

NATIONAL TALENT SEARCH EXAMINATION (FIRST LEVEL) 2016

SCHOLASTIC APTITUDE TEST

(For Students of Class X)

Date : 08/11/2015

Time : 90 Minutes

Max. Marks : 100

(For Blind Candidates Time : 2 Hours)

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open question booklet.

1. Answers are to be given on a **separate answer sheet (OMR sheet.)**
2. Please write your **Roll Number** as allotted to you in the admission card very clearly on **the test-booklet** and darken the appropriate circles on the **answer sheet** as per instructions given.
3. There are 100 questions in this test. All are compulsory. The questions numbers 1 to 13 belong to Physics, 14 to 24 Chemistry, 25 to 35 Biology, 36 to 55 Mathematics, 56 to 100 Social Science subjects.
4. Please follow the instructions given on the answer sheet for marking the answers.
5. If you do not know the answer to any question, do not waste time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and attempt them.
6. Since the time allotted for this question paper is very limited, you should make the best use of it by not spending too much time on any one question.
7. **Rough work** can be done **on the given Blank Pages at the back of the booklet** but not on the answer sheet/loose paper.
8. Every correct answer will be awarded one mark. There will be no negative marking.
9. **Please return the Answer sheet (OMR) only to the invigilator after the test.**
10. Hindi version of the question paper will be considered as final in case of any dispute arising out of variation in translated version.



Piprali Road, Sikar

Phone : 01572-241911, 242911 Mob. No. : 97832-62999

Website : www.matrixhighschool.org

1. A car travels 40 kms at an average speed of 80 km/h and then travels 40 kms at an average speed of 40 km/h.

The average speed of the car for this 80 km trip is –

- (1) 40 km/h (2) 45 km/h (3) 48 km/h (4) 53 km/h

Ans. (4)

Sol. Given $S_1 = 40$ km
 $V_1 = 80$ km/hr
 $S_2 = 40$ km
 $V_2 = 40$ km/hr

then,

$$\text{Average velocity} = \frac{\text{total distance}}{\text{Total time take}}$$

$$\text{Then } t_1 = \frac{S_1}{V_1} = \frac{40}{80} = \frac{1}{2} \text{ hr}$$

$$t_2 = \frac{S_2}{V_2} = \frac{40}{40} = 1 \text{ hr}$$

so total distance = $S_1 + S_2 = 40 + 40 = 80$ km

$$\text{Average velocity} = \frac{S_1 + S_2}{t_1 + t_2} = \frac{40 + 40}{\frac{1}{2} + 1} \Rightarrow \frac{80}{\frac{3}{2}} = \frac{160}{3} = 53 \text{ km/hr}$$

2. The term 'mass' refers to the same physical concept as

- (1) weight (2) inertia (3) force (4) acceleration

Ans. (2)

Sol. The terms 'mass' refers to the same physical concept as inertia

3. A 5.0 kg objects is moving horizontally at 6.0 m/s. In order to change its speed to 10.0 m/s, the net work done on the object must be

- (1) 40 J (2) 90 J (3) 160 J (4) 20 J

Ans. (3)

Sol. Given, initial velocity (u) = 6 m/s
 final velocity (v) = 10 m/s
 mass (m) = 5.0 kg
 work done = change in K.E.
 $= K.E_f - K.E_i$

$$= \frac{1}{2}mv^2 - \frac{1}{2}mu^2$$

$$= \frac{1}{2}m(v^2 - u^2)$$

$$= \frac{1}{2} \times 5((10)^2 - (6)^2)$$

$$\text{work done} = \frac{1}{2} \times 5 \times 64 = 160 \text{ J}$$

4. The momentum of an object at a given instant is independent of its

- (1) inertia (2) speed (3) velocity (4) acceleration

Ans. (4)

Sol. The momentum of an object at a given instant is independent of its acceleration

5. The pressure exerted on the ground by a man is greatest when
 (1) he stands with both feet flat on ground (2) he stands flat on one foot
 (3) he stands on the toes of one foot (4) all the above yield the same pressure

Ans. (3)

Sol. The pressure exerted on the ground by a man is greatest when he stands on the toes of one foot.

6. A sound wave has a wavelength of 3.0 m. The distance from a compression centre to the adjacent rarefaction centre is

- (1) 0.75 m (2) 1.5 m (3) 3.0 m (4) 6.0 m

Ans. (2)

Sol. A sound wave has a wavelength (λ) = 3.0 m so the distance from a compression centre to the adjacent

rarefaction centre is $\frac{\lambda}{2} = \frac{3.0}{2} = 1.5\text{m}$

7. Of the following, the copper conductor that has the least resistance is

- (1) thin, long and hot (2) thick, short and cool
 (3) thick long and hot (4) thin, short and cool

Ans. (2)

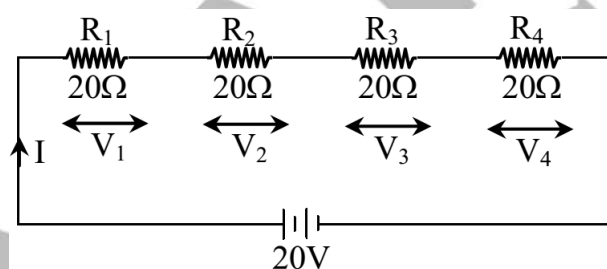
Sol. The copper conductor that has the least resistance is thick, short & cool.

8. Four $20\ \Omega$ resistors are connected in series and the combination is connected a 20 V emf device. The potential difference across any one of the resistors is:

- (1) 5V (2) 2V (3) 4V (4) 20 V

Ans. (1)

Sol. Given 4 Resistance, each of $20\ \Omega$ connected in series



$$\text{Equivalent resistance } (R_{eq}) = R_1 + R_2 + R_3 + R_4 \\ = 20 + 20 + 20 + 20$$

$$R_{eq} = 80\ \Omega$$

$$E = I R_{eq}$$

$$1 \Rightarrow \frac{E}{R_{eq}} \Rightarrow \frac{20}{80} = \frac{1}{4} \text{ Amp}$$

So

$$V_1 = V_2 = V_3 = V_4$$

$$V_1 = I \times R_1$$

$$V_1 \Rightarrow \frac{1}{4} \times 20 \Rightarrow 5\text{V}$$

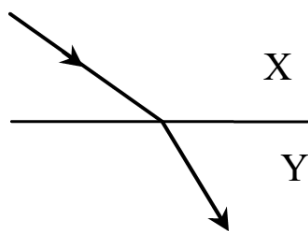
9. The magnetic field lines due to an ordinary bar magnet

- (1) form closed curves
 (2) cross one another near the poles
 (3) are more numerous near the N-pole than near the S-pole
 (4) do not exist inside the magnet.

Ans. (1)

Sol. The magnetic field lines due to an ordinary bar magnet form closed curves.

10. When light travels from medium X to medium Y as shown

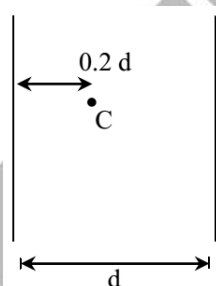


- (1) both the speed and the frequency decrease
 (2) both the speed and the frequency increase
 (3) both the speed and the wavelength decrease
 (4) both the wavelength and the frequency are unchanged.

Ans. (3)

Sol. When light travels from medium x to medium y, its speed & wavelength both decreases because light ray goes from rarer to denser medium.

11. A candle C is kept between two parallel mirrors, at a distance $0.2d$ from the mirror 1. Here d is the distance between mirrors. Multiple images of the candle appear in both mirrors. How far behind mirror 1 are the nearest two images of the candle in that mirror ?



- (1) $0.2d$, $1.8d$ (2) $0.2d$, $2.2d$ (3) $0.2d$, $0.8d$ (4) $0.2d$, $1.2d$

Ans. (1)

Sol. According to problem first image is formed at a distance of $0.2d$ & second image is formed at a distance of $1.8d$.

12. For a 1 MW wind energy generator, the minimum land area required for establishment of wind energy farm is about

- (1) 100 hectares (2) 50 hectares (3) 20 hectares (4) 2 hectares

Ans. (4)

Sol. For a 1 MW wind energy generator the minimum land area required for establishment of wind energy farm is about 2 hectares.

13. Milk of magnesia is an example of which type of colloid?

- (1) Gel (2) Emulsion (3) Sol (4) Foam

Ans. (3)

Sol. Dispersed phase is solid and dispersion medium is liquid.

14. The number of gram moles of aluminium ions present in 0.051 g of aluminium oxide is

- (1) 0.001 (2) 0.051 (3) 0.102 (4) 2

Ans. (1)

Sol. Given mass of Al_2O_3 is 0.051 g & total mass of 1 mole of Al_2O_3 is 102 gm.

$$\text{So, } \frac{0.051}{102} \times 2 = 0.001$$

15. Number of valence electrons in Cl atom is

- (1) 16 (2) 7 (3) 17 (4) 18

Ans. (2)

Sol. Atomic no. of chlorine is 17 and electronic configuration is 2, 8, 7 no. of electrons in valence shell is 7.

16. Isotopes of an element have
 (1) the same physical properties (2) different chemical properties
 (3) different number of neutrons (4) different atomic number
- Ans. (3)
- Sol. Isotopes differ in number of neutrons
17. Which of the following hydrocarbons undergoes addition reactions?
 (1) C_2H_6 (2) C_3H_8 (3) C_3H_6 (4) CH_4
- Ans. (3)
- Sol. Unsaturated hydrocarbon undergo hydrogenation (addition of hydrogen) reactions
18. Which of the following statements is not a correct statement about the trends when going from left to right across the periods of periodic table?
 (1) The elements become less metallic in nature
 (2) The number of valence electrons increases
 (3) The atoms lose their electrons more easily
 (4) The oxides become more acidic.
- Ans. (3)
- Sol. On moving from left to right in period ionization energy increases.
19. Acetic acid, with the molecular formula CH_3COOH has
 (1) 8 covalent bonds (2) 7 covalent bonds (3) 9 covalent bonds (4) 10 covalent bonds
- Ans. (1)
- Sol.
$$CH_3 - \overset{\overset{O}{\parallel}}{C} - OH$$
- Total no. of covalent bonds in acetic acid are 8
20. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be
 (1) calcium (2) carbon (3) silicon (4) iron.
- Ans. (1)
- Sol. Calcium reacts with oxygen to give calcium oxide which is also water soluble.
21. Metals in the middle of the activity series can be easily extracted from their
 (1) Carbonates (2) Sulphides (3) Nitrates (4) Oxides.
- Ans. (4)
- Sol. Metals in middle of the activity series are easily extracted from their oxides.
22. $Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s)$
 The above reaction is an example of a
 (1) combination reaction (2) neutralization reaction
 (3) decomposition reaction (4) displacement reaction.
- Ans. (4)
- Sol. More reactive lead (Pb) is displacing the less reactive copper (Cu).
23. Adding an alpha particle to the nucleus of sodium atom produces which new element?
 (1) Mg (2) P (3) Al (4) Ne.
- Ans. (3)
- Sol. Addition of a particles add 2 protons so, total no. of protons are 13. So, atomic no 13 is of aluminium
24. Which among the following cell organelles is able to make its own proteins?
 (1) Lysosome (2) Golgi apparatus (3) Plastid (4) Endoplasmic reticulum.
- Ans. (3)
- Sol. 'Plastid' is the cell organelle which produce its own protein

25. Intercalary meristem is present in
 (1) at the base of the leaves and both the sides of node
 (2) in the roots
 (3) at the tip of the leaves
 (4) at the shoot apex.
- Ans. (1)
- Sol. Intercalary meristem is present at the base of leaves and both sides of node.
26. Which among the following is an example of fungi?
 (1) Anabaena (2) Euglena (3) Mycoplasma (4) Agaricus.
- Ans. (4)
- Sol. Agaricus is the examples of fungi
27. In plants transport of soluble products in the process of photosynthesis occurs in
 (1) xylem (2) phloem (3) both the these (4) none of these.
- Ans. (2)
- Sol. In plants transport of soluble product occur through phloem tissue
28. Which among the following hormones is associated with wilting of leaves?
 (1) Absciscic acid (2) Gibberellin (3) Cytokinin (4) Auxin.
- Ans. (1)
- Sol. Absciscic acid is responsible for wilting of leaves
29. Seed is modification of
 (1) ovary (2) ovule (3) thalamus (4) all of these
- Ans. (2)
- Sol. Seed is the modification of ovule
30. How many types of muscle tissue are found?
 (1) Striated and unstriated (2) Striated and cardiac
 (3) Cardiac and unstriated (4) Striated, unstriated and cardiac.
- Ans. (4)
- Sol. Striated, unstriated and cardiac are the types of muscular tissue
31. Which characters are present in a vertebrate ?
 (1) Notochord, triploblastic, coelomate and bilateral symmetry
 (2) Notochord, diploblastic, coelomate and radial symmetry
 (3) Notochord, triploblastic, acoelomate and bilateral symmetry
 (4) Notochord, triploblastic, acoelomate and radial symmetry
- Ans. (1)
- Sol. Notochord, triploblastic, coelomate and bilateral symmetry are the characters of vertebrate
32. Synapse is
 (1) gap between two muscle cells (2) gap between two bones
 (3) gap between two neurons (4) gap between muscle and bone
- Ans. (3)
- Sol. Synapse is gap between two neurons
33. Regeneration is found in
 (1) tapeworm (2) leech (3) hydra (4) ascaris
- Ans. (3)
- Sol. Regeneration is found in hydra.
34. Which of the following groups constitutes a correct food chain ?
 (1) Grass → Rabbit → Snake → Eagle (2) Grass → Goat → Fox → Lion
 (3) Goat → Grass → Elephant → Snake (4) Grass → Wheat → Frog → Goat
- Ans. (1)
- Sol. Grass → Rabbit → Snake → Eagle
35. Which cell organelle is known as "powerhouse of the cell" ?
 (1) Mitochondria (2) Lysosome (3) Golgi apparatus (4) Endoplasmic reticulum
- Ans. (1)
- Sol. Mitochondria is the "power house of the cell" because it produces energy in the form of ATP

36. If $(1^2 + 2^2 + 3^2 + \dots + 12^2) = 650$, then the value of $(2^2 + 4^2 + 6^2 + \dots + 24^2)$ is
 (1) 1300 (2) 2600 (3) 2500 (4) 42250

Ans. (2)

Sol. $1^2 + 2^2 + 3^2 + \dots + 12^2 = 650$
 $2^2 \times (1^2 + 2^2 + 3^2 + \dots + 12^2) = 650 \times 2^2$
 $\Rightarrow (2^2 + 4^2 + 6^2 + \dots + 24^2) = 2600$

37. The square root of $x^{b^2} x^{b^2+2ab} x^{a^2-b^2}$ is

- (1) $x^{2(a+b)}$ (2) $x^{\frac{a+b}{2}}$ (3) $x^{\frac{(a+b)^2}{2}}$ (4) x^{a+b}

Ans. (4)

Sol. Let $A = x^{b^2} x^{b^2+2ab} x^{a^2-b^2}$
 $= x^{b^2+b^2+2ab+a^2-b^2}$
 $= x^{a^2+b^2+2ab}$
 $= x^{(a+b)^2}$

$\Rightarrow \sqrt{A} = \sqrt{x^{(a+b)^2}} = x^{a+b}$

38. If $(x+2)$ is a factor of $2x^3 - 5x + k$, then the value of k is

- (1) 6 (2) -6 (3) 26 (4) -26

Ans. (1)

Sol. Let $p(x) = 2x^3 - 5x + k$
 If $(x+2)$ is a factor of $p(x)$
 $\Rightarrow p(-2) = 0$
 $2(-2)^3 - 5(-2) + k = 0$
 $-16 + 10 + k = 0$
 $k = 6$

39. For which value of p the following pair of linear equations $3x + py = 7$, $px + 3y = 15$ will have no solutions?

- (1) ± 9 (2) ± 5 (3) ± 3 (4) ± 4

Ans. (3)

Sol. $3x + py = 7$
 $px + 3y = 15$

For No solution, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$\frac{3}{p} = \frac{p}{3}$

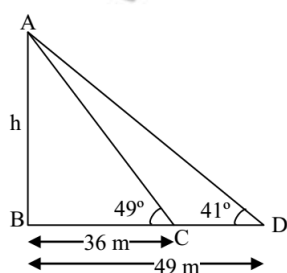
$p^2 = 9$

$p = \pm 3$

40. A tower is on a horizontal plane. The angles of elevation of top of the tower from two points on a line passing through the foot of the tower at distance 49 m and 36 m are 41° and 49° . The height of the tower is

- (1) 40 m (2) 42 m (3) 44 m (4) 46 m

Ans. (2)



Sol.

$$\tan 41^\circ = \frac{h}{49} \quad \dots(1)$$

$$\tan 49^\circ = \frac{h}{36} \quad \dots(2)$$

$$(1) \times (2)$$

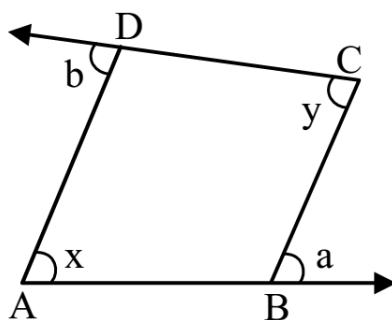
$$\tan 41^\circ \times \tan 49^\circ = \frac{h^2}{36 \times 49}$$

$$h^2 = 36 \times 49 \quad [\because \tan 41^\circ \times \tan 49^\circ = 1]$$

$$h = 6 \times 7$$

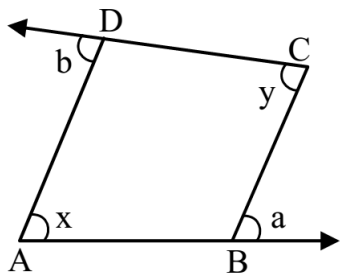
$$= 42 \text{ m}$$

41. Sides AB and CD of a quadrilateral ABCD are extended as in figure. Then $a + b$ is equal to



- Ans. (1) $x + 2y$ (2) $x - y$ (3) $x + y$ (4) $2x + y$
(3)

Sol.



As, ABCD is a quadrilateral, then $\angle A + \angle B + \angle C + \angle D = 360^\circ \dots(1)$

{Angle sum property}

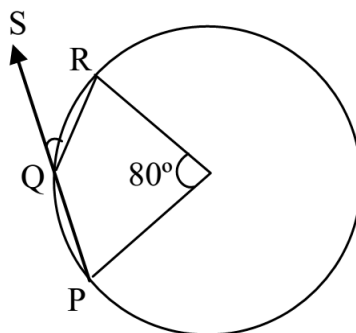
$$x + (180^\circ - a) + y + (180^\circ - b) = 360^\circ$$

$$x + 180^\circ - a + y + 180^\circ - b = 360^\circ$$

$$x + y - (a + b) = 0$$

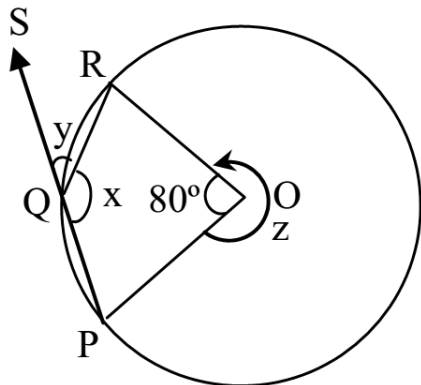
$$x + y = a + b$$

42. In the figure O is the centre of the circle and $\angle POR = 80^\circ$. Then $\angle RQS$ is



- Ans. (1) 30° (2) 40° (3) 140° (4) 50°
(2)

Sol.



$$\angle z = 360^\circ - 80^\circ$$

$$= 280^\circ$$

Now, $\angle z = 2x$ {Angle subtended at centre is twice the angle subtended at arc}

$$280^\circ = 2x$$

$$x = 140^\circ$$

$$x + y = 180^\circ \text{ \{linear pair\}}$$

$$140^\circ + x = 180^\circ$$

$$x = 40^\circ$$

43. If every side of a triangle is doubled then a new triangle is formed. The ratio of areas of these two triangles is

(1) 1 : 2

(2) 1 : 3

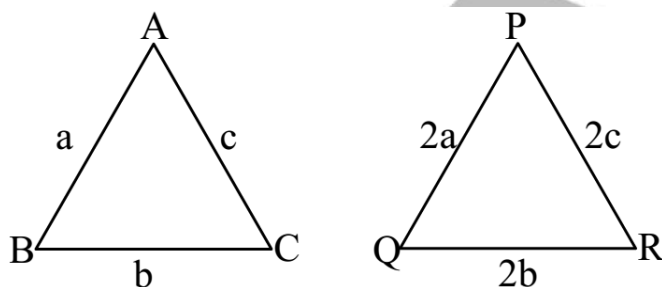
(3) 1 : 4

(4) 2 : 3

Ans.

(3)

Sol.



let the sides of $\triangle ABC$ be a, b, c & that of $\triangle PQR$ be $2a, 2b, 2c$

$$\text{Now, let } s_1 = \frac{a+b+c}{2} \text{ \& } s_2 = \frac{2a+2b+2c}{2} = 2\left(\frac{a+b+c}{2}\right) = 2s_1$$

$$\text{Area of } \triangle ABC = \sqrt{s_1(s_1-a)(s_1-b)(s_1-c)}$$

$$\text{\& Area of } PQR = \sqrt{s_2(s_2-2a)(s_2-2b)(s_2-2c)}$$

$$= \sqrt{2s_1(2s_1-2a)(2s_1-2b)(2s_1-2c)}$$

$$= 4\sqrt{s_1(s_1-a)(s_1-b)(s_1-c)}$$

$$\text{Now, } \frac{\text{area } \triangle ABC}{\text{area } \triangle PQR} = \frac{\sqrt{s_1(s_1-a)(s_1-b)(s_1-c)}}{4\sqrt{s_1(s_1-a)(s_1-b)(s_1-c)}} = \frac{1}{4}$$

44. If the difference of two numbers is 5 and difference of their square is 300, then sum of the numbers is
 (1) 1500 (2) 6 (3) 12 (4) 60

Ans. (4)

Sol. Let the two numbers be x & y .

$$x - y = 5 \quad (\text{let } x > y)$$

$$\& x^2 - y^2 = 300$$

$$\Rightarrow (x + y)(x - y) = 300$$

$$(x + y) \times 5 = 300$$

$$x + y = 60$$

45. If the equation $ax^2 + 2x - 2 = 0$ has real and distinct roots, then the value of a is

Ans. (1)

Sol. $ax^2 + 2x - 2 = 0$

for real & distinct roots,

$$(1) a > \frac{-1}{2}$$

$$(2) a \leq \frac{-1}{2}$$

$$(3) a \geq \frac{-1}{2}$$

$$(4) a = \frac{-1}{2}$$

Ans. (1)

Sol. $ax^2 + 2x - 2 = 0$

for real & distinct roots,

$$D > 0$$

$$(2)^2 - 4(1)(-2) > 0$$

$$4 + 8a > 0$$

$$a > \frac{-1}{2}$$

46. If $a + b + c = 0$ then the value of $\frac{(a+b)^2}{ab} + \frac{(b+c)^2}{bc} + \frac{(c+a)^2}{ca}$ is
 (1) 1 (2) 2 (3) 3 (4) -3

Ans. (3)

Sol. $a + b + c = 0$

$$\text{Now, } \frac{(a+b)^2}{ab} + \frac{(b+c)^2}{bc} + \frac{(c+a)^2}{ca}$$

$$= \frac{(-c)^2}{ab} + \frac{(-a)^2}{bc} + \frac{(-b)^2}{ca}$$

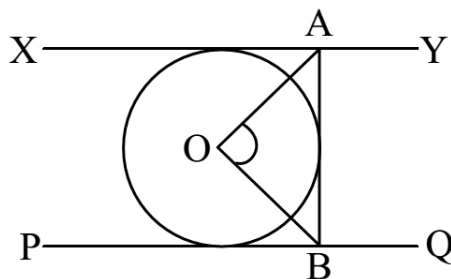
$$= \frac{c^2}{ab} + \frac{a^2}{bc} + \frac{b^2}{ca}$$

$$= \frac{c^2 + a^2 + b^3}{abc}$$

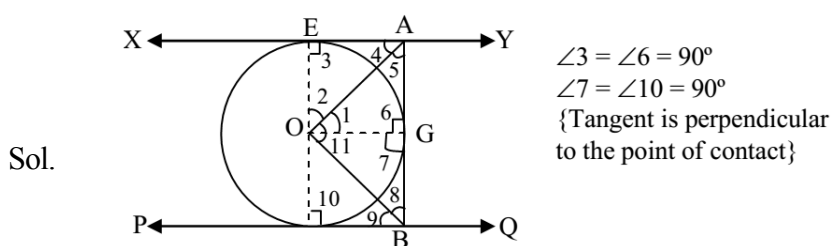
$$= \frac{3abc}{abc} \{ \because a + b + c = 0 \Rightarrow a^3 + b^3 + c^3 = 3abc \}$$

$$= 3$$

47. In the given figure O is the centre of a circle, XY, PQ, AB are tangents of the circle. If $XY \parallel PQ$, then the value of $\angle AOB$ is



- Ans. (1) 80° (2) 90° (3) 70° (4) 100°



Since, $OG = OE$ {radii of same circle}

Now, $\angle 3 = \angle 6 = 90^\circ$

\therefore OGAE is a square

similarly, OFBG is also a square

Now, $\angle A = \angle B = 90^\circ$

OA & OB bisects the angle.

$\Rightarrow \angle 4 = \angle 5$ & $\angle 8 = \angle 9 \Rightarrow \angle 4 + \angle 5 = 90^\circ$

$\Rightarrow 2 \angle 5 = 90^\circ$

$\Rightarrow \angle 5 =$

$$\Rightarrow \angle 5 = \frac{90^\circ}{2} = 45^\circ$$

Also, $\angle 8 = 45^\circ$

Now, In $\triangle OAB$,

$\angle 5 + \angle 8 + \angle AOB = 180^\circ$ {angle sum property}

$45^\circ + 45^\circ + \angle AOB = 180^\circ$

$\angle AOB = 90^\circ$

48. $\frac{\cos \theta}{1 - \tan \theta} - \frac{\sin \theta}{\cot \theta - 1}$ is equal to

(1) $\sin \theta + \cos \theta$

(2) $\cos \theta - \sin \theta$

(3) $2 \sin \theta$

(4) $\frac{1}{\cos \theta - \sin \theta}$

- Ans. (1)

Sol.

$$\begin{aligned} & \frac{\cos \theta}{1 - \tan \theta} - \frac{\sin \theta}{\cot \theta - 1} \\ &= \frac{\cos^2 \theta}{\cos \theta - \sin \theta} - \frac{\sin^2 \theta}{\cos \theta - \sin \theta} \\ &= \sin \theta + \cos \theta \end{aligned}$$

$$\begin{aligned} & \frac{\cos \theta}{1 - \frac{\sin \theta}{\cos \theta}} - \frac{\sin \theta}{\frac{\cos \theta}{\sin \theta} - 1} \\ &= \frac{(\cos \theta - \sin \theta)(\cos \theta + \sin \theta)}{\cos \theta - \sin \theta} \end{aligned}$$

49. A card is drawn from a well shuffled pack of 52 cards. The probability that card is a red ace is

- (1) $\frac{1}{13}$ (2) $\frac{1}{26}$ (3) $\frac{3}{52}$ (4) $\frac{1}{2}$

Ans. (2)

Sol. $P(\text{red Ace}) = \frac{2}{52} = \frac{1}{26}$

50. Value of $\tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ$ is

- (1) 0 (2) $\frac{1}{\sqrt{3}}$ (3) $\sqrt{3}$ (4) 1

Ans. (4)

Sol. $\tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ$
 $= \tan 20^\circ \tan 40^\circ \tan (90^\circ - 40^\circ) \tan (90^\circ - 20^\circ)$
 $= \tan 20^\circ \tan 40^\circ \cot 40^\circ \cot 20^\circ$
 $= 1$

51. Sum of last two terms of an A.P. is 60. If first term is 11 and common difference is 2, then the number of terms in the A.P. is

- (1) 22 (2) 20 (3) 11 (4) 19

Ans. (3)

Sol. Let the last two terms be a_n & a_{n-1} .
 Here $a = 11$ & $d = 2$
 Also, $a_n + a_{n-1} = 60$
 $a + (n-1)d + a + (n-1-1)d = 60$
 $2a + (2n-3)d = 60$
 $2 \times 11 + (2n-3)2 = 60$
 $(2n-3)2 = 38$
 $2n-3 = 19$
 $2n = 22$
 $n = 11$

52. If the difference of circumference and diameter of a circle is 60 cm, then the area of the circle is

- (1) $49 \pi \text{ cm}^2$ (2) $14 \pi \text{ cm}^2$ (3) $196 \pi \text{ cm}^2$ (4) $\frac{49}{4} \pi \text{ cm}^2$

Ans. (3)

Sol. Circumference - Diameter = 60
 $\pi d - d = 60$
 $d(\pi - 1) = 60$
 $d = \frac{60}{\pi - 1}$
 $d = \frac{60}{\frac{22}{7} - 1}$
 $d = \frac{60}{\frac{22-7}{7}}$ $d = \frac{60 \times 7}{15}$
 $d = 28$
 $\therefore r = 14 \text{ cm}$
 $\Rightarrow \text{Area of circle} = \pi r^2$
 $= \pi(14)^2 \text{ cm}^2$
 $= 196 \pi \text{ cm}^2$

53. If the areas of three adjoining faces of a cuboid are a^2 , b^2 and c^2 respectively, then the volume of the cuboid is

- (1) $a^2b^2c^2$ (2) abc (3) $a^3b^3c^3$ (4) \sqrt{abc}

Ans. (2)

Sol. Let length \times breadth = a^2 (1)

breadth \times height = b^2 (2)

height \times length = c^2 (3)

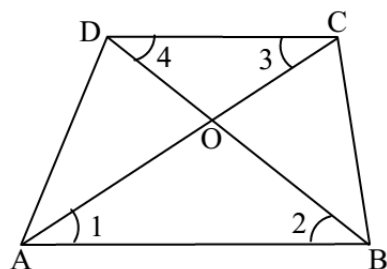
(1) \times (2) \times (3) we get

$$(\text{length} \times \text{breadth} \times \text{height})^2 = a^2 \times b^2 \times c^2$$

$$\text{length} \times \text{breadth} \times \text{height} = abc$$

$$\Rightarrow \text{volume} = abc$$

54. (4)



Sol.

$$\frac{AB}{DC} = \frac{3}{2}$$

$$AB \parallel DC$$

In $\triangle AOB$ & $\triangle COD$

$$\angle 1 = \angle 3 \quad [\text{Alternate interior angles are equal}]$$

$$\angle 2 = \angle 4$$

$\therefore \triangle AOB \sim \triangle COD$ [by AA similarity rule]

$$\Rightarrow \frac{\text{ar.} \triangle AOB}{\text{ar.} \triangle COD} = \left(\frac{AB}{DC} \right)^2 \quad [\text{If two triangles are similar, then the ratio of their areas are equal to the ratio of square of their corresponding sides}]$$

$$\frac{\text{ar.} \triangle AOB}{\text{ar.} \triangle COD} = \left(\frac{3}{2} \right)^2 = \frac{9}{4}$$

55. If the mean of 5, 9, x, 7, 4, y is 7, then relation between x and y is

- (1) $x + y = 42$ (2) $x + y = 17$ (3) $x - y = 10$ (4) $x - y = 42$

Ans. (2)

Sol. 5, 9, x, 7, 4, y

$$\text{mean} = \frac{\text{sum of all observation}}{\text{Total number of observation}}$$

$$7 = \frac{5 + 9 + x + 7 + 4 + y}{6}$$

$$25 + x + y = 42$$

$$x + y = 17$$

56. Tithe is

- (1) Religious tax (2) Implied tax (3) Taille tax (4) Feudal tax.

Ans. (1)

Sol. France under Louis XVI has 2 types of taxes levied on third estate Tithe & Taille, tithe was the religious tax given to church & Taille was the direct tax.

57. Who was Rasputin ?
 (1) King (2) Monk (3) Revolutionary (4) Prime Minister
 Ans. (2)
 Sol. Rasputin was an ascetic monk in Russia around 1869. Failing as a monk, also known as 'Mad Monk'.
58. The railway line which was to be constructed between Multan and Sukkur was
 (1) North Valley Railway (2) Indus Valley, Railway
 (3) Southern State Railway (4) West Valley Railway
 Ans. (2)
 Sol. Indus valley Railway is between Multan & Sukkur North valley Railways. Rest are of Britain, Australia etc
59. Who adopted the 'Scorched Earth Policy' ?
 (1) Portuguese (2) French (3) Dutch (4) German
 Ans. (3)
 Sol. Scorched Earth Policy was followed by Dutch in Java, Indonesia against Japanese invasion on the forests of Java.
60. Raikas belong to the state of
 (1) Rajasthan (2) Bihar (3) Uttar Pradesh (4) Karnataka
 Ans. (1)
 Sol. Rajasthan has postoral communities of aikas. Raikas & Maru aikas of Rajasthan.
61. Young Italy, a secret society was formed by -
 (1) Metternich (2) Giuseppe Mazzini (3) Bismarck (4) Hitler
 Ans. (1)
 Sol. Giuseppe Mazzini formed two secret revolutionary society's Young Italy in Marseillaise and young Europe in Berne.
62. The thinker Confucius belonged to the country-
 (1) England (2) America (3) China (4) Japan
 Ans. (3)
 Sol. Confucius was a chinese teacher (551 BC to 479 BC), Founder of confucianism.
63. Jallianwalla Bag incident took place on -
 (1) 10th April, 1919 (2) 13th April, 1919 (3) 14th April, 1919 (4) 18th April, 1919
 Ans. (2)
 Sol. Jalliwala Bagh Massacre took place on 13 th april 1919 after Rowlatt Act.
64. Dandi is located in -
 (1) Gujarat (2) Rajasthan (3) Maharashtra (4) Punjab
 Ans. (1)
 Sol. Dandi where salt law was broken by Mahatma Gandhi is in Gujrat. It a coastal village in Gujarat.
65. The great Depression began in -
 (1) 1927 AD (2) 1929 AD (3) 1930 AD (4) 1931 AD
 Ans. (2)
 Sol. Great economic depression started in most countries from 1929-1932
66. Which island was known as Amindiv whose name was changed in 1973 ?
 (1) Lakshadweep (2) Maldives (3) New Moore island (4) Car-Nicobar
 Ans. (1)
 Sol. Laccadive and Amindiv are presently the Union territory of Lakshadweep.

67. Match List-I with List II correctly and choose the correct code from the following -

List-I	List-II
(P) Kaveri	(i) Nasik
(Q) Godavari	(ii) Betul
(R) Tapi	(iii) Brahmagiri
(S) Krishna	(iv) Mahabaleshwar

Code :

P	Q	R	S
(1) i	ii	iii	iv
(2) iii	i	ii	iv
(3) ii	iii	i	iv
(4) iv	iii	ii	i

Ans. (2)

Sol. Godavari → Nasik

Tapi → Betul

Kaveri → Mahabaleshwar

Krishna → Brahmagiri

68. Stalagmite and Stalactite caves are located in -

- (1) Mawsynram (2) Cherrapunji (3) Shimla (4) Jammu and Kashmir

Ans. (2)

Sol. Cherrapunji is having stalagmites and stalactite caves, Belum caves M.P. and Mawsmi caves, Cherrapunji (Meghalaya).

69. Which state (s) has/have the highest reserved forest ratio ?

- (1) Kerala (2) West Bengal (3) Jammu and Kashmir (4) Maharashtra
(1) Only B (2) A and D (3) A and C (4) All of these

Ans. (2)

Sol. Highest reserved forest ratio is in Kerala and Maharashtra.

Kerala → 28.8 %

Maharashtra → 20.75 %

West Bengal → 13.38 %

Jammu and Kashmir → 9.08 %

70. With reference to water availability per person per year India's rank in the world is -

- (1) 131st (2) 133rd (3) 137th (4) 157th

Ans. (2)

Sol. 133rd is Rank of India in per capita availability of water.

71. Roof water harvesting system is a compulsory structure in which state ?

- (1) Bihar (2) Meghalaya (3) Tamil Nadu (4) Karnataka

Ans. (3)

Sol. Tamil Nadu government made it Mandatory to have roof top rain water harvesting in all the houses.

72. Match List-I and List-II and choose the correct code from the following -

List-I	List-II
(P) Waler	(i) Jharkhand
(Q) Dahiya	(ii) Himalayan region
(R) Khil	(iii) Madhya Pradesh
(S) Kuruwa	(iv) S.E. Rajasthan

Code :

P	Q	R	S
(1) i	ii	iii	iv
(2) iv	iii	i	ii
(3) ii	i	iii	iv
(4) iv	iii	ii	i

Ans. (4)

Sol. Dahiya is Rajput community of S.E. Raj. Kuruwa is a village in Jharkhand

73. Rubber is related to which type of vegetation ?
 (1) Tundra (2) Tropical rain forest (3) Mountain forest (4) Tropical deciduous forest
 Ans. (2)
 Sol. Rubber is a tropical rainforest vegetation very hot & very wet climate.
74. Koderma mines located in Jharkhand is rich in which minerals ?
 (1) Bauxite (2) Mica (3) Iron ore (4) Copper
 Ans. (2)
 Sol. Koderma mines in Jharkhand is rich in Mica.
75. Which of the following states is not connected with Hajira-Vijaypur-Jagdishpur pipeline ?
 (1) Madhya Pradesh (2) Maharashtra (3) Gujarat (4) Uttar Pradesh
 Ans. (2)
 Sol. Hajira – Gujarat
 Vijaypur – Madhya Pradesh
 Jagdishpur – Uttar Pradesh
76. Which among the following is not correctly matched ?
 (1) Popular unit – Salvador Alende
 (2) Solidarnosc or solidarity – Lech Walesa
 (3) National League for Democracy – Augusto Pinochet
 (4) Bath party – Saddam Hussein
 Ans. (3)
 Sol. National league for democracy was founded by Aun Saan Su Kyi in Myanmar.
77. Identify the correct order regarding the granting of universal adult franchise -
 (1) Argentina, India, Malaysia, Greece (2) Malaysia, Greece, India, Argentina
 (3) India, Argentina, Greece, Malaysia (4) Greece, Malaysia, India, Argentina
 Ans. (3)
 Sol. India – 1950
 Argentina – 1951
 Greece – 1952
 Malaysia – 1955
78. Find out the wrong explanation of function of United Nations :
 (1) Who lends money to governments when they need it ? International Monetary Fund (I.M.F.) does so
 (2) What happens when a country attacks another country in an unjust manner ? The N.N. Security Council, an organ of U.N. is responsible for maintaining peace and security among countries
 (3) The weightage of vote of every member of International Monetary Fund equal
 (4) Each permanent member of Security Council has veto power
 Ans. (3)
 Sol. 188 members of IMF -24 are founder members and 15 have special powers IMF president of World Bank US president or ambassador .
79. Find out the correct explanation -
 (1) Referendum - Only used for a specific government policy
 (2) Coup - A coup is legal system, in which system the government hands over all rights and powers to the military
 (3) Martial law - A system of rules, that takes effect when a military authority takes control of the normal administration of justice
 (4) Communist State - In communist state all political parties have complete liberty to compete for power
 Ans. (3)
 Sol. Martial law - A system of rules, that takes effect when a military authority takes control of the normal administration of justice

80. Pay attention on the following points :
- (1) A democratic government is a better government because it is a more accountable form of government
 - (2) Democracy improves the quality of decision making
 - (3) Democracy provides a method to deal with the differences and conflicts
 - (4) Democracy enhances the dignity of citizens
- Which are the factors involved in comprising Indian democracy ?
- (1) A and B (2) A and C (3) A, B and C (4) A, B, C and D
- Ans. (4)
- Sol. All are correct democracy is accountable, improves decision making deals with difference & conflicts, above all enhances the dignity of the citizen
81. Which among the following statements is a moral reason regarding the desirability of power sharing ?
- (1) Power sharing is good because it helps to reduce the possibility of conflict between social groups
 - (2) Social conflict often leads to violence and political instability. Hence power sharing is a good way to ensure the stability of political order
 - (3) Tyranny of the majority is not just oppressive for the minority, it often brings ruin to the majority as well
 - (4) A democratic rule involves sharing power with those affected by its exercise and who have to live with its effect
- Ans. (4)
- Sol. Major policy decisions are taken by those who are elected by the people is a moral reason or basic feature of democracy.
82. Let us look at some of the key features of federalism -
- (1) There are two or more levels (or tiers) of government
 - (2) Different tiers of government govern the same citizens, but each tier has its own jurisdiction
 - (3) The existence and authority of each tier of government is constitutionally guaranteed
 - (4) All states in the Indian Union have identical powers
- Which facts are correct regarding Indian Federalism -
- (1) B and D (2) A and D (3) A, B and C (4) A, B, C and D
- Ans. (3)
- Sol. Since all state in the Indian Union Do not have equal powers eg J&K & Delhi.
83. Find the correct sequence of languages in the ascending order according the proportion of speakers as described in 8th Schedule of the Constitution of India -
- (1) Hindi, Marathi, Telugu, Bangla
 - (2) Hindi, Bangla, Telugu, Marathi
 - (3) Hindi, Telugu, Bangla, Marathi
 - (4) Hindin, Bangla, Marathi, Telugu
- Ans. (2)
- Sol. Hindi → 41.1%
Bangla → 8.11 %
Telugu → 7.19 %
Marathi → 6.99 %

84. Match the following and choose the correct answer from the code -

Code :

P	Q	R	S
(1) ii	i	iv	iii
(2) i	ii	iii	iv
(3) i	iii	ii	iv
(4) ii	iv	i	iii

Ans. (1)

Sol. Power is shared among different organs of government such as the legislature, executive and judiciary - Community Government
 Power is shared among different social groups - Horizontal distribution of power
 The fundamental provisions of the constitution cannot be unilaterally changed by one level of government - Federalism
 3rd tier of Indian democratic system of local government were amended - In 1992

85. Match the following and choose the correct answer from the given code -

Code :

P	Q	R	S
(1) iii	ii	i	iv
(2) ii	iii	iv	i
(3) iii	i	ii	iv
(4) ii	iv	iii	i

Ans. (4)

Sol. Union list - Banking
 State list - Police
 Concurrent list - Education
 Residuary powers - Computer software

86. Which one of the following is an activity of the tertiary sector ?

(1) Mining (2) Tourism (3) Dairy (4) Agriculture

Ans. (2)

Sol. Tourism is a tertiary sector activity rest all are primary

87. In which state of India, is Amul Dairy situated ?
 (1) Rajasthan (2) Bihar (3) Gujarat (4) Karnataka
 Ans. (3)
 Sol. Amul is a cooperative of Gujarat.
88. The 'National Consumers Day' is celebrated on
 (1) 24th December (2) 24th November (3) 24th September (4) 24th October
 Ans. (1)
 Sol. 24th December is celebrated as National Consumers Day -
89. National income of any country is divided by its total population, we get
 (1) personal income (2) gross domestic product
 (3) private income (4) per capita income
 Ans. (4)
 Sol.
$$\text{Per capita income} = \frac{\text{National income}}{\text{Total Population}}$$
90. Among the following which is the method to estimate the poverty line ?
 (1) Investment method (2) Income method
 (3) Capital method (4) All of these
 Ans. (2)
 Sol. Poverty line is calculated by two methods
 1. Income or expenditure.
 2. Consumption
91. Which of the following statement is correct ?
 (1) Centre of curvature of a concave mirror lies in front of it whereas that of convex mirrors lies behind the mirror
 (2) Centre of curvature of a concave mirror lies behind it whereas that of convex mirror lies in front of the mirror
 (3) Centre of curvature of both concave and convex mirrors lie in front of the mirror
 (4) Centre of curvature of both concave and convex mirrors lie behind the mirror
 Ans. (1)
 Sol. Centre of curvature of a concave mirror lies in front of it whereas that of convex mirrors lies behind the mirror
92. Element X forms a chloride with the formula XCl_2 which is solid with a high melting point. X would belong to the same group of periodic table as -
 (1) Na (2) Mg (3) Al (4) Si
 Ans. (2)
 Sol. Mg reacts with chlorine to give magnesium chloride- MgCl_2
93. Calculate the number of molecules in 8g O_2
 (1) 8×10^{23} (2) 6.02×10^{23} (3) 1.51×10^{23} (4) 8
 Ans. (3)
 Sol. Given mass of O_2 molecule is 8 gm actual mass of O_2 molecules is 32

$$= \frac{\text{Given mass}}{\text{Molar mass}} \times \text{Avogadro number}$$

$$= \frac{8}{32} \times 6.022 \times 10^{23}$$

$$= 1.51 \times 10^{23}$$
94. Which of the following is correct for Fungi ?
 (1) Prokaryotic and saprophytic (2) Eukaryotic and autotrophic
 (3) Prokaryotic and autotrophic (4) Eukaryotic and saprophytic
 Ans. (4)
 Sol. Fungi is Eukaryotic and Saprophytic (eats dead & decay that's why it is called decomposer)

95. Iodine is essential for the synthesis of which hormone ?
(1) Adrenaline (2) Thyroxine (3) Insulin (4) Oxytocin

Ans. (2)

Sol. Thyroxine is hormone which requires Iodine presence.

96. 'Oriental Cricket Club' the first Indian Cricket Club was founded at
(1) Madras (2) Bombay (3) Kanpur (4) Calcutta

Ans. (2)

Sol. Bombay, the first cricket club was founded by Parsis - the oriental cricket club.

97. Which of the following is not associated with Coriolis force ?
(1) Cyclones (2) Ocean currents (3) Prevailing winds (4) Jet streams

Ans. (4)

Sol. Jet Streams are not effected by the earth's rotation that's why coriolis force will not be applicable.

98. The local government structure goes right up to the level
(1) village (2) Ward (3) State (4) District

Ans. (4)

Sol. Gram sabha to panchayat Samiti to Zila Parishad at district level under District Magistrate.

99. In which state of India maximum fair price shops are run by the co-operatives ?
(1) Maharashtra (2) Delhi (3) Tamil Nadu (4) Gujarat

Ans. (3)

Sol. Tamil Nadu has 14 fair price shops run by co-operatives.

100. Informal sources of credit do not include
(1) moneylenders (2) cooperatives (3) traders (4) friends

Ans. (2)

Sol. Cooperative are formal sources of credit.

