

Date : 30/10/2023

Subject : Science-I

Marks : 40

Q.1.A. Choose the correct alternative and complete the following statement:

[5]

- A body of mass 1 kg is attracted by the earth with a force which is equal to _____.
a) 9.8N b) $6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$ c) 1N d) 9.8 m/s^2
- Oily food kept out for few days gives a bad taste and a bad smell because of _____.
a) Corrosion b) Displacement c) Heating d) Rancidity
- _____ method is used for the purification of more reactive metals.
a) Chemical reduction b) Electrolytic reduction c) Roasting d) Calcination
- If the refractive index of glass with respect to air is $3/2$, then the refractive index of air with respect to glass is _____.
a) $1/2$ b) 3 c) $2/3$ d) $1/3$
- In modern periodic table, third period consists of _____ elements.
a) 1 b) 2 c) 8 d) 18

B Solve:

[5]

I) Match the pairs :

A

B

- | | |
|---|------------------------|
| 1) $\text{H}_2\text{O} + \text{CO}_2 \longrightarrow \text{H}_2\text{CO}_3$ | a) Decomposition |
| 2) $\text{CuSO}_4 + \text{Zn} \longrightarrow \text{ZnSO}_4 + \text{Cu} \downarrow$ | b) Neutralization |
| 3) $\text{AgNO}_3 + \text{NaCl} \longrightarrow \text{NaNO}_3 + \text{AgCl} \downarrow$ | c) Displacement |
| 4) $2\text{H}_2\text{O} \longrightarrow 2\text{H}_2 \uparrow + \text{O}_2 \uparrow$ | d) Combination |
| | e) Double Displacement |

II) State 'TRUE' or 'FALSE' :

- All artificial satellites revolve in similar orbits around the earth.
- Tungsten metal has the highest melting point.

III) Name the following :

- The scientist who first predicted the existence of gravitational wave.
- An illusion of the appearance of water on a hot road or in a desert is called.

IV) Complete the analogy :

- Normal elements : One incomplete outermost shell :: transition elements : _____
- For a convex lens, object between F_1 and $2F_1$: _____ :: Object at F_1 : Image at infinity

Q.2.A. Give scientific reasons: (Any 2)

[4]

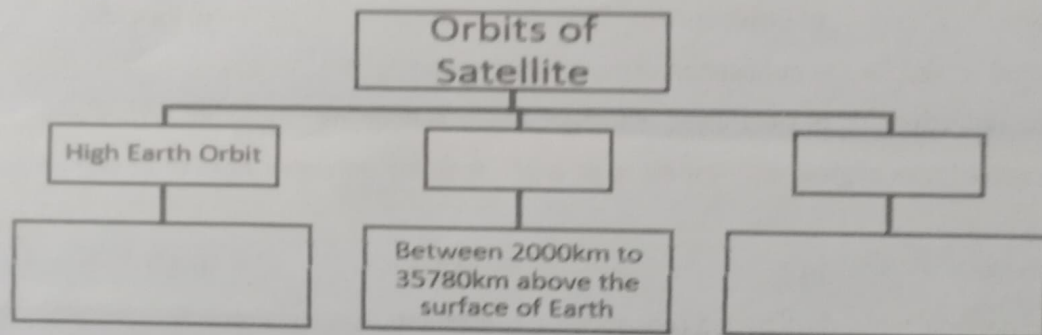
- Weight of an object changes from place to place on the surface of the earth.
- Lemon or tamarind is used for cleaning copper vessels turned greenish.
- Old people sometimes use bifocal glasses.

B. Solve: (Any 3)

[6]

- 1) Differentiate between : Physical change and Chemical change.
- 2) The absolute refractive index of water is 1.36. What is the velocity of light in water?
[Velocity of light in vacuum is 3×10^8 m/s]
- 3) Define : Alloys. Write any two examples with their constituents.

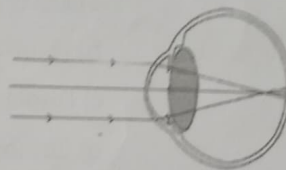
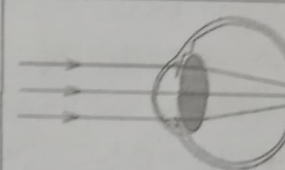
4)



Q.3 Solve: (Any 5)

[15]

- 1) State Newton's inverse square of law of gravitation and prove it mathematically.
- 2) Observe the following figures and complete the table :

	Points		
1.	Name the defect		
2.	Where will the image form?		
3.	Which type of lens is used to correct them?		

3) Add Potassium chromate into solution of Barium sulphate _____

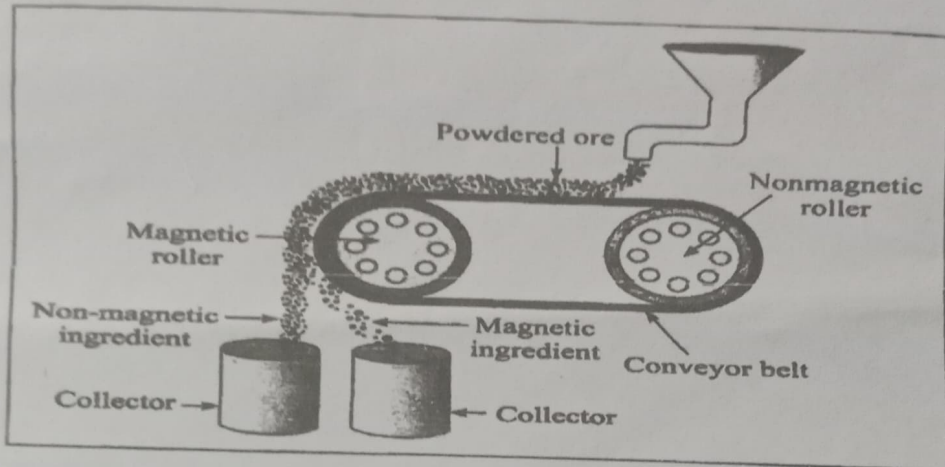
- i) Write the name and colour of the precipitate formed.
- ii) Write the balanced chemical equation for this reaction.
- iii) Identify the type of reaction.

4) Position of the elements in the periodic table _

- i) How is the problem regarding the position of cobalt (^{59}Co) and nickel (^{59}Ni) in Mendeleev's periodic table resolved in modern periodic table?
- ii) How did the position of $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$ get fixed in the modern periodic table ?
- iii) What do you think, should hydrogen be placed in the group 17 of halogens or group 1 of alkali metals in the modern periodic table?

5) Following figure represents one of the methods to concentrate ores ___

i) Identify and explain it.



6) Complete the following table:

Sr.no.	Abbreviation	Full form
1.	ISRO	
2.	GSAT	
3.	IRNSS	
4.	PSLV	
5.	IRS	
6.	GSLV	

Q.4) Solve: (Any 1)

[5]

1) Explain partial reflection, critical angle and total internal reflection with the help of a neat and labelled Diagram.

2) In the extraction of aluminium ___

i) Name the processes of concentration of bauxite.

ii) Write the function of cryolite and fluorspar in the electrolytic reduction of alumina.

iii) Draw neat and labelled diagram of electrolytic reduction of alumina

iv) Why is it necessary to replace anodes time to time?

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Source

Sonal Pathak

Q.1.A. Choose the correct alternative and rewrite :

- Angle subtended by the same arc are _____.
 a) equal b) unequal c) acute d) 180°
- Two circles with centres P and Q touch internally. If their radii are 10cm and 26cm then PQ = _____.
 a) 16cm b) 26cm c) 13cm d) 36cm
- The vertices of ΔPQR are P(3,7), Q(5,11) and R(- 2, 8), then slope of QR = _____.
 a) 7/3 b) 3/7 c) - 7/3 d) -3/7
- $\Delta ABC \sim \Delta DEF$ AB = 6, DE = 21, BC = 4 then EF = _____.
 a) 16 b) 36 c) 441 d) 14

[4]

B. Solve the following questions :

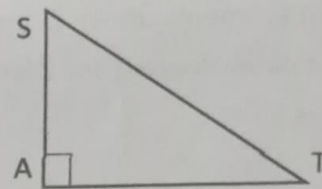
- In $45^\circ - 45^\circ - 90^\circ$ triangle, if one perpendicular side is 6cm then find the area of triangle.
- \square MATH is a cyclic quadrilateral. If $m\angle M = 4 m\angle T$, then find $m\angle M$.
- In ΔABC , seg PQ || side BC, AP= 3, PB = 6, AQ = 5, QC = x, find x.
- Point P is midpoint of seg AB where A(-4, 2) and B(6, 2) then find coordinates of P

[4]

Q.2.A. Carry out any two of the following activities:

- In ΔSAT , $m\angle A = 90^\circ$,
 $\angle S = (2x)^\circ$, $\angle T = x^\circ$
 ST = 12cm, Find SA and AT

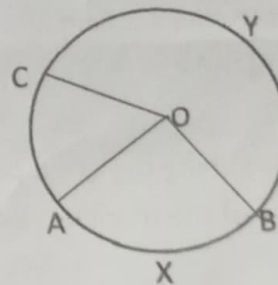
Solution : Use property of sum of angles of a triangle
 Find value of x hence value of $\angle S$ and $\angle T$
 State the type of triangle and find sides of the triangle.



- In the given figure, O is Centre of the circle.

$m\angle AOB = 110^\circ$, $m(\text{arc AC}) = 45^\circ$
 Find $m(\text{arc AXB})$ and $m(\text{CYB})$.

Solution : $m\angle AOB = 110^\circ$
 $\text{.....} = 110^\circ$
 $m(\text{arc AC}) = 45^\circ$
 $\text{.....} = 45^\circ$
 $m(\text{arc CYB}) = 360^\circ - (\text{.....})$



- Find the distance between A(7, - 3) and B(- 19, 1).

Solution : $d(A, B) = \text{.....}$ (formula)
 $= \text{.....}$ =

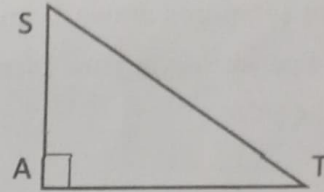
B. Solve any four sub questions the following

[8]

Q.2.A. Carry out any two of the following activities:

[4]

1. In ΔSAT , $m\angle A = 90^\circ$,
 $\angle S = (2x)^\circ$, $\angle T = x^\circ$
 $ST = 12\text{cm}$, Find SA and AT

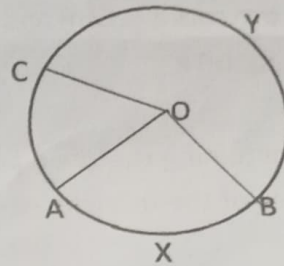


Solution : Use property of sum of angles of a triangle
 Find value of x hence value of $\angle S$ and $\angle T$
 State the type of triangle and find sides of the triangle.

2. In the given figure, O is Centre of the circle.

$m\angle AOB = 110^\circ$, $m(\text{arc } AC) = 45^\circ$

Find $m(\text{arc } AXB)$ and $m(\text{CYB})$.



Solution : $m\angle AOB = 110^\circ$
 $\text{.....} = 110^\circ$
 $m(\text{arc } AC) = 45^\circ$
 $\text{.....} = 45^\circ$
 $m(\text{arc } CYB) = 360^\circ - (\text{.....})$

3. Find the distance between $A(7, -3)$ and $B(-19, 1)$.

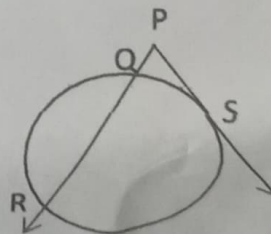
Solution : $d(A, B) = \text{.....}$ (formula)
 $= \text{.....}$ $= \text{.....}$

B. Solve any four sub questions the following

[8]

1. In ΔPQR , seg QS is the angle bisector of $\angle Q$. Show that $\frac{A(\Delta PQS)}{A(\Delta QRS)} = \frac{PQ}{QR}$
2. Point P is the centre of the circle. Chord AB is at distance 12cm from P . The radius of the circle is 20cm . Find the length of the chord.
3. If a line DE intersects sides AB and AC of ΔABC at D and E respectively and is parallel to BC . Then prove that $\frac{AD}{AE} = \frac{AB}{AC}$

4. In the given figure, Seg PS is the tangent segment.
 line PR is a secant.
 If $PQ = 3.6\text{cm}$, $QR = 6.4\text{cm}$, find the length of PS .



5. If the centroid of the triangle formed by the points $(3, -5)$, $(-7, 4)$, $(10, -k)$ is at the point $(k, -1)$. Find k .

Q.3.A. Carry out any one of the following activities :

1. The points $A(k, 3)$, $B(2, -4)$ and $C(-k + 1, -2)$ are collinear points. Find k .

Solution : $A(k, 3)$, $B(2, -4)$ and $C(-k + 1, -2)$ are collinear points.

Slope of line seg AB = slope of line seg BC

Slope = $m =$ _____ (formula)

Slope of line seg AB = _____

Slope of line seg BC = _____

_____ = _____

$k =$ _____.

2. Draw a circle of with centre O and radius 3.2cm . Draw a chord MN of length 3.8cm . Draw tangents to the circle through the points M and N .

Solution : Draw a circle of given radius. Draw a chord MN

Take point K in the alternate arc. Draw segment KM and KN

Draw an angle congruent to $\angle MKN$ at vertex M to draw required tangent

Repeat the same procedure at vertex N and draw another tangent.

Q.3.B. Attempt any two sub questions from the following

1. Prove that tangent segments drawn from an external point to the circle are congruent.
2. The diagonals of a parallelogram are 14cm and 22cm in length. The perimeter of the parallelogram is 52cm .

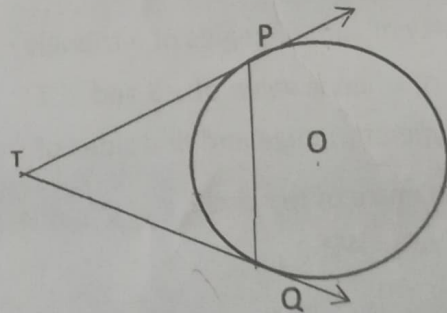
Find the length of the sides.

3. In the given figure,

Tangents drawn at points P and Q of a circle with centre O , intersect each other in point T

If the length of the chord is 8cm and $r = 5\text{cm}$

Then find the length TP .



4. Can the segment joining the given points form a triangle? If triangle is formed, state the type of the triangle considering sides of the triangle. $(6,4)$, $(-5, -3)$, $(-6, 8)$.

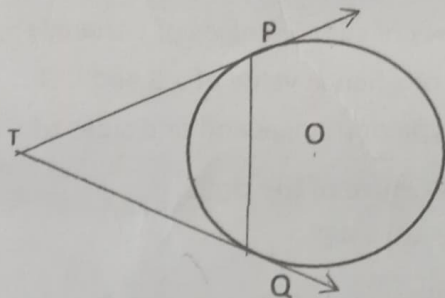
Q.3.B. Attempt any two sub questions from the following

[6]

1. Prove that tangent segments drawn from an external point to the circle are congruent.
2. The diagonals of a parallelogram are 14cm and 22cm in length. The perimeter of the parallelogram is 52cm. Find the length of the sides.

3. In the given figure,

Tangents drawn at points P and Q of a circle with centre O, intersect each other in point T. If the length of the chord is 8cm and $r = 5$ cm. Then find the length TP.



4. Can the segment joining the given points form a triangle? If triangle is formed, state the type of the triangle considering sides of the triangle. (6,4), (-5, -3), (-6, 8).

Q.4. Solve the following sub questions : (Any 2)

[8]

1. Prove : The bisector of an angle of a triangle divides the side opposite to the angle in the ratio of the remaining sides.
2. $\Delta ABC \sim \Delta PBR$. In ΔABC , $AB = 5.1\text{cm}$, $BC = 4.8\text{cm}$, $\angle B = 40^\circ$ $\frac{AC}{PR} = \frac{4}{7}$ Construct ΔABC and ΔPBR .
3. The vertices of a triangle are (5,1), (11,1) and (11,9). Find the coordinates of circumcentre of the triangle.

Q.5. Solve the following sub question : (Any 1)

[3]

1. Points M and N on sides AB and AC of ΔABC such that $AN = 2NC$, $AM = 2MB$. If CM and BN intersect in O, then prove that $5 \times CO = 3 \times CM$.
2. Line L intersect seg AC and seg AB of ΔABC in D and E respectively $\angle ADE \cong \angle ABC$.

Show that $\square BCDE$ is cyclic. Hence or otherwise prove that $\frac{AD}{AE} = \frac{AB}{AC}$.

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Date : 20/10/2023

Subject : Defence Studies

Marks: 25

Q.1.A. Fill in the blanks and rewrite the sentence:

[5]

1. _____ technology is critical to human survival and progress.
2. In the year _____, India declared that it was now a nuclear weapons state.
3. In 1967, protests against feudal system were held in _____ in India.
4. _____ authored 'The Arthashastra'.
5. The scheme called _____ aims at skills development of unemployed youth in Kashmir.

B. Rewrite names of Missiles from column A and write the correct categories in column B:

[4]

A	B
1. Nirbhay	1. Surface to Air Missile
2. Astra	2. Tactical Missile
3. Brahmos	3. Subsonic Cruise Missile
4. Prithvi I	4. Medium Range Ballistic Missile
5. Nag	5. Surface to Surface Missile
6. K4 Sagrika	6. Air to Air Missile
7. Pradyuman	7. Supersonic Cruise Missile
8. Agni	8. Anti-Tank Missile

C. Rewrite the statement and write whether it is true or false:

[2]

1. Olof Palme served as a Chancellor of the Federal Republic of Germany from 1969 to 1974.-
2. India joined the Nuclear Non-Proliferation Treaty in the year 1974.
3. Ladakh is one of the states of North Eastern Region of India.
4. The National Policy of Electronics plans to create a complete secure cyber eco system in the country.

Q.2.A. Rewrite the statement and give two examples of each:

[5]

1. Scientists who played important role in the development of India's nuclear policy.
2. Researchers who devised Human Development Index.
3. Futuristic technologies in the field of defence.
4. Factors required to be developed to become modern and prosperous nation.
5. Areas under Comprehensive Security.

B. Answer the following in one sentence:

[5]

1. Why was the National Cyber Security Policy introduced?
2. Why is the position of North Eastern states strategically important?
3. What is a fundamental aspect of India's security policy?
4. Write about the traditional dimension of National Security.
5. Why does Army conduct a Flag March during severe riot or unrest?

C. Give reasons (Any 2):

[4]

1. Science, Technology and Engineering are considered as one for the purpose of development.
2. In the age of globalisation, Human as well as Comprehensive Security became important.
3. Terrorism is called as 'Asymmetric warfare'.

Date: 2/11/2023

Subject : Water Security

Marks: 25

Q.1.A. Fill in the blanks and rewrite the sentence:

[5]

1. The Shirpur pattern has been implemented successfully in _____ district in Maharashtra.
2. Yashayahu developed the method of Drip Irrigation in the year _____.
3. Around _____ cubic meters of water can be stored in a big farm pond.
4. Jole Sanghna was established in each and every village in _____ and _____ to construct the dams near bank of bay and ocean.

B. Rewrite column A and write the correct answers in column B.

[2]

A	B
1. Pashan Lake	1. Wafa
2. Method of irrigation	2. Nashik
3. Nidhal	3. Raigad
4. Manjarpada Project	4. Stone Quarry
	5. NABARD

C. Write the names of activists for the given water conservation measures:

[6]

- | | |
|-------------------------------|---------------------------------------|
| 1. Semicircular dam | 4. Wells through public participation |
| 2. Hiware Bazar | 5. Khadakwasala Dam experiment |
| 3. Water Community Experiment | 6. Vanrai experiment |

Q.2.A. Rewrite the statement and give two examples of each:

[3]

1. Government schemes for water conservation.
2. Trees planted near contour trenches.
3. Traditional methods of irrigation.

B. Answer the following in one sentence:

[5]

1. What is a permanent solution for drought conditions?
2. What is irrigation?
3. Why is October called a 'Transitional Period' of Monsoon in Bharat?
4. State the goals of 'Paani Foundation'.
5. Which factors are considered before laying the tubes for drip irrigation?

C. Give reasons (Any 2):

[4]

1. It is necessary to survey the watershed area before carrying out development work.
2. There is a huge increase in the demand of drinking water in urban areas.
3. Water resources need to be planned and managed more effectively.