotopes are electrically neutral.

Reason: Isotopes are species with same mass number but different atomic numbers

Q.6. Assertion: Atom is electrically neutral.

Reason: A neutral particle, neutron is present in the nucleus of atom.

Q.7. Assertion: The size of the nucleus is very small as compared to the size of the

atom.Reason: The electrons revolve around the nucleus of the atom

Q.8. Assertion: Isotopes are electrically neutral.

Reason: Isotopes of an element have equal number of protons and electrons.

Q.9. Assertion: Isobars are identical in chemical

properties.Reason: Isobars have same atomic number.

Q.10. Assertion: Anions are larger in size than the parent atom.

Reason: In an anion, the number of protons in the nucleus is less than the number of electronsmoving around it.

PHYSICS

Q.1. Fill in the blank
(i) The value of g on the earth is about_____of that on the moon.
(ii) In fluids (liquids and gases), pressure acts in
___directions,and pressure_____as the
depth increases.
(iii) If the area of a snow shoe is five times_____than the area of
anordinary shoe, then the pressure of a snow shoe on the snow is
five times_____.
(iv) Force acting on a unit area is called_____.

(v) The weight of an object on the earth is about_____of its weighton the moon.

Q.2. If the area of an object is less than the pressure acting onthat object will be

(a) Less
(b) More
(c) Independent of area
(d) None of the above

Q.3. Even though stone also attracts earth towards itself, earthdoes not move

(a) Because of greater mass of earth
(b) Because of lesser mass of stone
(c) Force exerted by stone is less
(d) Force exerted earth is large

Q.4. Which of the statements is correct?

(a) Mass is constant and weight is variable
(b) Mass is variable and weight is constant.
(c) Both Mass and weight are variable
(d) Both Mass and weight are constant.

Q.5 Weight of the object is:

(a) More at the equator and less at poles
(b) More at poles and less at equator
(c) Same at poles and equator
(d) Depend on Mass of the object

Q.6. A man of mass 60 Kg is standing on the floor holding a stoneweighing 40 N. What is the force with which the floor is pushing him up?

Q.7. State Archimedes Principle?

Q.8. Why does a block of plastic released under water come upto the surface of water?

Q.9. Why will a sheet of paper fall slower than one that iscrumpled into a ball?

Q.10. Why is it difficult to hold a schoolbag having a strap madeof a thin and strong string?

Q.11. What makes a body to float or sink in a liquid?

Q.12. What is the importance of universal law of gravitation?

Q.13. What happens to the force between two objects, if

(i) the mass of one object is doubled?
(ii) the distance between the objects is doubled and tripled?
(iii) the masses of both objects are doubled?

Q.14. State the universal law of gravitation.

Q.15. What do you mean by buoyancy?

BIOLOGY

Take the printout of the following and paste in your Biology note book and write the answers in thenotebook.

CHAPTER- FUNDAMENTAL UNIT OF LIFE

Directions: In the following questions, a statement of assertion (A) is followed by a

statement ofreason (R). Mark the correct choice as:
 (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation ofassertion (A).
 (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation ofassertion (A).
 (c) Assertion (A) is true but reason (R) is false.
 (d) Assertion (A) is false but reason (R) is true.

Q.1. Assertion : A cell swells up when present in a hypotonic solution.Reason : More water molecules enter the cell than they leave.

Q.2. Assertion : The endoplasmic reticulum which lacks ribosomes is called smooth endoplasmicreticulum
Reason : SER is mainly involved in protein synthesis.

Q.3. Assertion : Mitochondria and chloroplasts are semiautonomous organelles.
Reason : They are formed by division of pre-existing organelles and contain DNA but lack proteinsynthesizing machinery.

Q.4. Assertion : Plasma membrane is selectively permeable.
Reason : Plasma membrane allows some molecules to pass through it more easily than others.

Q.5. Assertion : Leucoplasts perform photosynthesis.Reason : Chloroplasts store fats, starch and proteins.

Q.6. Assertion : Cell wall is a non-living part of the cell. Reason : It offers protection, definite shape and support.

Q.7. Assertion : A cell membrane shows fluid behaviour.Reason : A membrane is a mosaic of lipids and proteins.

Q.8. Assertion : A plant cell bursts if placed in water.
Reason : High turgor pressure causes bursting of plant cells.

Q.9. Assertion : Mitochondria are called 'powerhouses' of the cell. Reason : Mitochondria produce cellular energy in the form of ATP.

Q.10. Assertion : Plant cells have very large vacuoles.Reason : In plant cells, vacuoles are full of cell sap.

CHAPTER- TISSUES

Q.1. Assertion : Parenchyma cells help in storage of food.
Reason : Parenchyma cells are the main seats of
photosynthesis.

Q.2. Assertion : Vascular or conductive tissue is a distinctive feature of complex plants.
Reason : Vascular tissue has made survival of complex plants possible in terrestrial
environment.

Q.3. Assertion : The inner lining of intestine has tall epithelial
cells.Reason : Columnar epithelium facilitates absorption and
secretion.

Q.4. Assertion : Permanent tissue is composed of mature
cells. Reason : Meristematic tissue is a group of actively
dividing cells.
Q.5. Assertion : Most of plant tissues are dead.
Reason : Due to sedentary existence of plants, dead cells provide mechanical strength
moreeasily than live ones and need less maintenance.

Q.6. Assertion : Ciliated epithelium helps in movement of
particles.Reason : Cilia help in movement.

Q.7. Assertion : Meristematic tissues constitute the major portion of the
plant body.Reason : Meristematic tissues consist of differentiated cells.

Q.8. Assertion : Surface of skin is impervious to water.
Reason : Surface of skin is covered by stratified cuboidal epithelium.

Q.9. Assertion : Lateral meristems add thickness of
plants.Reason : Lateral meristems divide only in one
plane.

Q.10. Assertion : Vessel and sieve tube both are meant for transport
purposes.Reason : Vessels are lignified.

CASE BASED QUESTIONS-

CASE- 1:

Read the following and answer any four questions below from (i) to (v):

Bone is a solid, hard porous tissue. It forms the natural skeleton and gives the body its basic
structure and also supports the body. Its matrix is impregnated with phosphates and

carbonates ofcalcium and magnesium which provides hardness to it. The matrix also contains ossein protein. Thematrix is arranged in concentric rings which are called lamellae. Bone cells lie between the lamellaein fluid-filled spaces called lacunae.

(i) Bone cells are also called :
(a) Lacunae
(b) Osteocytes
(c) Neutrophils
(d) Erythrocytes

(ii) The matrix inside the bone is arranged in concentric rings called ………
(a) Cytoplasm
(b) Osteocyte
(c) Lacunae
(d) Lamellae

(iii) To form natural skeleton and to give support to the body is the main function of ……….
(a) Cells
(b) Muscles
(c) Bones
(d) Ligaments

(iv) The matrix of bone is impregnated with…………
(a) Carbon dioxide and oxygen
(b) Carbon dioxide and water
(c) Sulphates of sodium
(d) Phosphates and carbonates of calcium and magnesium

(v) Bone cells lie between the lamellae in fluid-filled spaces called ………….
(a) lamina
(b) osteocytes
(c) lacunae
(d) ossein

CASE-2

The covering or protective tissues in the animal body are epithelial tissues. Epithelium covers most organs and cavities within the body. External and Internal covering of the body and organsare all made of epithelial tissue.

Epithelial tissue cells are tightly packed and form a continuous sheet. They have only a small oralmost no intercellular spaces.it plays an important role in regulating the exchange of materials between the body and the external environment and also between different parts of the body.

Simple squamous epithelial cells are extremely thin and flat and form a delicate lining. The oesophagus and the lining of the mouth are also covered with squamous epithelium. The skin,which protects the body, is also made of squamous epithelium.

Where absorption and secretion occur, as in the inner lining of the intestine, tall epithelial cells arepresent. This columnar (meaning 'pillar-like') epithelium facilitates movement across the epithelialbarrier. In the respiratory tract, the columnar epithelial tissue also has cilia, which are hair-like projections on the outer surfaces of epithelial cells. These cilia can move, and their movement pushes the mucus forward to clear it. This type of epithelium is thus ciliated columnar epithelium.

Cuboidal epithelium (with cube-shaped cells) forms the lining of kidney tubules and ducts of salivary glands, where it provides mechanical support. Epithelial cells often acquire additional specialisation as gland cells, which can secrete substances at the epithelial surface. Sometimes aportion of the epithelial tissue folds inward, and a multicellular gland is formed. This is glandular epithelium.

1. The ciliated columnar epithelium is present in

(a) Respiratory tract

(b) Bile duct and oesophagus

(c) Fallopian tube and urethra

(d) Eustachian tube and stomach lining

(2) The cuboidal epithelium is present in

(a) Bronchioles

(b) Bile duct and oesophagus

(c) Fallopian tube and urethra

(d) Kidney tubules ducts of salivary glands

(3) External and Internal covering of the body and organs are all made of _____

(a) Skin Tissue

(b) Epithelial Tissue

(c) Nerves Tissue

(d) Connective Tissue

(4) How are cells arranged in epithelial tissue?

(a) Loosely packed

(b) Closely packed

(c) Arranged in discontinuous form

(d) Both a and c

(5) Enlist the types of Epithelial Tissue?

CASE -3

Blood is a type of connective tissue. The cells of connective tissue are loosely spaced and embedded in an intercellular matrix. The matrix may be jelly like, fluid, dense or rigid. The natureof matrix differs in concordance with the function of the particular connective tissue.

Blood has a fluid (liquid) matrix called plasma, in which red blood corpuscles (RBCs), white

bloodcorpuscles (WBCs) and platelets are suspended. The plasma contains proteins, salts and hormones. Blood flows and transports gases, digested food, hormones and waste materials to different parts of the body.

Bone is another example of a connective tissue. It forms the framework that supports the body. It also anchors the muscles and supports the main organs of the body. It is a strong and nonflexibletissue. Bone cells are embedded in a hard matrix that is composed of calcium and phosphorus compounds. Two bones can be connected to each other by another type of connective tissue called the ligament. This tissue is very elastic.

Another type of connective tissue, cartilage, has widely spaced cells. The solid matrix is composedof proteins and sugars. Cartilage smoothens bone surfaces at joints and is also

present in the nose, ear, trachea and larynx.
Areolar connective tissue is found between the skin and muscles, around blood vessels and nerves and in the bone marrow. It fills the space inside the organs, supports internal organs andhelps in repair of tissues.

(1) A connective tissue

(a) Has no matrix

(b) Covers the skin

(c) Has abundant matrix

(d) None of these

(2) Areolar connective tissue is found between

(a) Skin and muscles

(b) Blood vessels and nerves

(c) Both a & b

(d) None of these

(3) Two bones are connected to each other by another type of connective tissue called__

(a) Ligament
(b) Cartilage

(c) Bone marrow

(d) Blood

(4) What are the function of connective tissue?

(5) Give the examples of connective tissue.

CASE-4

Muscular tissue consists of elongated cells, also called muscle fibres. This tissue is responsible

formovement in our body. Muscles contain special proteins called contractile proteins, which contractand relax to cause movement

We can move some muscles by conscious will. Such muscles are called voluntary muscles. Thesemuscles are also called skeletal muscles as they are mostly attached to bones and help in body movement. Under the microscope, these muscles show alternate light and dark bands or striations, hence they are also called striated muscles. The cells of this tissue are long, cylindrical, unbranched and multinucleate.

The movement of food in the alimentary canal or the contraction and relaxation of blood vessels are involuntary movements. We can't control these muscle movement. The Smooth muscles or involuntary muscles control such movements. They are also found in the iris of the eye, in uretersand in the bronchi of the lungs. The cells are long with pointed ends (spindle-shaped) and uninucleate. They are also called unstriated muscles.

The muscles of the heart show rhythmic contraction and relaxation throughout life. Theseinvoluntary muscles are called cardiac. Heart muscle cells are cylindrical, branched and uninucleate.

(1) Which of the following muscle tissue are voluntary in nature?

(a) Cardiac muscle

(b) Smooth muscle

(c) auto rhythmic muscle

(d) None of the above

(2) The muscles whose contraction is under our control are known as

(a) Voluntary muscles

(b) Involuntary movements

(c) Cardiac muscle

(d) Unstrained muscle

(3) The smooth muscle are found in the

(a) Iris of eye

(b) Uterus

(c) Bronchi of lungs

(d) All of above

(4) Give the characteristic of striated muscles.

(5) Give the characteristic of non-striated muscles.

Practice the diagrams of plant cell, animal cell, parenchyma, sclerenchyma, collenchyma,meristem, striated, non- striated and cardiac muscles.

PHYSICS

Q.1. Fill in the blank

(i) The value of g on the earth is about_____of that on the moon.

(ii) In fluids (liquids and gases), pressure acts in

____directions,and pressure_____as the

depth increases.

(iii) If the area of a snow shoe is five times_____than the area

of anordinary shoe, then the pressure of a snow shoe on the

snow is five times_____.

(iv) Force acting on a unit area is called_____.

(v) The weight of an object on the earth is about_____of its

weighton the moon.

Q.2. If the area of an object is less than the pressure

acting onthat object will be

(a) Less

(b) More

(c) Independent of area

(d) None of the above

Q.3. Even though stone also attracts earth towards itself,

earthdoes not move

(a) Because of greater mass of earth

(b) Because of lesser mass of stone

(c) Force exerted by stone is less

(d) Force exerted earth is large

Q.4. Which of the statements is correct?

(a) Mass is constant and weight is variable

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(a) More at the equator and less at poles

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(c) Same at poles and equator

(d) Depend on Mass of the object

Q.6. A man of mass 60 Kg is standing on the floor holding a

stoneweighing 40 N. What is the force with which the floor

is pushing him up?

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Q.8. Why does a block of plastic released under water

come upto the surface of water?

Q.9. Why will a sheet of paper fall slower than one

that iscrumpled into a ball?

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madeof a thin and strong string?

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Q.12. What is the importance of universal law of gravitation?

Q.13. What happens to the force between two objects, if

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(ii) the distance between the objects is doubled and tripled?

(iii) the masses of both objects are doubled?

Q.14. State the universal law of gravitation.

Q.15. What do you mean by buoyancy?

Class 10th Autumn Holidays Homework

Art

1. Draw a still life on A4 size sheet by arranging a composition using two or more objects which are easily available at your home.

2. Draw a folk art painting of your choice on A4 size sheet. Example - Warli art.

Artificial Intelligence

NOTE: - Revise all the lessons and complete the work given below.

1. Revise All Basics of python programming language.
2. Tokens, keywords, identifiers, literals, operators and data types.
3. Basics of if loop, if-else loop, and while loop
4. Python libraries used for data science, computer vision and data visualization in your notebook.
5. Complete all pending work in your notebook.

Craft

1. Make five different types of flowers using origami papers or colourful sheets.

2. Make face mask of any two animal or bird.

Social Science

1. Portfolio (mention your activities, achievement, mygovt.in Quizzes certificates, any other participation.)

2. Write five Sample papers in your test notebook with answers. Sample Paper link:

https://drive.google.com/drive/folders/12ZfML5xcZUMMuxZxH5lVAvx4JG64jb4h

Prepare sample paper as per CBSE Pattern 2023-24. (Assignment has given to individual)

English

ACKNOWLEDGEMENT

PART-A

GENERAL INFORMATION

YOUR NAME

✏️ **Class & Section**_____

🧑‍🏫 **Class Teacher**_____

Roll No._____

CBSE Regi.No._____

📞 **Contact No.**_____

🏠 **Address** _____

Linguistic Proficiency

Language	Speaking	Reading	Writing
English			
Hindi			

MY HOBBIES

1._Hobby_____

(brief description)_

_____

_____

_____

___

2._Hobby_____

(brief description)_

_____

_____

_____

_____

3._Hobby_____

(brief description)_

_____

_____

_____

I WANT TO BE.....

Your area of interest as a professional...

1.

Reason:- _____

_____

_____

_____

2.

Reason:- _____

_____

_____

_____

3.

Reason:- _____

_____

_____

_____

My Strengths

1._____

BRIEF DESCRIPTION

_____

_____

_____

_____

2._____

BRIEF DESCRIPTION

_____

_____

_____

_____

3.._____

BRIEF DESCRIPTION

_____

_____

_____

_____

MY LIMITATIONS/
I NEED TO IMPROVE UPON

1._____

BRIEF DESCRIPTION

_____
_____
_____
_____
_____
_____

1._____

BRIEF DESCRIPTION

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1._____

BRIEF DESCRIPTION

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GAMES I LOVE TO PLAY

1._____

BRIEF DESCRIPTION:

_____
_____
_____
_____
_____
_____

2._____

BRIEF DESCRIPTION:

_____
_____
_____
_____
_____
_____

3_____

BRIEF DESCRIPTION:

_____
_____
_____
_____
_____
_____

ACHIEVEMENTS:

MY PARTICIPATION IN SCHOOL

S.NO.	ACTIVITY	TOPIC/DESCRIPTION	RANK(IF ANY)

PART-B
ACADEMIC
RECORDS

My thoughts on the subject

ONE AREA I CAN IMPROVE UPON AND HOW.

MOST LIKED TOPICS/ CHAPTER INENGLISH

S. No	Topics I like the most	Brief Description
1		
2		
3		
4		
5		

Other Achievements

(Olympiads /competitions /contests etc)

S.No.	Name of Competition	Achievement if any	Brief Description
1			
2			
3			
4			
5			

My wish/ desire

/expectation

S.No	I want to do in the subject	Brief Description
1		
2		
3		

S.NO.	REMARK
1.	
2.	
3.	
4.	
5.	

STUDENT SIGN_____

TEACHER SIGN_____

Add these Three Activities in your portfolio. 1.
Write a paragraph on the Mythological Background Behind Dusshera.

2. Write an article on any of the matches you liked in ICC WORLD CUP 2023 .

3. Write a self composed poem.

Science

II) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

III) **Section A** consists of 20 objective type questions carrying one marks each.

IV) **Section B** consists of 6 very Short answer type questions carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.

VI) **Section D** Consist of 3 long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.

V) **Section C** consists of 7 short answer type questions carrying 3 marks each. Answer to these questions should be in the range of 50 to 80 words.

VII) **Section E** Consists of 3 source based/case study units of assessment of 4 marks each with sub parts.

Section – A

Q.1) Shivani performed reaction in which the addition and removal of oxygen takes place simultaneously. Choose the correct name for the reaction-

A. Oxidation reaction
B. Reduction reaction
C. Redox reaction
D. Precipitation reaction

Q. 2) Which of the following are exothermic processes?

i) Reaction of water with quick lime

iii) Evaporation of water
ii) Dilution of an acid
iv) Sublimation of Camphor

A. (i) and(ii)

B. (ii) and (iii)
C. (i) and (iv)

D. (iii) and (iv)

Q.3) Vishal took 3ml of potassium sulphate solution in a beaker and added approximately 3ml of barium chloride solution. What would be observed?

A. Insoluble Yellow precipitate

C. Insoluble white precipitate
B. Insoluble green precipitate

D. The soluble become blue.

Q. 4) The PH value about four substances A, B, C and D is a below-

A- 8.7
B- 5.5
C- 1.7
D- 12.3

Identify the basic compound from the above given substances.

A. (A) and (B)

B. (B) and (C)
C. (A) and (D)

D. (C) and (D)

Q. 5) Chlor-alkali process is used for the manufacture of –

A. Chlorine

B. NaOH

C. Hydrogen

D. All of these

Q. 6) The ability of metals to be drawn into thin wires is known as-

A. Ductility

C. Sonorousity

B. Malleability

D. Conductivity

Q. 7) Identify the unsaturated compounds from the following-

I. Propane

II. Propene

III. Propyne

IV. Chloropropane

A. I and II

B. II and IV

C. III and IV

D. II and III

Q. 8) find out the incorrect statement given below :-

A. Length of small intestine in various animals depends upon the type of food they eat.

B. Enzymes for digestion of carbohydrates are not secreted in gastric juice.

C. In an Organism different enzymes have different pH.

D. Absorption of nutrients mostly occur in large intestine.

Q. 9) Trypsin Differ from pepsin in digestion of protein in-

A. Acidic medium

B. Alkaline medium

C. Neutral medium

D. All of the above

Q. 10) Which of the following acts as both endocrine and exocrine glands-

A. Adrenal

B. Pituatry

C. Ovaries

D. Pancreas

Q. 11) Which of the most common method of reproduction in majority of fungi and bacteria:-

A. Budding

B. Spore formation
C. Binary Fusion

D. Multiple fission

Q. 12) Segments of DNA which are responsible for pairs of an individual is called-

A. RNA
B. Gene
C. Chromosome
D. Any of the above

Q. 13) A torch bulb is rated at 1.5 V and 500 mA. It's resistance will be-

A. 2 Ω

B. 2.5Ω

C. 1 Ω

D. 3 Ω

Q. 14) If a wire is stretched to make it's length three time, it's resistance will become –

A. Three time
B. One third
C. Nine times
D. D. One tenth.

Q. 15) The magnetic field due to a straight conductor carrying current-

A. Increases with the current flowing through it.

B. Decreases with the thickness of the conductor.

C. Increases as we move away from it.

D. Does not change with the change of material of the conductor.

Q. 16) The magnetic field due to a current carrying solenoid is :

A. Independent of the material of the coil.

B. Uniform inside the solenoid

C. Independent of the number of turns per unit Length of the solenoid.

D. Independent of the strength of flowing current.

Question No. 17 to 20

Assertion – reasoning based questions read the statement carefully and choose the correct alternative from the following

A. both the assertion and reason are correct and the reason is the correct explanation of the assertion

B. both assertion and reason are correct but reason is not the correct explanation of the assertion

C. assertion is the true but the reason is false

D. assertion Is false but reason is true

17. Assertion – zinc reacts with sulphuric acid to from zinc sulphate and hydrogen gas and it is displacement reaction.

 Reason- zinc reacts with oxygen to form zinc oxide.

18. Assertion- Aerobic respiration require less energy as compared to anaerobic respiration

Reason – Mitochondria is the Power House of the cell

19. Assertion - When a compass needle is moved away from a current carrying straight conductor the deflection of the needle decreases.

Reason - The strength of the magnetic field decreases on moving away from the straight

conductor.

20. Assertion - Acquired trait cannot be passed on from one generation to next generation

Reason - Inaccuracy during DNA copying of acquired trait is minimum.

Section-B

Q.21 Generally when metals are treated with mineral acids hydrogen gas is liberated but when metals (except Mn and Mg) treated with HNO_3 hydrogen is not liberated why.

OR

Name the following:-

1) A metal which can melt when kept on palm.

2) A metal alloyed with any another metal to make an amalgam

Q.22) How would digestion of food be affected if the bile duct is completely blocked explain?

Q.23) State the role of the following in human digestive system:-

I) Hydrochloric acid

II) Villi

Q. 24)   State one example of each-

     a)   Positive phototropism

     b)   Chemotropism

Q.25 Gas A found in the upper layer of atmosphere is a deadly poison but is essential for all living beings. The amount of this gas started decreasing sharply in the 1980s

     A)   Identify Gas A
     B)   Why is it essential for all living beings.

Q. 26) Name the part of human eye :-

    a.   That controls and regulates the amount of light entering the eye.

    b.   Has delicate membrane and contain large number of light sensitive cells.

OR

Give reasons :-

    A)   The extent of deviation of a ray of light on passing through a glass prism depends on its colour.
    B)   Light of red colour is used for danger signals.

Section-C

Q. 27)

    What changes in colour is observed When white silver chloride is left exposed to
  a)   sunlight.

c) Write the chemical equation for this change.
b) State the type of chemical reaction involved in this change.

Q. 28) State reasons for the following.

A) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.

A) Write the smell and class of compound to which this compound belong.
B) During summer, a milk man usually adds a very small amount of baking soda to fresh milk.
B) Write the chemical equation for the reaction.
C) State the role of conc. H₂SO₄ in the reaction.
C) Ammonia is a base but does not contain hydroxyl group

Q. 29) Draw a diagram of human respiratory system and label trachea, lungs, diaphragm and alveolar sac on it.

OR

The leaves of a plant were covered with Aluminum foil, how would it affect the physiology of the plant?

Q. 30 A) What is understood by lateral displacement of light?

B) Illustrate it with the help of a diagram.

C) List any 2 factors on which lateral displacement of a particular substance depends?

Q.31) Ritu needs a lens of power -2D for correction of vision.

A) What kind of defect is she suffering from.

B) What are the possible causes of this defect.
C) What is the nature of corrective lens.

Q.32) State any 2 advantages and disadvantages of AC over DC.

OR

What is meant by solenoid? Draw magnetic field lines due to a current carrying conductor.

Q. 33) Explain biological magnification with the help of an example.

SECTION D

Q.34) Give reasons for the following:-

A) Carbon forms compounds mainly by covalent bonding.

B) Acetylene burns with a sooty flame.
C) Kerosene does not decolourise bromine water while cooking oils do.

D) Graphite is a good conductor of Electricity.

E) Soap form scum with hard water.
OR

Ethanoic acid reacts with absolute ethanol in the presence of Conc. H_2SO_4 to form a compound.

D) Write one use of the product of this reaction.

Q. 35) Write the function of the following

A) Ovary

B) Uterus
C) Placenta
D) Seminal vesicles
E) Oviduct

OR

A) Name the two types of germ cells present in the human beings

B) How do they structurally differ from each other?
C) Why are testes located outside the abdominal cavity of the body.?

Q. 36) A hot plate of an electric oven connected to a 220 V has two resistance coils. A and b , each of 24 Ω resistance which may be use separately in series or in parallel .what are the current in the three cases.

Section :- E

Q. 37) Atul and Riya were playing with a glass piece. They observe the image of a bird flying on the wall of the room. The image formed on the wall was changing in size for the same bird as it's distance changes.

Q1) Which type of mirror is to be used to obtain the image of the bird on the wall?

Q2) Which type of lens can be used to obtain the image of the bird on the wall?

Q3) Two thin lenses of power 3.5 D and -2.5 D placed in contact. find the power and focal length of the lenses in combination ?

OR

State the laws of refraction of light.

Q.38) The girls have not vanished overnight, decades of sex determination tests and female foeticide raised the sex ratio in India.

All human beings have 23 pairs of chromosomes in the nucleus of their sales out of these only 2 chromosomes named X&Y are sex chromosomes.

These chromosomes determine the sex of the foetus. No body is responsible for such a natural biological phenomenon.

Q1) What is the chromosomal difference between sperms and eggs of the human?

Q2) Why is sex determination banned?

Q3) How will the sex of the child be determined?

OR

What is meant by haploid and diploid?

Q. 39) The reactivity series offers a ranking of the metals in order of their reactivity. least reactive metals are placed at the bottom while the highly reactive metals are at the top of the series. More reactive metals can lose electrons more easily and form stable compound. More reactive metals are difficult to extract from its ore.

Q1) Arrange the metals gold, copper, iron and magnesium in order of their increasing reactivity.

Q2) What will you observe when some silver pieces are put into green coloured ferrous sulphate solution?

Q3) Common salt conduct electricity only in the molten state why?

OR

Why are Ionic compounds usually hard?

KENDRIYA VIDYALAYA SANGATHAN, JAMMU REGION

SAMPLE PAPER SET 02

CLASS - X   SUBJECT : SCIENCE (086)

TIME : 3 hours   M. M : 80

General instructions :

i. This question paper consists of 39 questions in 5 sections.

ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

*iii. **Section A** consists of 20 objective type questions carrying 1 mark each.*

*iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*

*v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*

*vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*

*vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

Section A

Q1. A student took sodium sulphate solution in a test tube and added Barium Chloride solution to it. He observed that an insoluble substance has formed. The colour and molecular formula of

the insoluble substance is:

(a) Grey, $BaSO_4$

(b) Yellow, $Ba(SO_4)_2$

(c) White, $BaSO_4$

(d) Pink, $BaSO_4$

Q2. Which of the following are exothermic processes?

 (i) Reaction of water with quick lime

(ii) Dilution of an acid

(iii) Evaporation of water

(iv) Sublimation of camphor (crystals)

(a) (i) and (ii)

(b) (ii) and (iii)

(c) (i) and (iv)

(d) (iii) and (iv)

Q3. Which one is a double displacement reaction?

(a) $BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + 2NaCl$

(b) $CaO + H_2O \longrightarrow Ca(OH)_2$

(c) $2Pb(NO_3)_2 \longrightarrow 2PbO + 4NO_2 + O_2$

(d) $Zn + 2AgNO_3 \longrightarrow Zn(NO_3)_2 + 2Ag$

Q4. Which of the following salts do not have the water of crystalisation?

(i) Bleaching powder

(ii) sodium chloride

(iii) Washing soda

(iv) Baking soda

(a) (ii) and (iv).   (b) (i) and (iii)

(c) (ii) and (iii).   (d) (i) and (iv)

Q5. Which of the following gives the correct increasing order of acidic strength?

(a) Water <Acetic acid <Hydrochloric acid

(b) Water <Hydrochloric acid <Acetic acid

(c) Acetic acid <Water <Hydrochloric acid

(d) Hydrochloric acid <Water <Acetic acid

Q6. Which of the following metals is highly ductile:

(a) iron.   (b) calcium

(c) Gold.   (d) silver

Q7. Which of the following contains covalent bond?

(a) $MgCl_2$.   (b) CaF_2

(c) Al_2O_3 (d) HCl

Q8. The opening and closing of the stomatal pore depends upon
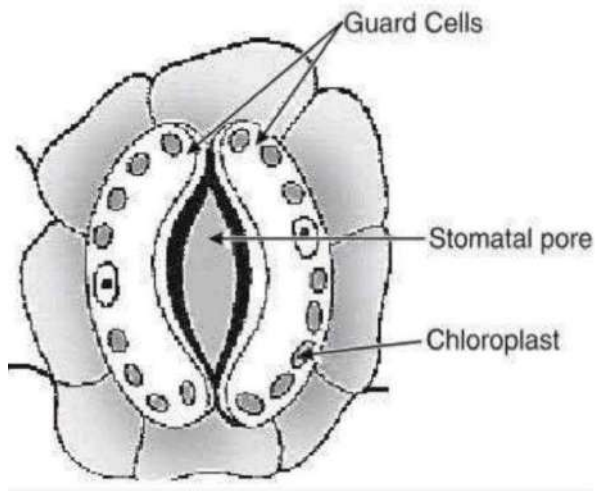
(a)Oxygen

(b) Temperature

(c)Water at the guard cell

(d) Concentration of carbon dioxide.

Q9. The mode of nutrition found in fungi is:
(a) Parasitic nutrition
(b) Holozoic nutrition
(c) Autotrophic nutrition
(d) Saprotrophic nutrition

Q10. A student accidentally places her hand on a flame of candle and quickly pulls her hand away. The flame represents

(a) a response   (b) a stimulus

(c) an impulse.   (d) an effector

Q11. Callus is defined as

(a) an insoluble carbohydrate   b) a tissue which forms embryo

(c) a tissue which grows to form foetus   (d) an unorganized mass of actively dividing cells maintained in a culture.

Q12. If pea plants having round green seeds and wrinkled yellow seeds are crossed,what phenotypic ratio will be obtained in F_2 progeny plants.

(a) 1:2:1

(b) 3:1

(c) 9:3:3:1

(d) 9:3:3;5..

Q13. If R1 and R2 be the resistance of the filament of 40 W and 60 W, respectively operating 220 V, then

(a) R1 < R2

(b) R2 < R1

(c) R1 = R2

(d) R1 ≥ R2

Q14. In order to reduce electricity consumption at home, what kind of appliance should one purchase?

(a) one which draws low power

(b) one which produces less heat

(c) one which operates at a higher voltage

(d) one which draws a high amount of current

Q15. Inside the magnet, the field lines moves

(a) from north to south

(b) from south to north

(c) away from south pole

(d) away from north pole

Q16 What is the relationship between resistance and current?

a)They are directly related to each other

b) They are inversely related to each other

c) The resistance has greater magnitude than current

d)The current has greater magnitude than resistance

For question numbers 17, 18 ,19 and 20, two statements are given-one labelled Assertion(A) and other labelled Reason(R).Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

A)Both A and R are true, and R is correct explanation of the assertion.
b) Both A and R are true, but R is not the correct explanation of the assertion
c)A is true, but R is false.
d) A is false, but R is true

Q 17)Asseretion:Mendal selected pea plant for his experiments
    Reason:Pea plant is cross pollinating and has unisexual flowers

Q18. Assertion:Pyruvate is a six carbon molecule

    Reason;It is prepared in the cytoplasm as the first step of cellular respiration.

Q19 Assertion:Calcium carbonate when heated gives gives calcium oxide and water.

    Reason:On heating calcium carbonate ,decomposition reaction reaction takes place.

Q20. Assertion; When a charged particle enters in the direction of a uniform magnetic

    field ,then it moves on a straight path without deviation.

    Reason :Magnetic force on a charged particle is zero, when it moves in direction
       of   magnetic field.

Section B- Short Answer Questions (02 marks each)

21. What are amphoteric oxides? Give two examples of amphoteric oxides.

Or

Define the following terms

a)Ductility

b)Malleability

22. What are the differences between the transport of materials in xylem and phloem?(Two differences)

23. Write the function of the following in the human alimentary canal:

(a) Saliva.   (b) bile juice

24. Answer the following:

(a) Which hormone is responsible for the changes noticed in females at puberty?-

(b) Blood sugar level rises due to deficiency of which hormone?-

(c) Dwarfism results due to deficiency of which hormone?

(d) Iodine is necessary for the synthesis of which hormone?

25. Draw a diagram of human eye and label the following parts: pupil, retina.

Or

Explain why a myopic person prefer to remove his spectacles while reading a book ?

26. State two problems caused by the non- biodegradable waste that we generate in our daily life.

Section C- Short Answer Questions (03 marks each)

27. Write the balanced chemical equations for the following reactions.

(a) Calcium hydroxide + Carbon dioxide $\rightarrow$ Calcium carbonate + Water

(b) Zinc + Silver nitrate. $\rightarrow$ Zinc nitrate + Silver

(c) Aluminium + Copper chloride $\rightarrow$ Aluminium chloride + Copper

28. (a) For the preparation of cakes, baking powder is used. If at home your mother uses baking soda instead of baking powder, how will it affect the taste of the cake and why?

(b) How is baking soda be converted into baking powder?

(c) What makes the cake soft and spongy?

29. Explain the process of breakdown of glucose

(a) in the presence of oxygen.   (b) in the absence of Oxygen

OR

What are 3 events in Photosynthesis ?.Explain

30. An object 4 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should the screen be placed to obtain a sharp image of the object. Calculate the height of the image.

31.a) Why does sky appear dark instead of blue to an astronaut?

b) Why do planets not twinkle?

32. Draw magnetic field lines around a bar magnet. List the properties of magnetic field lines.

Or

What happens to the force acting on current carrying conductor placed in a magnetic field when:

(a) Direction of magnetic field is reversed without changing the direction of current.
(b) Direction of the current is reversed without changing the direction of magnetic field.
(c) Direction of both the current and the magnetic field is reversed.

33. Gas A, found in the upper layers of the atmosphere, is a deadly poison but is essential for all living beings. The amount of this gas started declining sharply in the 1980s.

(a) Identify Gas A. How is it formed at higher levels of the atmosphere?

(b) Why is it essential for all living beings? State the cause for the depletion of this gas.

Section D- Long Answer Questions (05 marks each)

34. Soaps and detergents are both types of salts. State the difference between the two. Write the mechanism of the cleansing action of soaps. Why do soaps not form lather (foam) with hard water? Mention any two problems that arise due to the use of detergents instead of soaps.

Or

(i) What change will you observe if you test soap with litmus paper (red & blue)?

(ii) What is Hydrogenation? What is its industrial application?

(iii)Give a test that can be used to differentiate between butter and cooking oil.
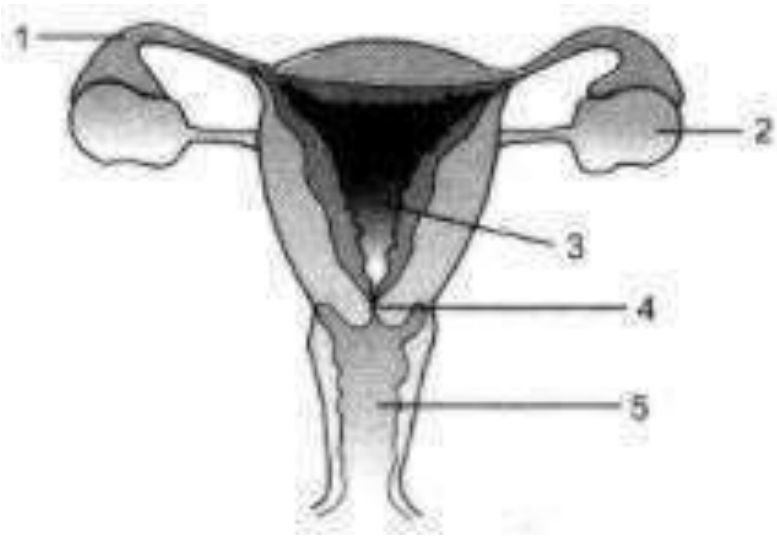
35. (a) Identify the given diagram. Name the parts from 1 to 5

(b) What is contraception? List three advantages of adopting contraceptive measures.

OR

a) How does embryo gets nourishment inside mother:s body

 b) Where does fertilization take place in human females?

c)What is a seed and ovary ?

36. (a) 100 J of work is done in transferring 20 C of charge between two points in a conductor. Find the resistance offered by the conductor, if a current of 2A flows through it

(b) Out of the two wires X and Y shown below, which one has greater resistance? Justify your
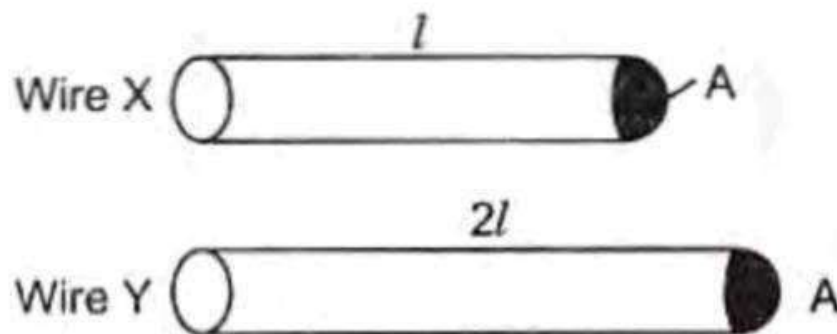
answer.

(c) What are the factors affecting resistance of a conductor?

Section E- Case Based Questions (04 marks each)

37. Read the given passage and answer the questions based on the passage and related studied

concepts.

Pure metals are usually too soft and weak for most uses. In pure metals the atoms are arranged orderly in layers. When force is applies to the metal, the layers of metal atoms can slide over one another.

To improve the strength and hardness of metals, atoms of another element can be added usually in small amounts which prevents atoms of the metal from sliding over one another, making the metals stronger and harder and less likely to get its shape distorted. The final product is an alloy of metal, e.g. ornaments are made up of 22 carat gold in which copper is added to gold. Alloy is a homogeneous mixture of two or more metals. One of them can be non-metal also, e.g., steel is an alloy of Iron and carbon. Alloys are made so as to improve properties of metals. Amalgam is alloy of metal with mercury.

(a) Stainless steel contains

(i) Fe + C   (ii) Fe+C+ Cr

(iii) Fe+C+ Cr+ Ni.   (iv) Fe+C+Mn+ Ni

(b) Solder is made up of

(i) Cu and Sn   (ii) Pb and Sn

(iii) Zn and Cu   (iv) Pb and Sb

(c) What are Alloys? How are Alloys made?

Or

a) What is the percentage of gold present in 22 carat gold ?

b) Name an alloy of Aluminium used for making body of aeroplanes

38. Answer the questions on the basis of your understanding of the following paragraph and related studied concepts.

Within minutes of a baby's birth, people start remarking about who this new baby resembles. Oh, he has his daddy's chin!' or 'She's got her mother's eyes!' but from where exactly do these similarities arise? Every individual has 46 chromosomes, 23 chromosomes from each parent. The chromosomes are composed of deoxyribonucleic acid or DNA that is tightly bundled. Now, certain segments of the DNA which are responsible for different traits in an individual are termed genes. Each chromosome contains over 20,000 genes. There is a lot of copying that has to take place to pass all these genes on from parents to a newly growing child. Understandably sometimes mistakes are made in the copying process.

(a) Number of chromosomes a human being has:

(i) 23 numbers

(ii) 23 pairs

(iii) 46 pairs

 (iv) 34 numbers

(b) Which of the following is not true about variation?

(1) Variation forms the basis of heredity.

(ii) Variations enables organisms to adapt in changing environment.

(iii) Variation is more in case of asexual reproduction.

(iv) Variation leads to development of new species.

(c) How is sex of a child determined in human beings?

Or

c)What are genes? Where are they located?

39. Answer the questions that follow on the basis of your understanding of the following case and the related studied concepts:

Shyam participated in a group discussion in his interschool competition on the practical application of light and was very happy to won the award for his school. On that very evening, his father celebrated the day with a family dinner. At a particular moment, Shyam observed in a curve plate, the image of a person's mobile sitting on his back side. Person's mobile was fell off which the person didn't know about it. Shyam went to the person and informed about this. The person was thankful to Shyam.

(a) From which side of the plate Shyam observed the incident?

(i) Outward curved.

(ii) Inwards curved.

(iii) Plane surface.

(iv) The side of the plate which have both outward and inward curves alternately.

(b) The part of the curve plate from which Shyam observed the incidence acts like a

(i)concave mirror

(ii) convex mirror

(iii) plane mirror

(iv) concave-convex lens

(c) .Name the type of mirror used in

(i) Headlights of a car

(ii) Side/rear-view mirror of a vehicle

Or

(c) An object is placed at a large distance in front of a convex mirror of radius of curvature 40 cm. How far is the image behind the mirror?

Maths

1. DO PRACTICE PT-2 QUESTIONS PAPER
2. COMPLETE YOUR NOTE BOOK TILL CHAPTER- 9

SECTION -B

1. If the HCF of 65 and 117 is expressible in the form $65m - 117$, then find the value of m.

2. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x, y are prime numbers, then find HCF (a, b).

3. Explain why $3 \times 5 \times 7 + 7$ is a composite number.

4. Prove that $\sqrt{3} + \sqrt{5}$ is an irrational.

5. Find the zeros of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeros and the coefficients.

6. For what value of k the system of equation 8x+5y=9 and kx+10y=8 has no solution?

7. Find the sum of first 22 terms of an AP in which d = 7 and 22nd term is 149.

8.State and prove Basic Proportionality Theorem.

9. Find the values of y for which the distance between the points P(2, − 3) and Q(10, y) is 10 units.

10.Find the ratio in which the line segment joining A(1, − 5) and B(− 4, 5) is divided by the x-axis. Also find the coordinates of the point of division.

11. ABC is a right triangle, right angled at B. A circle is inscribed in it. The lengths of the two sides containing the right angle are 6 cm and 8 cm. Find the radius of the incircle.

12. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.

Work Education

1. Make thermal power plant or hydro power plant in a chart and colour the chart with appropriate colours.

2. Make a working model of staircase wiring system.

Class 11th Autumn Holidays Homework

Hindi

अर्धवार्षिक परीक्षा पत्र उत्तर पुस्तिका में हल करो

1. https://kvshindi025.blogspot.com/2018/10/blog-post_15.html?m=1
2. हिंदी की पाठ्य पुस्तक से किसी भी एक लेखक या कवि का परियोजना कार्य के बिंदुओं के आधार पर   चयन करके फाइल में परियोजना कार्य तैयार करें।

3. जनसंचार और अभिव्यक्ति के पाठ14,15 और 16 में से लघुत्तरात्मक 25 प्रश्नों के उत्तर उत्तर पुस्तिका में लिखो और याद करो।

Geography

Practical file :- Complete the portion covered for the practical file.

Answer these questions in your notebook :-

Ques. 1 Answer these questions in your notebook :-

A) Explain the direct and indirect sources to know about the interior of the earth
B) Explain the movement of the Indian plate.
C) Explain the concept of ocean sea floor spreading.
D) Briefly discuss the formation of three types of rocks. Draw a neat diagram of rock Cycle.
E) What is the importance of Physical Geography?
F) Explain different branches of Physical geography.
G) You observe every day in your surroundings that there is variation in natural as well as cultural phenomena. All the trees are not of the same variety. All the birds and animals you see, are different. All these different elements are found on the earth. Can you now argue that geography is the study of "areal differentiation"?

Ques. 2 Locate and label the following features with appropriate symbol in the political map of India: -

1) Mark the state sharing international boundary with three countries.
2) Locate an island in Bay of Bengal.

3) Highest peak of southern India.

4) The river known as Dakshin Ganga.

5) A river flowing through the trough to drain in Arabian Sea.

6) Second highest peak of western ghat.

Maths

CONCEPTS AND RESULTS

** Set : a set is a well-defined collection of objects.

If a is an element of a set A, we say that " a belongs to A" the Greek symbol ⊠ (epsilon) is used to denote the phrase 'belongs to'. Thus, we write a

∈A. If 'b' is not an element of a set A, we write b ∉A and read "b does not belong to A".

There are two methods of representing a set :

(i) Roster or tabular form (ii) Set-builder form.

In roster form, all the elements of a set are listed, the elements are being separated by commas and are enclosed within brackets { }. For example, the set of all even positive integers less than 7 is described in roster form as {2, 4, 6}.

In set-builder form, all the elements of a set possess a single common property which is not possessed by any element outside the set. For example, in the set {a, e, i, o, u}, all the elements possess a common property, namely, each of them is a vowel in the English alphabet, and no other letter possess this property. Denoting this set by V, we write V = {x : x is a vowel in English alphabet}

** **Empty Set :** A set which does not contain any element is called the empty set or the null set or the void set. The empty set is denoted by the symbol φ or { }.

** **Finite and Infinite Sets :** A set which is empty or consists of a definite number of elements is called finite otherwise, the set is called infinite.

** **Equal Sets :** Two sets A and B are said to be equal if they have exactly the same elements and we write

A = B. Otherwise, the sets are said to be unequal and we write A ≠ B.

** **Subsets :** A set A is said to be a subset of a set B if every element of A is also an element of B.

In other words, A⊂B if whenever a ∈A, then a ∈B. Thus A ⊂B if a ∈A ⇒a ∈B   If A is not a subset of B, we write A ⊄ B. ** Every set A is a subset of itself, i.e., A ⊂A.

** φ is a subset of every set**.**
** If A⊂B and A ≠ B , then A is called a proper subset of B and B is called superset of A. ** If a set A has only one element, we call it a singleton set. Thus, { a } is a singleton set.

** Closed Interval : $[a, b] = \{x : a \le x \le b\}$

** Open Interval : $(a, b) = \{x : a < x < b\}$

** Closed open Interval : $[a, b) = \{x : a \le x < b\}$

** Open closed Interval : $(a, b] = \{x : a < x \le b\}$

** **Power Set :** The collection of all subsets of a set A is called the power set of A. It is denoted by P(A)

 If A is a set with n(A) = m, then it can be shown that $n[P(A)] = 2^m$.

** **Universal Set :** The largest set under consideration is called Universal set.

** **Union of sets :** The union of two sets A and B is the set C which consists of all those elements which are either in A or in B (including those which are in both). In symbols, we write. $A \cup B = \{x : x \in A$ or $x \in B\}$. $x \in A \cup B \Rightarrow x \in A$ or $x \in B$ $x \notin A \cup B \Rightarrow x \notin A$ and $x \notin B$

AUB
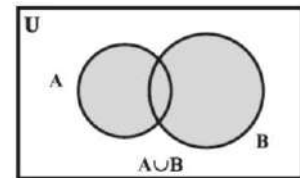
** **Some Properties of the Operation of Union**

 (i) $A \cup B = B \cup A$ (Commutative law)
 (ii) $(A \cup B) \cup C = A \cup (B \cup C)$ (Associative law) (iii) $A \cup \phi = A$ (Law of identity element, ϕ is the identity of $\cup$)
 (iv) $A \cup A = A$ (Idempotent law)
 (v) $U \cup A = U$ (Law of U)

** **Intersection of sets :** The intersection of two sets A and B is the set of all those elements which belong to both A and B. Symbolically, we write $A \cap B = \{x : x \in A$ and $x \in B\}$ $x \in A \cap B \Rightarrow x \in A$ and $x \in B$ $x \notin A \cap B \Rightarrow x \notin A$ or $x \notin B$

A∩B
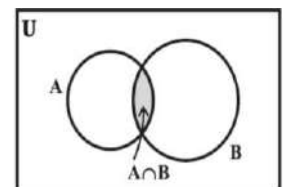
** **Disjoint sets :** If A and B are two sets such that $A \cap B = \phi$, then A and B are called disjoint sets.
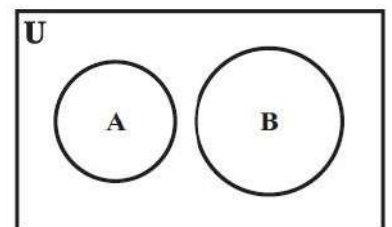
** **Some Properties of Operation of Intersection**
 (i) $A \cap B = B \cap A$ (Commutative law).
 (ii) $(A \cap B) \cap C = A \cap (B \cap C)$ (Associative law).
 (iii) $\phi \cap A = \phi$, $U \cap A = A$ (Law of ϕ and U).
 (iv) $A \cap A = A$ (Idempotent law)

(v)   A ∩ (B ∪ C) = (A ∩ B) ∪ (A ∩ C) (Distributive law) i. e., ∩ distributes over ∪

** **Difference of sets :** The difference of the sets A and B in this order   is the set of elements which belong to A but not to B.
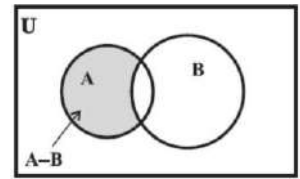
Symbolically, we write A − B and read as " A minus B". A − B = { x : x ∈A and x ∉ B }.

* The sets A − B, A ∩B and B − A are mutually disjoint sets, i.e., the intersection of any of these two sets is the null set. ** **Complement of a Set :** Let U be the universal set and A a subset of U. Then the complement of A is the set of all elements of U which are not the elements of A. Symbolically, we write A' to denote the complement of A with respect to U.
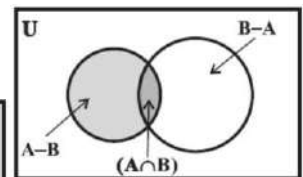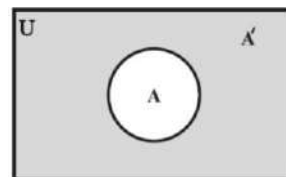
Thus, A' = {x : x ∈ U and x ∉ A }. Obviously A' = U − A

** **Some Properties of Complement Sets**
1. Complement laws: (i) A ∪ A' = U (ii) A ∩ A' = φ
2. De Morgan's law: (i) (A∪ B)′ = A' ∩ B' (ii) (A ∩ B)' = A' ∪ B'
3. Law of double complementation : (A')' = A
4. Laws of empty set and universal set φ' = U and U' = φ.

** **Practical Problems on Union and Intersection of Two Sets :**
(i) n (A∪ B) = n (A) + n (B) − n (A ∩ B)
(ii) n (A∪ B) = n (A) + n (B) , if A ∩ B = φ.
(iii)   n (A∪ B∪ C) = n (A) + n (B) + n (C) − n (A ∩ B) − n (B ∩ C) − n (A ∩ C) + n (A ∩ B ∩ C).

QUESTIONS FOR HHW

1 : How many elements are there in the complement of set A?

A. 0   B. 1   C. All the elements of A   D. None of these

2 : Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, P = {1, 2, 5}, Q = {6, 7}. Then P ∩ Q' is :

A. P   B. Q   C. Q'   D. None

3. The cardinality of the power set of {x: x∈N, x≤10} is _____.

A. 1024   B. 1023   C. 2048   D. 2043

4. If A, B and C are any three sets, then A × (B ∪ C) is equal to:

A. (A × B) ∪ (A × C)   C. (A × B) ∩ (A × C)
B. (A ∪ B) × (A ∪ C)   D. None of the above

<u>(B) ASSERTION AND REASON</u>

1. **DIRECTION**: In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct answer as

(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false but reason is true 1. Assertion (A) 'The collection of all natural numbers less than 100' is a set. Reason (R) :A set is a well-defined collection of the distinct objects.

Day 2 (21/10/23)
RELATIONS & FUNCTIONS CONCEPTS AND RESULTS
** **Cartesian Products of Sets :** Given two non-empty sets P and Q. The cartesian product P

× Q is the set of all ordered pairs of elements from P and Q, i.e., P × Q = { (p , q) : p ▢ P, q

▢ Q }

** Two ordered pairs are equal, if and only if the corresponding first elements, are equal and the second   elements are also equal.

** If there are p elements in A and q elements in B, then there will be pq elements in A × B, i.e.   if n(A) = p and n(B) = q, then n(A × B) = pq.
** If A and B are non-empty sets and either A or B is an infinite set, then so is A × B.

** A × A × A = {(a, b, c) : a, b, c ▢A}. Here (a, b, c) is called an ordered triplet.
** **Relation :** A relation R from a non-empty set A to a non-empty set B is a subset of the cartesian product

   A × B. The subset is derived by describing a relationship between the first element and the second   element of the ordered pairs in A × B. The second element is called the image of the first
element.
** The set of all first elements of the ordered pairs in a relation R from a set A to a set B is called the   domain of the relation R.

** The set of all second elements in a relation R from a set A to a set B is called the range of the relation

   R. The whole set B is called the co-domain of the relation R. Range ▢ co-domain. ** A relation may be represented algebraically either by the Roster method or by the Setbuilder method.

** An arrow diagram is a visual representation of a relation.

** The total number of relations that can be defined from a set A to a set B is the number of possible   subsets of A × B. If n(A) = p and n(B) = q, then n (A × B) = pq and the total number of relations is 2^{pq}.
** A relation R from A to A is also stated as a relation on A.

** **Function:** A relation f from a set A to a set B is said to be a function if every element of set A has one and only one image in set B.

In other words, a function f is a relation from a non-empty set A to a non-empty set B such that the domain of f is A and no two distinct ordered pairs in f have the same first element.

If f is a function from A to B and $(a, b) \in f$, then f (a) = b, where b is called the image of a under f and a is called the pre-image of b under f.

** A function which has either R or one of its subsets as its range is called a real valued function. Further, if its domain is also either R or a subset of R, it is called a real function.

Some functions and their graphs

** **Identity function** Let **R** be the set of real numbers. Define the real valued function f : **R** →**R** by y = f(x) = x for each x∈**R**. Such a function is called the identity function. Here the domain and range of f are **R**.
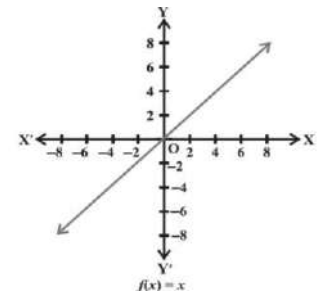
Constant function : Define the function f: **R** → **R** by y = f (x) = c, x∈**R** where c is a constant and each x∈**R**. Here domain of f is **R** and its range is {c}.
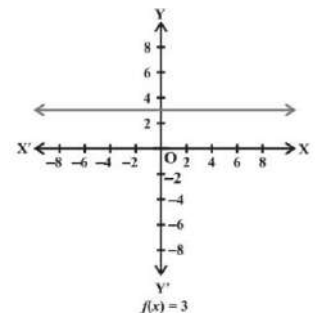
Polynomial function : A function f : **R**→**R** is said to be polynomial function if for each x in **R**, y = f (x) = $a_0 + a_1x + a_2x^2 + ...+ a_n x^n$, where n is a non-negative integer and $a_0, a_1, a_2,...,a_n \in$ **R**.

** **Rational functions :** are functions of the type $\dfrac{f(x)}{g(x)}$, where f(x) and g(x) are polynomial functions of x defined in a domain, where g(x) ≠ 0.

** **The Modulus function :** The function f: **R→R** defined by   f(x) = |x| for each x∈ **R** is called modulus function. For each   non-negative value of x, f(x) is equal to x.
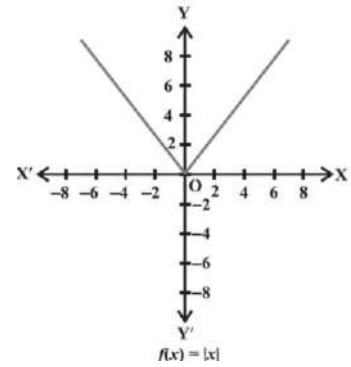
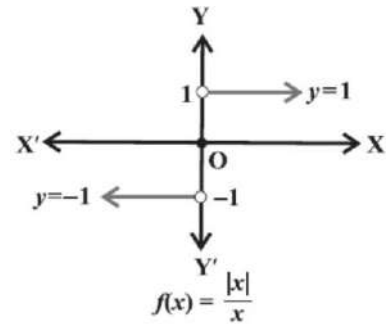But for negative values of x, the value of f(x) is the negative of

$$x, x \geq 0$$

the value of x, i.e., f (x) $=$. $-$ x, x $\leq$ 0

** **Signum function :** The function f : **R→R** defined by

$$1, \text{ if } x > 0 \qquad f(x) = 0, \text{ if } x = 0$$

$$-1, \text{if } x < 0$$

is called the signum function. The domain of the   signum function is **R** and the range is the set {−1, 0, 1}.

** **Greatest integer function :**
The function f : **R → R** defined by f(x) = [x], x∈**R** assumes   the value of the greatest integer, less than or equal to x. Such a function is called the greatest integer function.

    [x] = −1 for −1 ≤ x < 0

    [x] = 0 for 0 ≤ x < 1

    [x] = 1 for 1 ≤ x < 2

    [x] = 2 for 2 ≤ x < 3 and   so on.
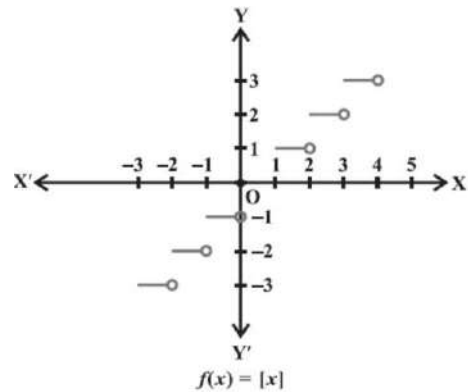
Algebra of real functions

** **Addition of two real functions :** Let f : X → **R** and g : X → **R** be any two real functions, where X⊆**R**.

Then, we define (f + g): X → **R** by (f + g) (x) = f (x) + g (x), for all x⊆X.

** **Subtraction of a real function from another :** Let f :X → **R** and g:X → **R** be any two real functions,   where X⊆**R**. Then, we define (f – g) : X→**R** by (f – g) (x) = f(x) – g(x), for all x⊆X. ** **Multiplication by a scalar :** Let f : X→**R** be a real valued function and α be a scalar.

Here by scalar, we

  mean a real number. Then the product α f is a function from X to **R**
      defined by (α f) (x) = α f (x), x⊆X.

** **Multiplication of two real functions :** The product (or multiplication) of two real functions f :X→**R** and   g :X→**R** is a function fg :X→**R** defined by (fg) (x) = f(x) g(x), for all x⊆X.

** **Quotient of two real functions** Let f and g be two real functions defined from X→**R** where X⊆**R**. The

   quotient of f by g denoted by 🔲🔲🔲 _gf 🔲🔲🔲🔲(x) 🔲 ___gf ((xx)) , provided g(x) ≠ 0, x 🔲 X

🔲

QUESTIONS FOR HHW

        Q 1. If A= {a, b} and B = {1, 2} then the number of functions from set A to set B is

        (A) 2   (B) 4   (C) 16   (D) None of these

        Q 2. A function is defined by f(t) = 2t – 5, then the value of f(-3) is

        (A) - 11   (B) 11   (C) 1   (D) -1

        Q 3. If f(x) = - |x|. Choose the correct option from the following:

        (A) Domain is set of negative real numbers   (B) Range is set of real numbers

(C) Range is set of all negative integers   (D) Range is (-∞, 0]

Q 4.   Let f = {(1, 1), (2, 3), (0, -1), (-1, -3)} be a function from Z to Z
defined by   f(x) = mx + c.

  Determine c.

   (A) 1   (B) 0   (C) - 1   (D) - 3

Assertion and Reason type (1 mark)

Q 5.In the following question, a statement of Assertion

   (A) is followed by a statement of Reason

   (R). Choose the correct answer out of the following
choices.

  (a) Both (A) and (R) are true and (R) is the correct
      explanation of (A).
  (b) Both (A) and (R) are true but (R) is not the correct
      explanation of (A).
  (c) (A) is true but (R) is false.
  (d) (A) is false but (R) is true.

ASSERTION (A): The function f: A→B defined by f = {(1, x), (2, y), (3,
x)}, then its domain is A = {1, 2, 3} and range is {x, y}.

REASON(R) : The range of the function f is always the co-domain
set.

     Day 3(22/10/23)
        TRIGONOMETRIC FUNCTIONS CONCEPTS AND RESULTS
Angles : Angle is a measure of rotation of a given ray about its
initial point.

**** Measurement of an angle.**
****English System (Sexagesimal system)**
   (i) 1 right angle = 90 degrees = 90°.   (ii) 1° = 60 minutes = 60'.   (iii) 1' = 60
second = 60''.

French System (Centesimal system)

(iv) 1 right angle = 100 grades = 100 g. (v) 1 g = 100 minutes = 100 '

(vi) 1' = 100 seconds = 100 '' **Circular System.**

(vii) $180° = 200^g = π$ radians = 2 right angles, where a radian is an angle subtended at the centre of a circle by an arc whose length is equal to the radius of the circle.

(viii)   The circular measure $θ$ of an angle subtended at the centre of a circle by an arc of length **l** is equal to the ratio of the length **l** to the radius r of the circle.

(ix) Each interior angle of a regular polygon of n sides is equal to $\dfrac{2n-4}{n}$ right angles.

T-ratios	0	$\dfrac{π}{6}$	$\dfrac{π}{4}$	$\dfrac{π}{3}$	$\dfrac{π}{2}$	$\dfrac{2π}{3}$	$\dfrac{3π}{4}$	$\dfrac{5π}{6}$	$π$
Sin	0	$\dfrac{1}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{\sqrt{3}}{2}$	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{1}{2}$	0
Cos	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{1}{2}$	0	$\dfrac{1}{-2}$	$\dfrac{1}{-\sqrt{2}}$	$-\dfrac{\sqrt{3}}{2}$	−1
tan	0	$\dfrac{1}{\sqrt{3}}$	1	$\sqrt{3}$	n.d	$-\sqrt{3}$	−1	$\dfrac{1}{-\sqrt{3}}$	0

** **Formulae for t-ratios of Allied Angles :**

All T-ratio changes in $\dfrac{π}{2}$ and $\dfrac{3π}{2}$ while remains unchanged in $π$ and $2π$.

$$\sin\left(\dfrac{π}{2}±θ\right) = \cosθ \qquad \sin\left(\dfrac{3π}{2}±θ\right) = \cosθ$$

$$\cos\left(\dfrac{π}{2}±θ\right) = ∓\sinθ \qquad \cos\left(\dfrac{3π}{2}±θ\right) = ±\sinθ$$

II Quadrant   I Quadrant

$$\dfrac{\pi}{2}\qquad \square$$

$$\tan\dfrac{\pi}{2}\_\square\square\square\dfrac{\pi}{2}\square\square\cot\square$$

$$\dfrac{\pi}{2}\qquad \square$$

$$\sin\square\square\square\square\square\square\sin\square$$

0

$$\cos\square\square\square\square= = \cos\square$$

$$\square > 0$$

$$\tan\square\square\square\square\square= \square\tan\square$$

$$\dfrac{\pi}{2}\qquad \square$$

$$\tan\dfrac{\pi}{2}\_\dfrac{3\square}{\square}\square\dfrac{\pi}{2}\square\square\cot\square$$

$$\dfrac{\pi}{2}\qquad \square$$

$$\sin\square 2\square\square\square\square\square\sin\square$$

$$\cos\square 2\square\square\square\square \cos\square$$

$$\tan\square 2\square\square\square\square\square\tan\square$$

sin□ > 0	**All > 0**
tan□ > 0	**cos**

$\square$

III Quadrant   IV Quadrant

3□
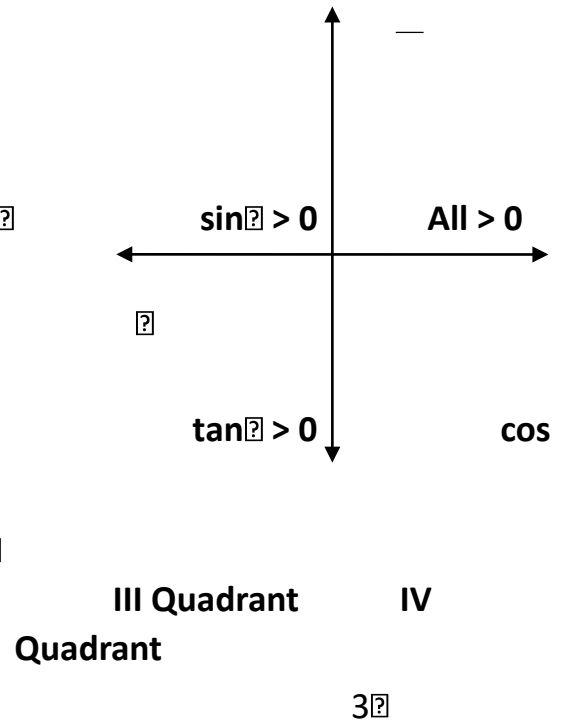
** Sum and Difference formulae :

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}, \quad \tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\tan\left(\frac{\pi}{4} + A\right) = \frac{1 + \tan A}{1 - \tan A}, \quad \tan\left(\frac{\pi}{4} - A\right) = \frac{1 - \tan A}{1 + \tan A}$$

$$\cot(A + B) = \frac{\cot A.\cot B - 1}{\cot B + \cot A}, \quad \cot(A - B) = \frac{\cot A.\cot B - 1}{\cot B - \cot A}$$

$$\sin(A + B) \sin(A - B) = \sin^2 A - \sin^2 B = \cos^2 B - \cos^2 A$$

$$\cos(A + B) \cos(A - B) = \cos^2 A - \sin^2 B = \cos^2 B - \sin^2 A$$

**Formulae for the transformation of a product of two circular functions into algebraic sum of two circular functions and vice-versa.

$$2 \sin A \cos B = \sin (A + B) + \sin(A - B)$$

$$2 \cos A \sin B = \sin (A + B) - \sin(A - B)$$

$$2 \cos A \cos B = \cos (A + B) + \cos(A - B)$$

$$2 \sin A \sin B = \cos (A - B) - \cos(A + B)$$

$$\sin C + \sin D = 2 \sin\frac{C + D}{2}\cos\frac{C - D}{2}, \quad \sin C - \sin D = 2 \cos\frac{C + D}{2}\sin\frac{C - D}{2}.$$

$$\cos C + \cos D = 2 \cos \frac{C+D}{2} \cos \frac{C-D}{2},$$

$$\cos C - \cos D = -2 \sin \frac{C+D}{2} \sin \frac{C-D}{2}.$$

** Formulae for t-ratios of multiple and sub-multiple angles :

$$\sin 2A = 2 \sin A \cos A = \frac{2\tan A}{1 + \tan^2 A}.$$

$$\cos 2A = \cos^2 A - \sin^2 A = 1 - 2\sin^2 A = 2\cos^2 A - 1 = \frac{1 - \tan^2 A}{1 + \tan^2 A}.$$

$$1 + \cos 2A = 2\cos^2 A \qquad 1 - \cos 2A = 2\sin^2 A$$

$$1 + \cos A = 2\cos^2 \frac{A}{2}$$

$$1 - \cos A = 2\sin^2 \frac{A}{2}$$

$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A},$$

$$\tan 3A = \frac{3\tan A - \tan^3 A}{1 - 3\tan^2 A}.$$

$$\sin 3A = 3\sin A - 4\sin^3 A, \qquad \cos 3A = 4\cos^3 A - 3\cos A$$

$$\sin 15^\circ = \cos 75^\circ = \frac{\sqrt{3}-1}{\sqrt{}} . \quad \& \quad \cos 15^\circ = \sin 75^\circ = \frac{\sqrt{3}+1}{2\sqrt{2}},$$

$$\tan 15^\circ = \frac{\sqrt{3}-1}{\sqrt{3}+1} = 2 - \sqrt{3} = \cot 75^\circ \quad \& \quad \tan 75^\circ = \frac{\sqrt{3}+1}{\sqrt{3}-1} = 2 + \sqrt{3} = \cot 15^\circ.$$

$$\sin 18^\circ = \frac{\sqrt{5}-1}{4} = \cos 72^\circ \qquad \text{and} \qquad \cos 36^\circ = \frac{\sqrt{5}+1}{4}$$

$$= \frac{\sqrt{10 - 2\sqrt{5}}}{4} = \sin 54^\circ. \qquad \qquad \frac{\sqrt{10 - 2\sqrt{5}}}{4}$$

$$\sin 36^\circ = \frac{1}{2}\sqrt{} = \cos 54^\circ \qquad \text{and} \qquad \cos 18^\circ = \sqrt{} = \sin 72^\circ.$$

$$\tan 22\tfrac{1}{2}^\circ = \sqrt{2} - 1 = \cot 67\tfrac{1}{2}^\circ \qquad \text{and} \qquad \tan 67\tfrac{1}{2}^\circ = \sqrt{2} + 1 = \cot 22\tfrac{1}{2}^\circ.$$

** **Properties of Triangles**

: In any △ ABC, $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$ [Sine Formula]

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}, \quad \cos B = \frac{c^2 + a^2 - b^2}{2ca}, \quad \cos C = \frac{a^2 + b^2 - c^2}{2ab}.$$

** **Projection Formulae** : a = b cos C + c cos B, b = c cos A + a cos C, c = a cos B + b cos A

** **Some important trigonometric substitutions :**

$\sqrt{a^2 + x^2}$	Put $x = a\tan\theta$ or $a\cot\theta$
$\sqrt{x^2 - a^2}$	Put $x = a\sec\theta$ or $a\,\mathrm{cosec}\,\theta$
$\sqrt{a+x}$ or $\sqrt{a-x}$ or both	Put $x = a\cos 2\theta$
$\sqrt{a^n + x^n}$ or $\sqrt{a^n - x^n}$ or both	Put $x^n = a^n \cos 2\theta$
$\sqrt{1 + \sin 2\theta}$	$= \sin\theta + \cos\theta$
$\sqrt{1 - \sin 2\theta}$	$= \cos\theta - \sin\theta,\ 0 < \theta < \dfrac{\pi}{4}$
	$= \sin\theta - \cos\theta,\ \dfrac{\pi}{4} < \theta < \dfrac{\pi}{2}$

General solutions:

*cos⬚ 0 ⬚⬚⬚ n⬚, n ⬚Z

*sin ⬚⬚0 ⬚⬚⬚ ⬚2n ⬚1⬚_⬚, n ⬚ Z

2

*tan⬚⬚0 ⬚⬚⬚n⬚, n ⬚ Z

*sin ⬚⬚ sin ⬚⬚⬚⬚ n⬚⬚⬚⬚⬚1⬚ⁿ⬚, n ⬚ Z

*cos⬚⬚ cos⬚⬚⬚⬚⬚ 2n⬚⬚⬚⬚, n ⬚Z

*tan⬚⬚ tan⬚⬚⬚⬚ n⬚⬚⬚, n ⬚Z

Examples: 1. The value of tan
1° tan 2° tan 3° … tan 89° is:
(a) 0   (b) 1   (c) ½   (d) Not defined

Correct option: (b) 1

Solution: tan 1° tan 2° tan 3° … tan 89°

= [tan 1° tan 2° … tan 44°] tan 45°[tan (90° − 44°) tan (90° − 43°)… tan (90° − 1°)]

= [tan 1° tan 2° … tan 44°] [cot 44° cot 43°……. cot 1°] × [tan 45°] = [(tan 1° × cot 1°) (tan 2° × cot 2°) …..(tan 44° × cot 44°)] × [tan 45°]

We know that, tan A × cot A =1 and tan 45° = 1

Hence, the equation becomes as;

= 1 × 1 × 1 × 1 × …× 1= 1 {As 1^n = 1} **2. If**
α + β = π/4, then the value of (1 + tan
α) (1 + tan β) is :

(a) 1   (b) 2   (c) – 2   (d) Not defined

Correct option: (b) 2

Solution: Given, $\alpha + \beta = \pi/4$

Taking "tan"
on both sides,
$\tan(\alpha + \beta) =$
$\tan \pi/4$

We know that, $\tan(A + B) = (\tan A + \tan B)/(1 - \tan A \tan B)$ and $\tan \pi/4 = 1$.

So, $(\tan \alpha + \tan \beta)/(1 - \tan \alpha \tan \beta)$
$= 1 \tan \alpha + \tan \beta = 1$
$- \tan \alpha \tan \beta \tan \alpha$
$+ \tan \beta + \tan \alpha \tan$
$\beta = 1$….(i)

$(1 + \tan \alpha)(1 + \tan \beta) = 1 + \tan \alpha + \tan \beta + \tan \alpha \tan \beta$

$= 1 + 1$ [From (i)]=2

3. Find the radius of the circle in which a central angle of 60° intercepts an arc of length
37.4 cm (use π = 22/7).
Solution: Given, Length of the arc = l = 37.4 cm

Central angle = θ = 60° = $60\pi/180$ radian = $\pi/3$ radians

We know that, r = l/θ

$= (37.4) * (\pi / 3)= (37.4) / [22 / 7 * 3]= 35.7$ cm

Q4.Find the value of √3 cosec 20° − sec 20°.
Solution:√3 cosec 20° − sec 20°

$$= \frac{\sqrt{3}}{\sin 20°} - \frac{1}{\cos 20°} \qquad = \frac{\sqrt{3}\cos 20° - \sin 20°}{\sin 20° \cos 20°} = 4\left(\frac{\frac{\sqrt{3}}{2}\cos 20° - \frac{1}{2}\sin 20°}{2\sin 20° \cos 20°}\right)$$

$$= 4\left(\frac{\sin 60° \cos 20° - \cos 60° \sin 20°}{\sin 40°}\right) = 4\left(\frac{\sin (60° - 20°)}{\sin 40°}\right) = 4$$

QUESTIONS FOR HHW

1. A horse is tied to a post by a ripe. If the horse moves along a circular path always keeping the rope tight and describes 88 m when it has traced out 72^0 at the centre, find the length of the rope.

2. If $\cos \theta = -\frac{1}{2}$, $\pi < \frac{3\pi}{2}$ $\theta <$, Evaluate $4\tan^2\theta - 3\csc^2\theta$.

3. Show that $\cos 60^0 + \cos 120^0 + \cos 240^0 - \sin 330^0 = 0$

4. Show that $\sqrt{2 + \sqrt{2 + 2\cos 4x}} = 2\cos x$

5. Show that$(\cos x + \cos y)^2 + (\sin x + \sin y)^2 = 4\sin^2\left(\frac{x+y}{2}\right)$

6. Show that$\cos 2\theta .\cos\frac{\theta}{2} - \cos 3\theta .\cos\frac{9\theta}{2} = \sin 5\theta .\sin\frac{5\theta}{2}$

7. Show that$\frac{1 + \sin 2x + \cos 2x}{1 + \sin 2x - \cos 2x} = \cot x$

8. Show that $\cos A . \cos (60 - A) . \cos (60 + A) = \frac{\cos 3A}{4}$

9. If $\cos A + \cos B = \frac{1}{2}$,$\sin A + \sin B = \frac{1}{4}$, Show that $\tan\left(\frac{A+B}{2}\right) = \frac{1}{2}$

10. Show that $2\sin^2\beta + 4\cos(\alpha + \beta) \sin\alpha \sin\beta + \cos 2(\alpha + \beta) = \cos 2\alpha$.

COMPLEX NUMBERS
CONCEPTS AND RESULTS

∗ A number of the form (a + ib) where a b $\in$ R, the set of real $\sqrt{}$ numbers, and i = $\sqrt{-1}$ (iota) is called a complex number. It is denoted by z, z = a + ib. "a" is called the real part of complex number z and "b" is the imaginary part i.e. Re(z) = a and Im(z) = b. * Two complex numbers are said to be equal i.e. $z_1 = z_2$.

$\Rightarrow$ (a + ib) = (c + id)

$\Rightarrow$ a = c and b = d

$\Rightarrow$ Re (z_1) = Re (z_2) & Im(z_1) = Im(z_2). * A complex number z is said to be purely real if Im(z) = 0
and is said to be purely imaginary if Re(z) = 0.

∗ The set R of real numbers is a proper subset of the set of complex number C, because every real number can be considered as a complex number with imaginary part zero. * i^{4n} = $(i^4)^n = (1)^n = 1$ $i^{4n+1} = i^{4n}.i = (1).i = i$ $i^{4n+2} = i^{4n}. i^2 = (1)(-1) = -1$ $i^{4n+3} = i^{4n}.i^3 = (1)(-i) = -i$.

Algebra of Complex Numbers

** **Addition of two complex numbers :** Let z_1 = a + ib and z_2 = c + id be any two complex numbers.

Then, the sum $z_1 + z_2$ is defined as follows: $z_1 + z_2$ = (a + c) + i (b + d), which is again a complex number.

The addition of complex numbers satisfy the following properties:

(i) The closure law The sum of two complex numbers is a complex number, i.e., $z_1 + z_2$ is a complex number for all complex numbers z_1 and z_2 .

(ii) The commutative law For any two complex numbers z_1 and z_2, $z_1 + z_2 = z_2 + z_1$

(iii)   The associative law For any three complex numbers z_1, z_2, z_3, $(z_1 + z_2) + z_3 = z_1 + (z_2 + z_3)$.

(iv) The existence of additive identity There exists the complex number $0 + i\,0$ (denoted as 0), called the additive identity or the zero complex number, such that, for every complex number z, $z + 0 = z$.

(v) The existence of additive inverse To every complex number $z = a + ib$, we have the complex number $-a + i(-b)$ (denoted as $-z$), called the additive inverse or negative of z. Thus $z + (-z) = 0$ (the additive identity).

** **Difference of two complex numbers :** Given any two complex numbers z_1 and z_2, the difference $z_1 - z_2$ is defined as follows: $z_1 - z_2 = z_1 + (-z_2)$.

** **Multiplication of two complex numbers :** Let $z_1 = a + ib$ and $z_2 = c + id$ be any two complex numbers.

Then, the product $z_1 z_2$ is defined as follows: $z_1 z_2 = (ac - bd) + i(ad + bc)$

**The multiplication of complex numbers possesses the following properties :

(i) **The closure law** The product of two complex numbers is a complex number, the product $z_1 z_2$ is a complex number for all complex numbers z_1 and z_2.

(ii) **The commutative law** For any two complex numbers z_1 and z_2, $z_1 z_2 = z_2 z_1$

(iii) **The associative law** For any three complex numbers z_1, z_2, z_3, $(z_1 z_2) z_3 = z_1 (z_2 z_3)$.

(iv) **The existence of multiplicative identity** There exists the complex number $1 + i\,0$ (denoted as 1), called the multiplicative identity such that $z.1 = z$, for every complex number z.

(v) **The existence of multiplicative inverse** For every non-zero complex number $z = a + ib$ or $a + bi$

(a ≠ 0, b ≠ 0), we have the complex number $\dfrac{a}{a^2 + b^2} + i\dfrac{-b}{a^2 + b^2}$ (denoted by $\dfrac{1}{z}$ or z^{-1}),

called the

$$\frac{1}{z}$$

multiplicative inverse of z such that z. $\frac{1}{z} = 1$ (the multiplicative identity).

(vi) **The distributive law** For any three complex numbers $z_1, z_2, z_3,$

    (a) $z_1(z_2 + z_3) = z_1 z_2 + z_1 z_3$ (b) $(z_1 + z_2) z_3 = z_1 z_3 + z_2 z_3$

**Division of two complex numbers : Given any two complex numbers z_1 and z_2, where z_2

$\neq 0$, the quotient $\frac{z_1}{z_2}$ is

       defined by $\frac{z_1}{z_2}$

$$\frac{z_1}{z_2} = z_1 . \frac{1}{z_2} . z_2$$

**Modulus a Complex Number : Let z = a + ib be a complex number. Then, the modulus of z, denoted by | z |, is defined to be the non-negative real number $\sqrt{a^2 + b^2}$, i.e., | z | = $\sqrt{a^2 + b^2}$

** Properties of Modulus :

   If z, z_1, z_2 are three complex numbers then

     (i) $|z| = 0 \Rightarrow z = 0$ i.e., real part and imaginary part are zeroes.

     (ii) $|z| = |\bar{z}| = |-z|$

     (iii) $z . \bar{z} = |z|^2$

     (iv) $|z_1.z_2| = |z_1|.|z_2|$

     (v) $\left|\dfrac{z_1}{z_2}\right| = \dfrac{|z_1|}{|z_2|}$, $z_2 \neq 0$

     (vi) $|z_1+z_2|^2 = |z_1|^2 + |z_2|^2 + 2Re(z_1 \bar{z_2})$

     (vii) $|z_1-z_2|^2 = |z_1|^2 + |z_2|^2 - 2Re(z_1 \bar{z_2})$

   (viii) $|z_1+z_2|^2 + |z_1-z_2|^2 = 2(|z_1|^2 + |z_2|^2)$

**Conjugate of a Complex Number : Let z = a + ib then its conjugate is denoted by $\bar{z} = (a - ib)$.

Properties of conjugates :

(i) $\overline{(\bar{z})}$ = z

(ii) $z + \bar{z} = 2\text{Re}(z)$

(iii) $z - \bar{z} = 2i\,\text{Im}(z)$

(iv) $z + \bar{z} = 0 \Rightarrow$ z is purely real.

(v) $z.\bar{z} = [\text{Re}(z)]^2 + [\text{Im}(z)]^2.$

(vi) $\overline{z_1 \pm z_2} = \bar{z}_1 \pm \bar{z}_2$

(vii) $\overline{z_1.z_2} = \bar{z}_1.\bar{z}_2$

(viii) $\overline{\left(\dfrac{z_1}{z_2}\right)} = \dfrac{\bar{z}_1}{\bar{z}_2}, \quad z_2 \neq 0$

Argand Plane and Polar Representation

Some complex numbers such as 2 + 4i, − 2 + 3i, 0 + 1i, 2 + 0i, − 5 −2i and 1 − 2i which correspond to the ordered pairs (2, 4), (− 2, 3), (0, 1), (2, 0), (−5, −2), and (1, − 2), respectively, have been represented geometrically by the points A, B, C, D, E, and F, respectively.
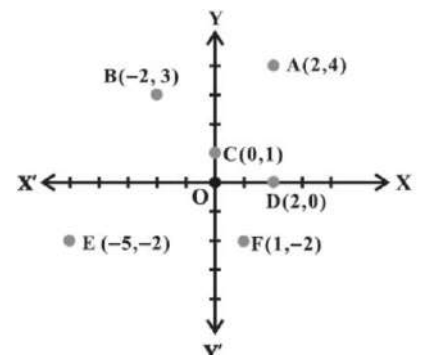
The plane having a complex number assigned to each of its point is called the complex plane or the Argand plane.
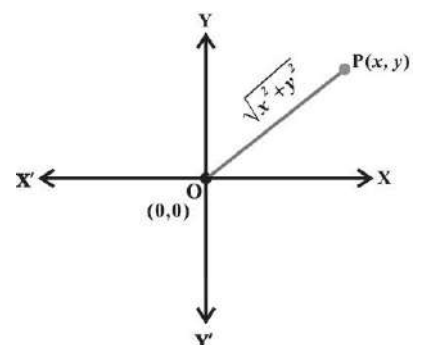
In the Argand plane, the modulus of the complex number x + iy = $\sqrt{x^2 + y^2}$ is the distance between the point P(x, y) to the origin O (0, 0). The points on the x-axis corresponds to the complex numbers of the form a + i 0 and the points on the y-axis corresponds to the complex numbers of the form 0 + i b. The x-axis and y-axis in the Argand plane are called, respectively, the real axis and the imaginary axis.

The representation of a complex number z = x + iy and its conjugate z = x − iy in the Argand plane are, respectively, the points P (x, y) and Q (x, − y).
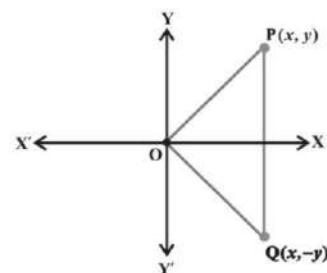
Geometrically, the point $(x, -y)$ is the mirror image of the point (x, y) on the real axis

QUESTIONS FOR HHW

1	$i^n + i^{n+1} + i^{n+2} + i^{n+3}$ is equal to (a)0 (b) 1 (c) -1 (d) 2
2	If $z_1 = 3 + 2i$ and $z_1 = 2 - 4i$ and $\|z_1 + z_2\|^2 + \|z_1 - z_2\|^2$ is equal (a) 11 (b)22 (c) 55 (d)66
3	The real part of $\dfrac{(1+i)^2}{3-i}$ is (a)$\dfrac{1}{3}$ (b)$-\dfrac{1}{5}$ (c)$\dfrac{-1}{3}$ (d) None of these
4	If $z = -5i^{-15} - 6i^{-8}$ then $\bar{z}$ is equal to (a) -6-5i (b) -6 +5i (c) 6 -5i (d) 6 +5i
5	(a)$\dfrac{1}{5} + i\dfrac{2}{5}$ (b)$\dfrac{1}{5} - i\dfrac{2}{5}$ (c)$-\dfrac{1}{5} + i\dfrac{2}{5}$ Multiplicative Inverse of complex number (1-2i)=... (d) None of these
6	**Assertion-Reason** Assertion: The equation $ix^2 - 3ix + 2i = 0$ has non real roots.
	Reason: If a, b, c are real and $b^2 - 4ac \geq 0$, then the roots of the equation $ax^2 + bx + c = 0$ are real and if $b^2 - 4ac < 0$,then the roots of the equation $ax^2 + bx + c = 0$ are non-real. (a) A is true, R is true; R is a correct explanation of A. (b) A is true, R is true; R is not a correct explanation of A. (c) A is true; R is false (d) A is false; R is true.

| 7	**Case study**
	The conjugate of a complex number z is the complex number obtained by replacing i with -i number. It is denoted by $\bar{z}$.
	The modulus of a complex number z = a + ib is defined as the non-negative real number $\sqrt{a^2 + b^2}$. It is denoted by $|z|$ i. e
	$$|z| = \sqrt{a^2 + b^2}$$
	(a)If $(x - iy)(3 + 5i)$ is the conjugate of –6 – 24i, (b) If $f(z) = \frac{7-z}{1-z^2}$ the find the value of x + y ,where z = 1 + 2i then find $|f(z)|$.
8	Express the following complex number in the form a + ib $$\frac{3 - \sqrt{-16}}{1 \quad \sqrt{\ 9} - \quad -}$$
9	Evaluate $1 + i^2 + i^4 + i^6 + \cdots + i^{20}$.
10	If z_1, z_2 are 1 – i and –2 + 4i respectively $\ \text{Im}\left(\frac{z_1 z_2}{z_1}\right)$ find
11	Find the value of $(1 + i)^6 + (1 - i)^3$
12	Solve the equation $|z + 1| = z + 2(1 + i)$
13	If $z = x + iy$ and $w = \frac{|1-iz|}{|z-i|}$ and $|w| = 1$ then show that z is purely real.
14	If x+iy= $\sqrt{\frac{a+ib}{c+id}}$, then prove that $(x^2 + y^2)^2 = \frac{a^2+b^2}{c^2+d^2}$

DAY 5(24/10/23)

LINEAR INEQUALITIES MAIN CONCEPTS AND RESULTS

* Two real numbers or two algebraic expressions related by the symbol '<', '>', '≤' or '≥' form an **inequality**.
* **Numerical inequalities :** $3 < 5$; $7 > 5$
* **Literal inequalities :** $x < 5$; $y > 2$; $x \geq 3$, $y \leq 4$
* **Double inequalities :** $3 < 5 < 7$, $2 < y < 4$
* **Strict inequalities :** $ax + b < 0$, $ax + b > 0$, $ax^2 + bx + c > 0$
* **Slack inequalities :** $ax + by \leq c$, $ax + by \geq c$, $ax^2 + bx + c \leq 0$
* **Linear inequalities :** $ax + b < 0$, $ax + b \geq 0$

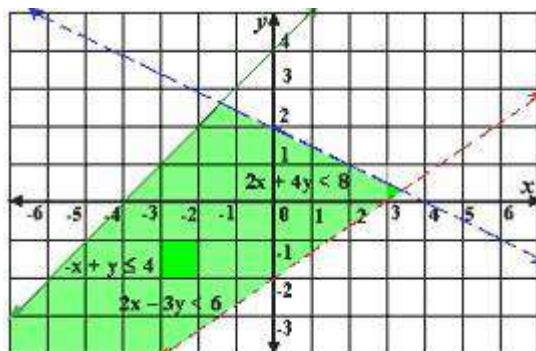*** Quadratic inequalities :** $ax^2 + bx + c > 0$, $ax^2 + bx + c \leq 0$

**** Algebraic Solutions of Linear Inequalities in One Variable and their Graphical Representation**
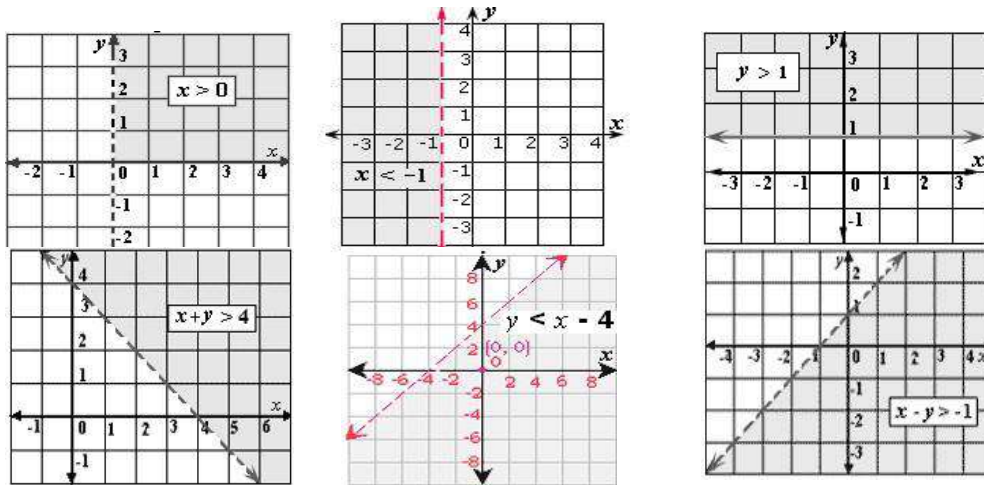
**** Graph of system of linear inequalities,** $2x - 6y < 12$, $3x + 4y < 12$ **and** $4x + 2y \geq 8$.
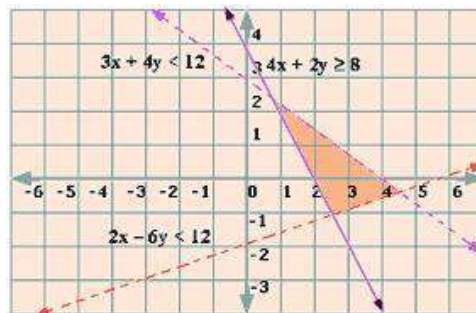
****Graph the system of linear inequalities.** $2x - 3y < 6$, $-x + y \leq 4$, $2x + 4y < 8$

QUESTIONS FOR HHW

1. Given that x,y and b are real numbers

and x<y, b >0 , then A. $\frac{x}{b} < \frac{y}{b}$ B. $\frac{x}{b} \le \frac{y}{b}$ C. $\frac{x}{b} > \frac{y}{b}$ D. $\frac{x}{b} \ge \frac{y}{b}$

2. The solution set of equation $|x + 2| \le 5$ is

A. (-7,5)   B. [-7.3]   C.   [-5,5]

        D.   (-7,3) 3. The shaded part of a line is in given figure

can also be described as

A. $(-\infty, 1) \cup (2, \infty)$ B. $(-\infty, 1] \cup [2, \infty)$ C.(1,2)   D. [1,2]

4.   A recharger manufacturing company produces rechargers and
its cost function for a week is $C(x) = \frac{1}{10}(4270 + 23x$) and its revenue
function is R(x) = 3x, where x is the number of rechargers produced
and sold per week. Number of rechargers must be sold for the
company to realize a profit is

A. x $\ge$ 618   B. x> 610   C. x>   480   D.None of These

In the following questions, a statement of Assertion(A)is

followed by a statement of Reason (R). Choose the correct

answer out of the following choices.

(a) **Both (A) and (R) are true and (R) is the correct explanation of (A).**

(b) **Both (A) and (R) are true but (R) is not the correct explanation of (A).**

(c) **(A) is true but (R) is false.**

        (d)(A) is false but(R) is true.

5. Assertion (A): The solution set of the inequality x-3<2 ,x ∈ N is {1,2,3,4,5,6,7,8}.

   Reason (R) :Solution set of a inequality in x is set of values of x satisfying the inequality .

Answer . 1.A   2.B.   3. A   4. B   5. d

Short type questions (2marks/3 marks)

1. Solve the inequation 3 x + 17 ≤ 2(1 − x)

2.Solve the inequality $\frac{x+3}{x-2} \le 2$

3. Find all pair of consecutive odd integers , both are smaller than 18, such that their sumis more than20.

4.In a game, a person wins if he gets the sum greater than 20 in four throws of a die. In three throws he got numbers 6, 5, 4. What should be number in his fourth throw, so that he wins the game.

5.Solve the inequalities and represent the solution graphically on number line: 5x + 1 > −24, 5x − 1< 24.

6.Solve 3x-5 < x+1.Show the solution on number line.

7. A solution of 9% acid is to be diluted by adding 3% acid solution to it. The resulting mixture is to be more than 5% but less than 7% acid. If there is 460 liters of 9% acid solution, how many liters of 3% solution will have to be added?

8. Solve the inequality $\frac{2x-3}{4} +9 \ge 3+\frac{4x}{3}$.

9.The longest side of a triangle is twice the shortest side and the third side is 2 cm longer than the shortest side. If the perimeter of the triangle is more than 166 cm then find the minimum length of the shortest side.

10. Solve the inequation $\frac{2x+4}{x-1} \ge 5$

PERMUTATIONS AND COMBINATIONS MAIN CONCEPTS AND RESULTS

** Fundamental principle of counting, or(the multiplication principle): "If an event can occur in m different ways, following which another event can occur in n different ways, then the total number of occurrence of the events in the given order is m × n."

Factorial notation The notation n! represents the product of first n natural numbers, i.e., the product

$1 \times 2 \times 3 \times \ldots \times (n-1) \times n$ is denoted as n!. We read this symbol as 'n factorial'.   Thus, $1 \times 2 \times 3 \times 4 \ldots \times (n-1) \times n = n!$ $n! = n(n-1)!$

$= n(n-1)(n-2)!$ [provided (n ≥ 2)]

$= n(n-1)(n-2)(n-3)!$ [provided (n ≥ 3)]

Permutations A permutation is an arrangement in a definite order of a number of objects taken some or all at a time.

** The number of permutations of n different objects taken r at a time, where 0 < r ≤ n and the objects do not

repeat is $n(n-1)(n-2)\ldots(n-r+1)$, which is denoted by

$$P(n,r) \quad \text{OR} \quad {}^nP_r = \frac{n!}{(n-r)!}, 0 \le r \le n$$

** ${}^nP_0 = 1 = {}^nP_n$

** The number of permutations of n different objects taken r at a time, where repetition is allowed, is n^r.

** The number of permutations of n objects, where p_1 objects are of one kind, p_2 are of

second kind, ..., p_k are of kth kind and the rest, if any, are of different kind is $\frac{n!}{p_1! p_2! \ldots p_k!}$ ** The number of permutations of an dissimilar things taken all at a time along a circle is $(n-1)!$.

** The number of ways of arranging a distinct objects along a circle when clockwise and anticlockwise arrangements are considered alike is $\frac{1}{2}$ (n -1) !.

** The number of ways in which (m + n) different things can be divided into two groups

containing m and n things is $\dfrac{(m+n)!}{m!\,n!}$.

Combination of n different objects taken r at a time, denoted b

$$\frac{{}^nC_r}{n!} = \frac{1}{r! \cdot (n-r)!}$$

$^nP_r = {}^nC_r \, r!$, $0 \le r \le n$

$${}^nC_0 = 1, \quad {}^nC_n = {}^nC$$

1

□

n

□

n

C

n

□

1

$nC_2 = \frac{n(n-1)}{2!}$ □nC_2

$nC_3 = \frac{n(n-1)(n-3)}{3!}$ □nC_n□3

** $^nC_r = {}^nC_s \Rightarrow r = s$ or $r + s = n$

** $nC_r = nC_{r-1} = n-1Cr$

QUESTIONS FOR HHW

Q.1 If $^{10}P_r = 5040$, find the value of r   Q.2 If 5. $^4C_r = 6$. $^5C_{r-1}$, find value of r.

Q.3 How many 6-digit number can be formed from the digits 0,1,3,5,7,9 which are divisible by 10 and no digit is repeated ?

Q.4 How many words can be formed by using the letters of the word ORIENTAL, so that the vowels always occupy the odd places ?

Q.5 How many squares in a chess board?

Q.6 How many palindrome of 5 letters can be made by using letters of the word MATHS? Q.7 It is required to seat 5 men and 4 women in a row so that the women occupy the even places.

How many such arrangements are possible ?

Q.8 Given12 flags of different colours, how many different signals can be generated if each signal requires the use of 2 flags, one below the other?

Q.9 There are four bus routes between A and B; and three bus routes between B and C. A man can

travel round-trip in number of ways by bus from A to C via B. If he does not want to use a bus

route more than once, in how many ways can he make round trip?

Q.10 In an examination there are three multiple choice questions and each question has 4 choices.

Find the number of ways in which a student can fail to get all answer correct.

Long answer type questions

Q.1 A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has (i) no girl ? (ii) at least one boy and one girl ? (ii) at least 3 girls ? Q.2 Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are written as in a dictionary, what will be the 50th word? Q.3 In an examination, a question paper consists of 12 questions divided into two parts i.e., Part I

and Part II, containing 5 and 7 questions, respectively. A student is required to attempt 8 questions in all, selecting at least 3 from each part. In how many ways can a student select the questions ?

Q.4 How many number of signals that can be sent by 6 flags of different colours taking one

o
r

m
o
r
e

a
t

a

t
i
m
e
?

Q.5 A sports team of 11 students is to be constituted, choosing at least 5 from Class XI and at least

5 from Class XII. If there are 20 students in each of these classes, in how many ways can the team be constituted?

DAY 7(26/10/23)
BINOMIAL THEOREM MAIN CONCEPTS AND RESULTS
** Binomial theorem for any positive integer n

n

$(a + b)^n = {}^nC_0 a^n + {}^nC_1 a^{n-1}.b + {}^nC_2 a^{n-2}.b^2 + ... {}^nC_{n-1}a.b^{n-1} + {}^nC_n b^n = {}^nC_k a^{n-k}b^k$

$$k$$

≥ 0 ** The coefficients ${}^nC_r$ occurring in the binomial

theorem are known as binomial coefficients.

** There are (n +1) terms in the expansion of $(a+b)^n$, i.e., one
more than the index.

** $(1+ x)^n = {}^nC_0 + {}^nC_1 x + {}^nC_2 x^2 + ... + {}^nC_{n-1}x^{n-1} + {}^nC_n x^n$

** $(1+ x)^n = {}^nC_0 + {}^nC_1 x + {}^nC_2 x^2 + ... + (-1)^n {}^nC_n x^n$.

** $n C_0 + nC_1 + nC_2 + nC_3 + ... + nC_n = 2^n$.

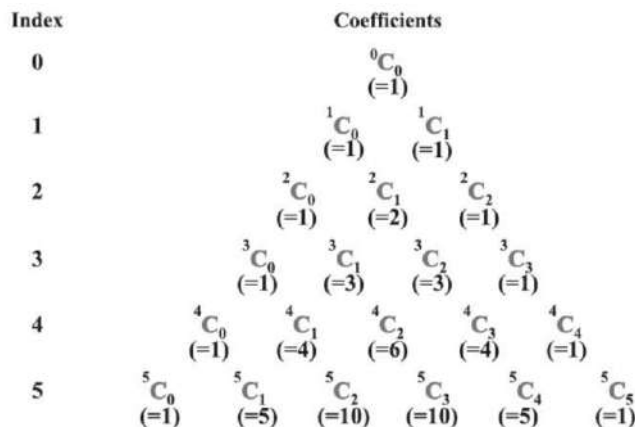** $nC_0 - nC_1 + nC_2 - nC_3 + ... + (-1)^{n-1} nC_n = 0$.

** General Term in the expansion of $(a + b)^n = t_{r+1} = {}^nC_r a^{n-r}.b^r$

** Middle term in the expansion of $(a + b)^n$

(i) $\left(\dfrac{n}{2}+1\right)^{th}$ term if n is even   (ii) $\left(\dfrac{n+1}{2}\right)^{th}$ and $\left(\dfrac{n+1}{2}+1\right)^{th}$ terms if n is odd.

**Pascal's Triangle

QUESTIONS FOR HHW

1	$(1 + 4x + 4x^2)^{10}$ has
	10 TERMS B) 11 TERMS C) 20 TERMS D)21 TERMS
2	The ratio of the coefficients of x^r and x^{r-1} in $(1 + x)^n$ is
	A) $\dfrac{n+r}{r}$ B)$\dfrac{n-r+1}{r}$ $\dfrac{n+r-1}{r}$ C) D) NONE

3	If the coefficient of x^2 and x^3 in the expansion of $(3 + mx)^9$ are equal , then the value of m is A) $-\frac{9}{7}$ B) $-\frac{7}{9}$ C) $\frac{9}{7}$ D) $\frac{7}{9}$
4	The term independent of x in the expansion of $\left(2x + \frac{1}{3x^2}\right)^6$ is A) 2nd B) 3rd C) 4th D) 5th
5	Using binomial theorem, evaluate $(99)^5$.
6	Expand $\left(x^2 + \frac{3}{x}\right)^4$, $x \neq 0$ b using Pascal triangle.
7	Prove that: $(a + b)^6 - (a - b)^6$ is aneven number if a and b are integers:
8	Find 4th term of the expansion $\left(3x + \frac{2}{x}\right)^6$
9.	Find 5th term from the end of the expansion $(a + bx)^7$
10.	Find $(a + b)^6 - (a - b)^6$ hence evaluate $(\sqrt{3} + \sqrt{2})^6 - (\sqrt{3} - \sqrt{2})^6$
11	Find a, if the 4th and 5th term of the expansion $(2 + a)^7$ are equal.
12	Expand: $(x^2 + 1 - 2x)^3$
13	Find the value of $(a^2 + \sqrt{a^2 - 1})^4 + (a^2 - \sqrt{a^2 - 1})^4$
14	Using binomial theorem prove that $5^{4n} + 52n-1$ is divisible by 676 $\forall$ n $\in$ N
15	Find he middle term in the expansion $\left[\frac{x}{7} - \frac{5}{x}\right]^6$
16	Find the coefficient x^4 in $\left[2x^2 - \frac{3}{x}\right]^5$ of
17	Using the binomial theorem, show that $6^n - 5n$ always leaves remainder 1 when divided by 25
18	Find a if coefficients of x^2 and x^3 in $(3+ax)^9$ are equal.
19	The coefficients of 2nd and 3rd terms in the expansion of $(1 + a)^n$ are in the ratio 1:2. Find n.
20	Find the middle term(terms) in the expansion of $\left(3x - \frac{x^3}{6}\right)^5$
21	**Case based Question**:In class XI, teacher explained binomial theorem. Two students Shivani and Vishwani trying to solve the exercise. Shivani expanded $(1+x)^6$ by using Binomial theorem, Viswani expanded $(x+1)^6$. **Based on this above information answer the following questions**. 1. According to Shivani find 4th term . 2. Find the value of $6_{C0} + 6_{C1} + 6_{C2} + 6_{C3} + \ldots \ldots + 6_{C6}$ 3. Find the positive value of x if 3rd terms of Shivani and Vishwani are equal.

SEQUENCE AND SERIES CONCEPTS AND RESULTS

** Sequence : is an arrangement of numbers in a definite order according to some rule. A sequence can also be defined as a function whose domain is the set of natural numbers or some subsets of the type {1, 2, 3....k). ** A sequence containing a finite number of terms is called a finite sequence. A sequence is called infinite if it is not a finite sequence.

** Series : If a_1, a_2, a_3,...,an, be a given sequence. Then, the expression $a_1 + a_2 + a_3 +,...+ a_n$

+ ...

** Arithmetic Progression (A.P.) : is a sequence in which terms increase or decrease regularly by the same constant.

A sequence a_1, a_2, a_3,..., a_n,... is called arithmetic sequence or arithmetic progression if

$a_n + 1 = a_n + d$, n ∈ N, where a_1 is called the first term and the constant term d is called the common difference of the A.P.

** The nth term (general term) of the A.P. a, a + d, a + 2d, ... is **a_n = a + (n − 1) d.** ** If a, b, c are in A.P. and k(≠0) is any constant, then   (i) a + k, b + k, c + k are also in A.P.

(ii)   a − k , b − k , c − k are also in A.P.

(iii)   ak, bk, ck are also in A.P a

     b   c

(iv)   , , are also in
      A.P. $\frac{}{k}$ $\frac{}{k}$ $\frac{}{k}$

** If a, a + d, a + 2d, …, a + (n − 1) d be an A.P. Then l = a + (n − 1) d.

Sum to n terms $S_n = \frac{n}{2}[2a + (n-1)d]$

$= \frac{n}{2}[a + l]$

** **Arithmetic mean (A.M.)** between two numbers a and b is $\frac{a+b}{2}$.

** **n arithmetic means** between two numbers a and b are $a + \frac{b-a}{n+1}$, $a + \frac{2(b-a)}{n+1}$, $a + \frac{3(b-a)}{n+1}$, … , $a + \frac{n(b-a)}{n+1}$.

** Sum of n A.M.^{S} = n(single A.M.)

** Three consecutive terms in A.P. are   a − d , a, a + d.

   Four consecutive terms in A.P. are   a − 3d , a − d , a + d, a + 3d.

   Five consecutive terms in A.P. are   a − 2d , a − d , a, a + d, a + 2d.

      These results can be used if the sum of the terms is given.

** In an A.P. the sum of terms equidistant from the beginning and end is constant and equal to the sum of first and last terms.

** m^{th} term from end of an A.P. = $(n − m + 1)^{th}$ term from the beginning.

Geometric Progression (G . P.) :A sequence is said to be a geometric progression or G.P., if the ratio of   any term to its preceding term is same throughout.

A sequence a1, a2, a3,..., an,... is called geometric progression, if each term is nonzero and $\dfrac{a_{k+1}}{a_k} = r$ (constant) , for k ≥ 1.

By taking $a_1 = a$, we obtain a geometric progression, a, ar, ar^2, ar^3,...., where a is called the first term and r is called the common ratio of the G.P.

** **General term of a G .P. =** $a_n = ar^{n-1}$.

** **Sum to n terms of a G .P. =** $\dfrac{a(r^n - 1)}{r - 1}$ if r ≠ 1 **and** $\dfrac{a(1 - r^n)}{1 - r}$ if r ≠ 1.

** **Sum of terms of an infinite G.P. =** $\dfrac{a}{1 - r}$.

** **Geometric Mean (G .M.)**: of two positive numbers a and b is the number is $\sqrt{ab}$. ** **n geometric mean** between two numbers a and b are

$\underset{1}{a\left(\dfrac{b}{a}\right)^{\frac{1}{n+1}}}$, $\underset{2}{a\left(\dfrac{b}{a}\right)^{\frac{2}{n+1}}}$, $\underset{3}{a\left(\dfrac{b}{a}\right)^{\frac{3}{n+1}}}$, ... $\underset{n}{a\left(\dfrac{b}{a}\right)^{\frac{n}{n+1}}}$.

** Three consecutive terms in G .P. $\dfrac{a}{r}$

e

,

a

,

a

r

.

r

a

a

3

.

Four consecutive terms in G.P.

a

r

e

3

,

r

,

a

r

,

a

r

r

a

a

2

.

Five consecutive terms in G.P.

a

r

e

2

,

r

,

a

,

a

r

,

a

r

r

These results can be used if the product of the terms is given

QUESTIONS FOR HHW

Q1. If 3rd, 8th and 13th terms of G.P. are p,q and r respectively, then which one of the following is correct

    a. $q^2 = pr$ b. $r^2 = pq$ c. $pq = r$ d. $2q = p+r$

Q2. . If nth term of a sequence is $a_n = (-1)^{n-1} n^3$, then its 9th term is

A) 105   B) 177   C) 324   D) 729

Q3. geometric mean between 1 and 256 IS

A) 8   b. 16   c. 14   d. 12

Q4. If x, 2x+3 ,3x+3 are in G.P. ,then 4th term is

A) -13.5   b. -14.5   c.-15.5   d. -16.5

Q5. Statement I : Four terms of the G.P. 3 ,3^2 , 3^3 ,…. Are needed to give the sum 120

Statement II: T_n =ar^n is n^{th} terms of G.P. whose first term is a and common ratio r.

a) Both the statement I and Statement II are true and statement II is the correct explanation of Statement I
b) Both the statement I and Statement II are true and statement II is not the correct explanation of Statement I
c) Statement I is true but Statement II is false
d) Statement I is false but Statement II is true

Q6 Write first five terms of sequence whose n^{th} term is given by $a_n = (-1)^{n-1} \ 5^{n+1}$ Q7.for what values of x , the numbers -2/7 ,x -7/2   are in G.P.

Q8. Find the 12th term of a G.P. whose 8th term is 192 and the common ratio is 2.

Q9. The sum of first three terms of a G.P. is and their product is 1. Find the common ratio and the terms.

Q10. Find the sum to n terms of the sequence, 8, 88, 888, 8888… .

11.   Let S be the sum, P the product and R the sum of reciprocals of n terms in a G.P. Prove that
$P^2 R^n = S^n$.

12.   If A and G be A.M. and G.M., respectively between two positive numbers, prove that the numbers are$A_⊡ (A_⊡G)(A_⊡G)$.

13 **Case study**
Rahul being a plant lover decides toopen a nursery and he bought fewplants with pots. He wants to place potsin such a way that number of pots infirst row is 2, in second row is 4 and in third row is 8 and so on. Answer the following questions based on the above information.

(i)   Find the number of pots in the 8th row.

(ii)   Find the total number of pots in 10 rows.

(iii)   If Rahul wants to place 510 pots in all, how many rows will be formed?

DAY 9(28/10/23)

STRAIGHT LINES
CONCEPTS AND RESULTS

** Any point on the X-axis is (x, 0) and on the Y-axis is (0, y)

** Distance between two points $A(x_1, y_1)$ & $B(x_2, y_2)$ is AB = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$.

** **Section formula**

(i)   Coordinates of a point dividing the line   joining $A(x_1, y_1)$ & $B(x_2, y_2)$ internally in the ratio m : n is

$$\left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right).$$

(ii)   Coordinates of a point dividing the line joining $A(x_1, y_1)$ & $B(x_2, y_2)$ externally in the ratio m : n is

$$\left(\frac{mx_2 - nx_1}{m-n}, \frac{my_2 - ny_1}{m-n} \right).$$

** Coordinates of the mid point of the line   joining $A(x_1, y_1)$ & $B(x_2, y_2)$ is

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

** Centroid of a $\triangle ABC$ with vertices $A(x_1, y_1)$, $B(x_2, y_2)$ & $C(x_3, y_3)$

$$\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right).$$

** In centre of $\triangle ABC$ with vertices $A(x_1, y_1)$, $B(x_2, y_2)$ & $C(x_3, y_3)$ is

$$\left(\frac{ax_1+bx_2+cx_3}{a+b+c}, \frac{ay_1+by_2+cy_3}{a+b+c} \right)$$ where a = BC, b = AC, c = AB.

** Area of $\triangle ABC$ with vertices $A(x_1, y_1)$, $B(x_2, y_2)$ & $C(x_3, y_3)$ = | $x_1(y_2 - y_3) + x_2(y_3 - y_1)$

$+ x_3(y_1 - y_2)$| .

** Equation of any line parallel to X-axis is $y = a$, & equation of X-axis is $y = 0$.

** Equation of any line parallel to Y-axis is $x = b$ & equation of Y axis is $x = 0$.

** Slope of line inclined at an angle θ with the + ve X- axis = tan θ.

** Slope of a line parallel to X-axis = 0 ,   slope of a line parallel to Y-axis = undefined.   Slope of a line equally inclined to the coordinate axes is −1 or 1. ** Slope of a line joining the points $A(x_1, y_1)$, $B(x_2, y_2)$ is $\frac{y_2 - y_1}{x_2 - x_1}$, $x_1 \neq x_2$.

** Slope of the line $ax + by + c = 0$, is $-\frac{a}{b}$.

** If two lines are parallel, then their slopes are equal.

** If two lines are perpendicular, then the product of their slopes is −1.

** Any equation of the form Ax + By + C = 0, with A and B are not zero, simultaneously, is called the general linear equation or general equation of a line.

   (i) If A = 0, the line is parallel to the x-axis (ii) If B = 0, the line is parallel to the yaxis

   (iii) If C = 0, the line passes through origin.

** Equation of a line having slope = m and cutting off an intercept 'c' and Y-axis is y = mx + c.

** Equation of a line through the point (x_1, y_1) and having slope m is $y - y_1 = m(x - x_1)$.

** Equation of a line making intercepts of 'a' & 'b' on the respective axes is $\frac{x}{a} + \frac{y}{b} = 1$

** The equation of the line having normal distance from origin p and angle between normal and the   positive x-axis ω is given by x cosω + y sinω = p .

** Distance of a point $P(x_1, y_1)$ from the line ax + by + c = 0

$$\text{is } d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2}}$$

$$\frac{\boxed{?}}{b2}$$

** Equation of the line parallel to ax + by + c = 0 is ax + by + λ = 0.

** Equation of the line perpendicular to ax + by +c= 0 is bx − ay + λ = 0.

** If two lines are intersecting and $\boxed{?}$ is the angle between them, then $\tan\boxed{?} = m^{2\,\boxed{?}\,m1}$

$1\boxed{?}$ m_1m_2 where m_1 = slope of first line, m_2 = slope of second line and $\boxed{?}$ = acute angle.   If tan $\boxed{?}$ = negative $\boxed{?}$ $\boxed{?}$ = obtuse angle between the intersecting lines. ** Distance between two parallel lines ax + by + c_1 = 0 & ax + by + c_2 = 0 is $c^{1\,\boxed{?}c2}$. a2 $\boxed{?}$b2

QUESTIONS FOR HHW

1) Slope of a line which cuts off intercepts of equal lengths on the axes is

(a) -1 (b) 0   (c) 2   (d) √3

2.The value of y so that the line through (3,y) and (2,7) is parallel to the line through (-1,4) and (0,6) is

 a)7   (b) 10   (c) 9   (d) 8

3) The radius of the circle $x^2 + y^2 + 8x + 10y − 8 = 0$ is

a) 8   (b) 10   (c) 9   (d) 7

4) The focus of the parabola $y^2 = - 8x$ is

A) (2,0) b) (-2,0)   c) (0,2)   d) (0,-2)

5) Assertion (A). The slope of a line passing through two points (-5, 2)   and (3,-2) is   Reason (R). The slope of a line passing through two given points (x_1, y_1)   and (x_2, y_2) is

$y2-y1$

a)   Both A and R are true and R is the correct explanation of A.

b)   Both A and R are true but R is not correct explanation of A.

c)   A is true but R is false

d)   A is false but R is true.
     e)
     Both A and R are false.

Biology

1. SOLVE THE SAMPLE PAPER GIVENIN YOUR NOTEBOOK.
2. PREPARE AN INVESTIGATORY PROJECT.
3. 3.COMPLETE ALL THE PRACTICAL WORK

Class 12th Autumn Holidays Homework

Hindi

1. https://kvshindi025.blogspot.com/2018/10/blog-post_15.html?m=1
2. हिंदी की पाठ्य पुस्तक से किसी भी एक लेखक या कवि का परियोजना कार्य के बिंदुओं के आधार पर   चयन करके फाइल में परियोजना कार्य तैयार करें।

3. जनसंचार और अभिव्यक्ति के दिए गए 25 प्रश्नों के उत्तर उत्तर पुस्तिका में लिखो और याद करो।

अर्धवार्षिक परीक्षा पत्र उत्तर पुस्तिका में हल करो

Geography

Practical file :- Complete the portion covered for the practical file.

Answer these questions in your notebook :-

Ques. 1 Study the given map and answer the questions that follows-

   A) Identify the type of agriculture practiced in the shaded areas
   B) Write 5 characteristics associated with this type of practice.

Ques. 2 Study the given map carefully and answer the questions that follows-

   1. Identify the type of cultivation
   2. Name the major crops cultivated in these areas.
   3. 'Low yield per acre but high yield per person' justify the statement.

Ques. 3 Study the following table carefully and answer the questions that follow:

(3.1) In which decade was the growth rate of urban population the lowest in the country?

(3.2) In which year was the decennial growth rate of urban population the highest?

(3.3) Why is the number of towns growing in India?

Ques. 4 Answer these questions :-

  A) hat is doubling time of population? Explain the spatial pattern of population change

Of the world.

   B) Differentiate between primitive subsistence farming and intensive subsistence farming.
   C) What is commercial livestock rearing? Write the characteristics of this type of farming.

Project :- Write a report about the primitive societies which live in complete harmony with their natural environment. Show their region of habitat through maps. Give a detail account of their economic livelihood.

Biology

1. SOLVE THE SAMPLE PAPER GIVEN IN YOUR NOTEBOOK
2. PREPARE AN INVESTIGATORY PROJECT.
3. COMPLETE ALL THE PRACTICAL WORK.

Maths

(DAY -1 :- 20/10/2023)
RELATIONS & FUNCTIONS

1. Let A and B be two finite sets with n (A) = m and n (B) = n with m = n then find the number of bijective functions from A to B.

2. Let A = {1,2,3}. Find the number of equivalence relations containing (1,2) .

3. If A = {1,2,3}, B = {4,6,9} and R is a relation from A to B defined by ' x is smaller than y'. Write the range of R.

4. State whether The relation R = { (1,1),(2,2),(3,3)} on {1,2,3} is equivalence relation or not.

5. Let A = $\mathbf{R}$ – {3} and B = $\mathbf{R}$ – {1}. Consider the function f : A →B defined by

   $f (x) = \left(\dfrac{x-2}{x-3}\right)$ Is f one-one and onto? Justify your answer

6. Consider a function f : R+→[-5, ∞) defined f(x) = $9x^2$ +6x – 5. Show that f is one- one and onto function, Where R+ is the set of all non-negative real numbers.

7. Show that the function f: R → {x∈R :-1 < x < 1} defined by f(x) = $\dfrac{x}{1+|x|}$, x ∈R is one- one and onto function.

8. Show that the relation R in the set A = {1, 2, 3, 4, 5} given by R = {(a, b) : |a – b| is even}, is an equivalence relation. Show that all the elements of {1, 3, 5} are related to each other and all the elements of {2, 4} are related to each other. But no element of {1, 3, 5} is related to any element of {2, 4}.

9. Show that each of the relation R in the set A = {x ∈ **Z** :
   0 ≤ x ≤ 12}, given by
       R = {(a, b) : |a - b| is a multiple of 4} is an
   equivalence relation. Find the set of all
        elements related to 1.

10.   Let N denote the set of all natural numbers and R be
   the relation on N×N defined by $(a,b)R(c,d) \Leftrightarrow ad(b+c) = bc(a+d)$
   prove that R is an equivalence relation on N×N.

ANSWERS

1) [n!]   2) {4,6,9}
3) Equivalence Relation   9) {1, 5, 9}

(DAY -2 :- 21/10/2023)
INVERSE TRIGONOMETRIC FUNCTIONS

* Domain & Range of the Inverse Trigonometric Function :

	Functions	*Domain*	*Range*(Principal value Branch)
I.	$\sin^{-1}$:	$[-1,1]$	$[-\pi/2, \pi/2]$
II.	$\cos^{-1}$:	$[-1,1]$	$[0, \pi]$
III.	$\csc^{-1}$:	$R-(-1,1)$	$[-\pi/2, \pi/2]-\{0\}$
IV.	$\sec^{-1}$:	$R-(-1,1)$	$[0, \pi]-\{\pi/2\}$
V.	$\tan^{-1}$:	R	$(-\pi/2, \pi/2)$
VI.	$\cot^{-1}$:	R	$(0, \pi)$

1). Find the principal value of $\sec^{-1}(-2)$.

2) Find the principal value of $\sin^{-1}\left(\cos\dfrac{2\pi}{3}\right)$.

3) Find the principal value of $\cot^{-1}\left(\tan\dfrac{3\pi}{4}\right)$.

4). Find the value of $\sin^{-1}\left\{\cos(\sin^{-1}\dfrac{\sqrt{3}}{2})\right\}$.

5). Find the value of $\cot\left[\sin^{-1}\left\{\cos\left(\tan^{-1}1\right)\right\}\right]$.

6) . Principal value of $\cos^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)$ is equal to

7) Evaluate :- $\cos^{-1}\left(\cos\dfrac{2\pi}{3}\right)+\sin^{-1}\left(\sin\dfrac{2\pi}{3}\right)$ 8) Evaluate :-

$\cos^{-1}\left(\cos\dfrac{7\pi}{6}\right)$

9) Write the principal value of $\tan^{-1}\left(\sqrt{3}\right)-\cot^{-1}\left(-\sqrt{3}\right)$.

10) Write the value of $\tan^{-1}\left[2\sin\left(2\cos^{-1}\dfrac{\sqrt{3}}{2}\right)\right]$

ANSWERS

1). $\dfrac{2\pi}{3}$	2). $-\dfrac{\pi}{6}$	3) $-\dfrac{\pi}{4}$	4) $\dfrac{3\pi}{4}$	5) $\dfrac{\pi}{6}$

(DAY -3 :- 22/10/2023)
MATRICES

1) If $[2x \quad 3]\begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}\begin{bmatrix} x \\ 8 \end{bmatrix} = O$, find x.

2) Find the matrix P satisfying the matrix equation

$\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} P \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$. Also

find a matrix Q such that P + Q = O, where O is a zero matrix

3) If $A = \begin{bmatrix} 0 & -\tan\dfrac{\alpha}{2} \\ \tan\dfrac{\alpha}{2} & 0 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. Prove that

$I + A = (I - A)\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$

4) If $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$, find x and y such that $A^2 + xI = yA$. Also

find the value of $(x - y)$.

5) For what value of x: $[1 \quad 2 \quad 1]\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix}\begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = O$. Use the value of

x to find A^2, if

$A = \begin{bmatrix} x & -x \\ -x & x \end{bmatrix}$.

6) If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, show that $A^2 - 5A - 14I = O$.

7) Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 5 \\ 7 & 4 \end{bmatrix}$. Find a matrix D such that

CD - AB = O.

8) Express $A = \begin{bmatrix} 3 & 2 & 3 \\ 4 & 5 & 3 \\ 2 & 4 & 5 \end{bmatrix}$ as the sum of a symmetric(P) and a skew-symmetric (Q)

matrix. Also find $P^T + Q^T$.

9) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then prove that $A^2 - 4A - 5I = 0$ and, hence find A^{-1}.

10) Let A = $\begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ and $f(x) = x^2 - 4x + 7$. Show that $f(A) = O$. Use this result to find A^5.

ANSWERS

1) $x = 0, x = \frac{-23}{2}$ 2) P= $\begin{bmatrix} 25 & 15 \\ -37 & -22 \end{bmatrix}$, Q = $\begin{bmatrix} -25 & -15 \\ 37 & 22 \end{bmatrix}$ 4) . x = 8, y = 8; 0

5) x = -1, A^2 = $\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ 7. D = $\begin{bmatrix} -191 & -110 \\ 77 & 44 \end{bmatrix}$ 8)

$\begin{bmatrix} 3 & 3 & 5/2 \\ 3 & 5 & 7/2 \\ 5/2 & 7/2 & 5 \end{bmatrix} + \begin{bmatrix} 0 & -1 & 1/2 \\ 1 & 0 & 1/2 \\ -1/2 & 1/2 & 0 \end{bmatrix}$; $\begin{bmatrix} 3 & 4 & 2 \\ 2 & 5 & 4 \\ 3 & 3 & 5 \end{bmatrix}$

9) A^{-1} = $\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 2 & 2 & -3 \end{bmatrix}$ 10. $\begin{bmatrix} -118 & -93 \\ 31 & -118 \end{bmatrix}$

(DAY -4 :- 23/10/2023)
Determinants

1. Using matrix method, solve: x + y + z = 6; y + 3z = 11; x - 2y + z = 0

2. Using matrix method, solve: 3x - 2y +3z = 8; 2x + y - z = 1; 4x -3 y +2z = 4

3. Solve the system using matrices: $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4$; $\frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1$; $\frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2$

4. If A = $\begin{bmatrix} 2 & 3 & 1 \\ -3 & 2 & 1 \\ 5 & -4 & -2 \end{bmatrix}$, find A^{-1} and use it to solve the system of equations:

   2x - 3y + 5z = 11, 3x + 2y - 4z = - 5, x + y - 2z = - 3

5. Using matrices, solve the following system of equations:
   (i) x + 2y - 3z   = - 4
        2x + 3y + 2z   = 2
        3x - 3y - 4z   = 11
   (ii) 4x + 3y + 2z   = 60
        x + 2y + 3z   = 45
        6x + 2y + 3z   = 70

6. Find the product AB, where $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ and use it to
solve the equations: $x - y + z = 4$, $x - 2y - 2z = 9$, $2x + y + 3z = 1$

7. Using matrices, solve the following system of equations:
$$\frac{1}{x} - \frac{1}{y} + \frac{1}{z} = 4; \qquad \frac{2}{x} + \frac{1}{y} - \frac{3}{z} = 0 , \qquad \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 2$$

8. Find the product AB, where $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$

and
use it to solve: $x - y + 2z = 1$, $2y - 3z = 1$, $3x - 2y + 4z = 2$.

9. Find A^{-1} if $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ and show that $A^{-1} = \frac{A^2 - 3I}{2}$.

10. Given $A = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$, find BA and use this
to solve the system of equations: $y + 2z = 7, x - y = 3, 2x + 3y + 4z = 17$.

ANSWERS
1. x = 1, y = 2, z = 3   2. x = 1, y = 2, z = 3
  3. x = 2, y = 3, z = 5
4. x = 1, y = 2, z = 3   5. (i) x = 3, y = -2, z = 1
  (ii) x = 5, y = 8, z = 8
6. AB = 8I, x = 3, y = - 2, z = -1   7. $x = \frac{1}{2}$, y = -1, z = 1

8. x = 0, y = 5, z = 3   9. $A^{-1} = \begin{bmatrix} -1 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 1 & -1 \end{bmatrix}$ 10. x = 2,
y = -1, z = 4

(DAY -5 :- 24/10/2023)
CONTINUITY AND DIFFERENTIABILITY

1. Find the value of k for which $f(x) = \begin{cases} \dfrac{\sqrt{1+kx} - \sqrt{1-kx}}{x}, & -1 \le x < 0 \\ \dfrac{2x+1}{x-1}, & 0 \le x \le 1 \end{cases}$ is

continuous at x = 0 .

2. If $f(x) = \begin{cases} 3ax+b, & \text{if } x>1 \\ 11 & \text{if } x=1, \\ 5ax-2b, & \text{if } x<1 \end{cases}$ continuous at $x = 1$, find the values

of a and b.

3. If $f(x) = \begin{cases} \dfrac{1-\sin^3 x}{3\cos^2 x}, & \text{if } x < \dfrac{\pi}{2} \\ a & \text{if } x = \dfrac{\pi}{2} \\ \dfrac{b(1-\sin x)}{(\pi-2x)^2} & \text{if } x > \dfrac{\pi}{2} \end{cases}$ is continuous at $x = \dfrac{\pi}{2}$, find a, b.

4. If $y = (\log_e x)^x + x^{\log_e x}$ find $\dfrac{dy}{dx}$.

5. If $x = a(\theta - \sin\theta), y = a(1+\cos\theta)$, find $\dfrac{d^2 y}{dx^2}$ at $\theta = \dfrac{\pi}{2}$

6 If $x = a\left(\cos\theta + \log\tan\dfrac{\theta}{2}\right)$ and $y = a\sin\theta$ find $\dfrac{dy}{dx}$ at $\theta = \dfrac{\pi}{4}$.

7. If $y = \sin(m\sin^{-1} x)$, prove that $(1-x^2)\dfrac{d^2 y}{dx^2} - x\dfrac{dy}{dx} + m^2 y = 0$

8. If $x^m \cdot y^n = (x+y)^{m+n}$, prove that $\dfrac{dy}{dx} = \dfrac{y}{x}$

9. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, $-1 < x < 1$, prove that $\dfrac{dy}{dx} = -\dfrac{1}{(1+x)^2}$

10. If $y = \sqrt{x + \sqrt{x + \sqrt{x + \dots \infty}}}$, then find $\dfrac{dy}{dx}$.

11. If $(\cos x)^y = (\sin y)^x$, then find $\dfrac{dy}{dx}$.

ANSWERS

1. k = −1	**2** $a=3, b=2$	**3.** $a = \dfrac{1}{2},$ $b=4$

(DAY -6 :- 25/10/2023)
APPLICATION OF DERIVATIVES

1. Find the intervals in which function $f(x) = 2x^3 - 15x^2 + 36x + 1$ is strictly increasing or strictly decreasing.

2.   Find the intervals in which function $f(x) = \sin x - \cos x$, $0 \le x \le 2\pi$, is strictly increasing or strictly decreasing.
3.   . Find the absolute maximum and minimum values of a function f given by $f(x) = 2x^3 - 15x^2 + 36x + 1$ on the interval $[1, 5]$.
4.   A man whose height is 2 m walks at a uniform speed of 6 m/minutes away from a lamp post 5 m high. Find the rate at which the length of his shadow increases.
   5. Water is leaking from a conical funnel at the rate of 5 cm ^{2} /s. If the radius of the base of the funnel is 5 cm and the altitude is 10 cm, find the rate at which the water level is dropping when it is 2.5 cm from the top.
   6. The length x of a rectangle is decreasing at the rate of 3 cm/minute and the width y is increasing at the rate of 2cm/minute. When x =10cm and y = 6cm, find the rates of change of (a) the perimeter and (b) the area of the rectangle.

   7. The volume of a cube is increasing at the rate of 8 cm^3/s. How fast is the surface area   increasing when the length of an edge is 12 cm?

   8.   Show that the volume of the largest cone that can be inscribed in a sphere of radius R is 8/27 of the volume of the sphere.
   9. 17. Show that semi-vertical angle of right circular cone of given surface area and maximum volume is $\sin^{-1}(1/3)$.
10.   An open box with a square base in to be made out of a given quantity of sheet of area c^2.Show that the maximum volume of the box is $\frac{c^3}{6\sqrt{3}}$.
   11.   A rectangular sheet of tin 45 cm by 24 cm is to be made into a box without top by cutting off squares from each corner and folding up the flaps. What should be the side of the square to be cut off so that the volume of the box is the maximum possible?
12.   Find the interval in which the function f given by $f(x) = x^2 e^{-x}$ is strictly increasing.

(DAY -7 :- 26/10/2023)
<u>INDEFINITE & DEFINITE INTEGRALS</u>

1.   1. $\int \dfrac{1}{\sqrt{x}+x}\,dx$ 2. $Evluate: \int \sqrt{\tan x}\ dx$

         3. $\int \dfrac{1}{\sin(x-a).\cos(x-b)}\,dx$ 4. $\int \tan x.\tan 2x.\tan 3x\ dx$

5. $\int \frac{sinx-xcosx}{x(x+sinx)} dx$　　6. $\int \frac{1}{(\sqrt{x}+\sqrt[3]{x})} dx$　　7. $\int \frac{x^4+1}{x^2+1} dx$　　8.

$\int \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx$

9. $\left(\int e^{2x} \frac{1+sin2x}{1+cos2x}\right) dx$　　10. $\int \frac{sec^4 x}{\sqrt{tanx}} dx$　　11. $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \sqrt{1+sin2x} \ dx$

12. If $\int_a^b x^3 dx = 0$ and if $\int_a^b x^2 dx = \frac{2}{3}$ find a and b.

13.

Evaluate: $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} cosx . log(sinx) dx$

14. Evaluate: $\int_1^3 (|x-1|+|x-2|+|x-3|)dx$

15.

$$\int_0^{\pi/4} \log(1+\tan x) \ dx$$

16. Prove that: $\int_0^{\frac{\pi}{2}} sin2x . log(tanx)dx = 0$

17. Evaluate:

$\int_0^{\frac{\pi}{2}} \frac{x \ sinx}{1+cos^2 x} dx$

18. Evaiuate: $\int_{-2}^2 \frac{x^2}{1+5^x} dx$

19.

$\int_0^{\frac{\pi}{2}} 2sinx . cosx . tan^{-1}(sinx) \ dx$

20. $\int_0^1 \frac{log(1+x)}{1+x^2} \ dx$

Answer

1. $2log_e|1+\sqrt{x}|+C$　　**2.** $\frac{1}{\sqrt{2}}tan^{-1}(\frac{tanx-1}{\sqrt{2tanx}}+\frac{1}{2\sqrt{2}}log|\frac{tanx-\sqrt{2tanx}+1}{tanx+\sqrt{2tanx}+1}|+c$

　　3. $\frac{1}{cos(x-b)}[log sin(x-a) - cos(x-b)] + c$

4. $\frac{1}{3} logcos3x + \frac{1}{2} logcos2x + logcosx + c$　　5. log x- log(x+sinx)+c

6. $2\sqrt{x} -3\sqrt[3]{x}+6x^{\frac{1}{6}}-6log(x^{\frac{1}{6}}+1)+c$　　7. $\frac{x^3}{3} - x + 2 \ tan^{-1}x + c$

8. $- \sqrt{1-x^2} \ sin^{-1}x$ +x+c　　9. $\frac{1}{2}e^{2x}$ tanx +c　　10. $2\sqrt{tanx} + \frac{2}{5} \ tan^{\frac{5}{2}}x+c$

(DAY -8 :- 27/10/2023)
APPLICATION OF INTEGRATION

1. Find the area enclosed by the circle $x^2 + y^2 = 2$.

2. Find the area of the region bounded by the curve $y = x^2$ and the line $y = 16$.

3. Find the area of the region bounded by the curve $y = \sqrt{16 - x^2}$ and x-axis.

4. Find Area of the region bounded by $y^2 = 4x$, y-axis, and the line y = 3.

5. Find The area of the region bounded by the curve x = 2y + 3 and the y lines,
   y = 1 and y = -1

6. Sketch the region of the ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{16} = 1$ and find its area, using integration.

7. Sketch the graph of $y = |x + 3|$ and evaluate the area under the curve $y = |x + 3|$ above x-axis and between x = -6 to x = 0. using integration.

8. Find the area of the region bounded by $x^2 = 4y$, y = 2, y = 4 and the y-axis in the first quadrant using integration

9. Find the Area of Triangle having vertices A (2 , 3) , B (4 , 7) C (6 , 2)

10. Find the Area of Triangle bounded by lines :- 3x +3 - 2y = 0 , x + 2y -7 = 0 , x-2y+1=0

   Answers:
1. 2π sq units
2. $\dfrac{256}{3}$ sq units
3. 8π sq units
4. $\dfrac{9}{4}$ sq units
5. 6 sq units
6. 20π sq units
7. 9 Sq. units
8. $16 - 4\sqrt{2}\ sq.\,units$
9. 9 sq units
10. 4 sq units

(DAY -9 :- 28/10/2023)
DIFFERENTIAL EQUATIONS

1. Find the particular solution of the differential equation
   $\left(1 + e^{2x}\right)dy + \left(1 + y^2\right)e^x = 0$; given that y=1 and x=0

2. Find the particular solution of the differential equation
$\log\left(\dfrac{dy}{dx}\right)=3x+4y$, given that y=0 when x=0

3. Solve the following differential equation :
$\left(x\sin^2\dfrac{y}{x}-y\right)dx+xdy=0$

4. Solve the following differential equation :
$xdy-ydx=\sqrt{x^2+y^2}\,dx$

5. Find the solution of the differential equation
$(xdy-ydx)y\sin\left(\dfrac{y}{x}\right)=(ydx+xdy)x\cos\left(\dfrac{y}{x}\right)$

6. Solve the following differential equation:
$x\log x\dfrac{dy}{dx}+y=\dfrac{2}{x}\log x$

7. Solve the differential equation:
$x\dfrac{dy}{dx}+y-x+xy\cot x=0,\ x\neq 0$

8. Find the particular solution of the differential equation
$\dfrac{dy}{dx}+y\cot x=2x+x^2\cot x, x\neq 0$ given that y= 0 and x = pie / 2

9. Find the general solution of the differential equation
$ydx-(x+2y^2)dx=0$

10.. solve the differential equation
$\left(\tan^{-1}y-x\right)dy=(1+y^2)dx$

Answer

1. $\tan^{-1}y+\tan^{-1}e^x=\dfrac{\pi}{2}$ 2. $4e^{3x}+3e^{-4y}=7$ 3. $\cot\left(\dfrac{y}{x}\right)=\log|x|+c$

(b) $y+\sqrt{x^2+y^2}=cx^2$ 5. $\sec\left(\dfrac{y}{x}\right)=cxy$

6. $y\log x=-\dfrac{2}{x}(1+\log x)+c$ 7. $y=\dfrac{1}{x}-\cot x+\dfrac{c}{x\sin x}$

8. $y=x^2-\dfrac{\pi^2}{4\sin x},\sin x\neq 0$ 9. $x=2y^2+cy$

10. $x=\left(\tan^{-1}y-1\right)+ce^{-\tan^{-1}y}$

VECTOR ALGEBRA

1. Write a vector of magnitude 15 units in the direction of vector $\hat{i} - 2\hat{j} + 2\hat{k}$.

2. .Find $\vec{a}.\vec{b}$ if $\vec{a} = 3\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{b} = 2\hat{i} + 3\hat{j} + 3\hat{k}$.

3. If $\vec{a}$ and $\vec{b}$ are two vectors such that $|\vec{a} . \vec{b}| = |\vec{a} \times \vec{b}|$, then what is the angle between $\vec{a}$ and $\vec{b}$

4. If $|\vec{a}| = 3$, $|\vec{b}| = 5$ and $\vec{a} . \vec{b} = 9$. Find $|\vec{a} \times \vec{b}|$

5. The dot products of a vector with the vectors $\hat{i} - 3\hat{j}$, $\hat{i} - 2\hat{j}$ and $\hat{i} + \hat{j} + 4\hat{k}$ are 0 , 5 and 8 respectively. Find the vector.

6. If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j}$ are such that $\vec{a} + \lambda\vec{b}$ is

perpendicular to $\vec{c}$, find the value of λ.

7. If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$, then find the angle between $\vec{a}$ and $\vec{b}$.

8. Let $\vec{a}$, $\vec{b}$, $\vec{c}$ be three vectors such that $|\vec{a}| = 3, |\vec{b}| = 4, |\vec{c}| = 5$ and each of them being perpendicular to the sum of the other two, find $|\vec{a} + \vec{b} + \vec{c}|$.

9. If with reference to the right handed system of mutually perpendicular unit vectors $\hat{i}, \hat{j}$ and $\hat{k}$, $\vec{a} = 3\hat{i} - \hat{j}$, $\vec{\beta} = 2\hat{i} + \hat{j} - 3\hat{k}$ then express $\vec{\beta}$ in the form of $\vec{\beta}_1 + \vec{\beta}_2$, where $\vec{\beta}_1$ is parallel to $\vec{a}$ and $\vec{\beta}_2$ is perpendicular to $\vec{\alpha}$.

10. If $\vec{a} = 4\hat{i} + 5\hat{j} - \hat{k}$, $\vec{b} = \hat{i} - 4\hat{j} + 4\hat{k}$, $\vec{c} = 3\hat{i} + 4\hat{j} - \hat{k}$, then find a vector $\vec{d}$ perpendicular to both $\vec{c}$ and $\vec{b}$ and $\vec{d}.\vec{a} = 21$

ANSWERS

1 5 $(\hat{i} - 2\hat{j} + 2\hat{k}$

2. $\vec{a} \cdot \vec{b} = 9$ 3. $\dfrac{\pi}{4}$ 4. 12

5. $15\hat{i} + 5\hat{j} - 3\hat{k}$ 6. 8

7. $\dfrac{\pi}{2}$ 8. $5\sqrt{2}$

9. $\vec{\beta}_1 = \dfrac{1}{2}(3\hat{i} - \hat{j})$, $\vec{\beta} = \dfrac{1}{2}\hat{i} + \dfrac{3}{2}\hat{j} - 3\hat{k}$ 10 $-\dfrac{1}{3}(\hat{i} - 16\hat{j} - 13\hat{k})$.