

## NATIONAL TALENT SEARCH EXAMINATION(FIRST LEVEL)-2016

(For Students of Class X)

### Scholastic Aptitude Test

Time : 90 minutes

Max. Marks: 100

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 object 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.

$$\begin{aligned} &= K.E_f - K.E_i \\ &= \frac{1}{2}mv^2 - \frac{1}{2}mu^2 \\ &= \frac{1}{2}m(v^2 - u^2) \\ &= \frac{1}{2} \times 5 ((10)^2 - (6)^2) \end{aligned}$$

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

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 ( $\lambda$ ) = 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]

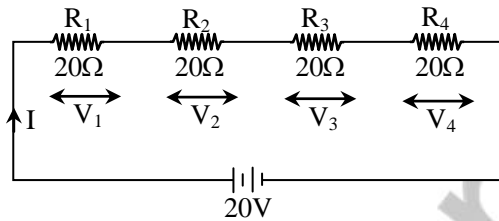
**Sol.** The copper conductor that has the least resistance is thick, short & cool.

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

- (1)  $5\text{V}$                       (2)  $2\text{V}$                       (3)  $4\text{V}$                       (4)  $20\ \text{V}$

**Ans.** [1]

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



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

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

$$E = I R_{eq}$$

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

So  $V_1 = V_2 = V_3 = V_4$

$$V_1 = I \times R_1$$

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

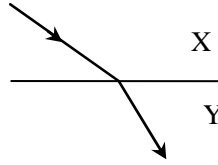
**9.** The magnetic field lines due to an ordinary bar magnet

- (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

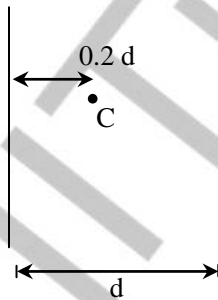


- (1) both the speed and the frequency decrease
- (2) both the speed and the frequency increase
- (3) both the speed and the wavelength decrease
- (4) both the wavelength and the frequency are unchanged.

**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 dispersium 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  $\text{Al}_2\text{O}_3$  is 0.051 g & total mass of 1 mole of  $\text{Al}_2\text{O}_3$  is 102 gm.

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)  $\text{C}_2\text{H}_6$                                       (2)  $\text{C}_3\text{H}_8$                                       (3)  $\text{C}_3\text{H}_6$                                       (4)  $\text{CH}_4$

**Ans.** [3]

**Sol.** Unsaturated hydrocarbon undergo hydrogenation (addition of hydrogen) reactions

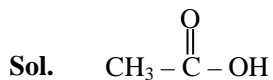
18. Which of the following statements is not a correct statement about the trends when going from left to right across the periods of periodic table?  
(1) The elements become less metallic in nature  
(2) The number of valence electrons increases  
(3) The atoms lose their electrons more easily  
(4) 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  $\text{CH}_3\text{COOH}$  has  
(1) 8 covalent bonds                      (2) 7 covalent bonds                      (3) 9 covalent bonds                      (4) 10 covalent bonds

Ans. [1]



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]

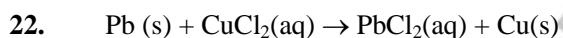
Sol. Calcium reacts with oxygen to give calcium oxide which is also water soluble.

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.



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  $\alpha$  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





**Sol.** Let  $A = x^{b^2} \cdot x^{b^2+2ab} \cdot x^{a^2-b^2}$

$$= x^{b^2+b^2+2ab+a^2-b^2}$$

$$= x^{a^2+b^2+2ab}$$

$$= x^{(a+b)^2}$$

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

- 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)  $\pm 9$                                       (2)  $\pm 5$                                       (3)  $\pm 3$                                       (4)  $\pm 4$

**Ans.** [3]

**Sol.**  $3x + py = 7$

$$px + 3y = 15$$

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

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

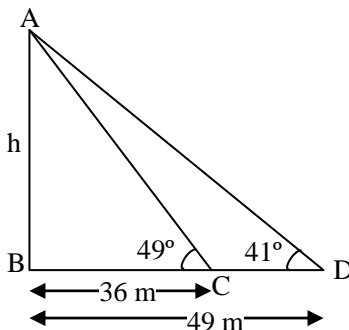
$$p^2 = 9$$

$$p = \pm 3$$

- 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  $41^\circ$  and  $49^\circ$ . The height of the tower is
- (1) 40 m                                      (2) 42 m                                      (3) 44 m                                      (4) 46 m

**Ans.** [2]

Sol.



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

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

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

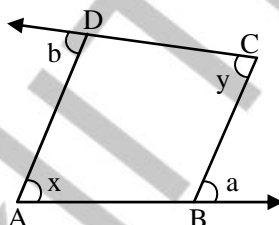
$$\tan 41^\circ \times \tan 49^\circ = \frac{h^2}{36 \times 49}$$

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

$$h = 6 \times 7$$

$$= 42 \text{ m}$$

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



(1)  $x + 2y$

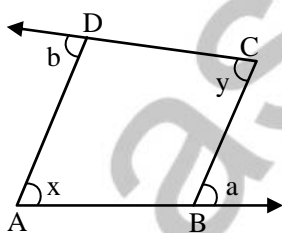
(2)  $x - y$

(3)  $x + y$

(4)  $2x + y$

Ans.  
Sol.

[3]



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

{ Angle sum property }

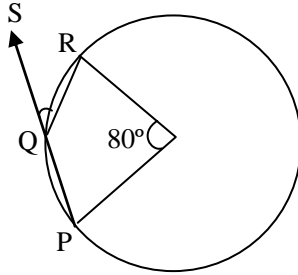
$$x + (180^\circ - a) + y + (180^\circ - b) = 360^\circ$$

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

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

$$x + y = a + b$$

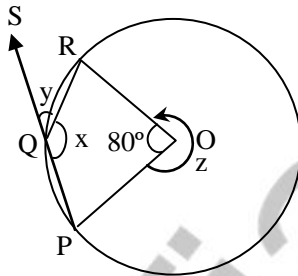
42. In the figure O is the centre of the circle and  $\angle POR = 80^\circ$ . Then  $\angle RQS$  is



- (1)  $30^\circ$                       (2)  $40^\circ$                       (3)  $140^\circ$                       (4)  $50^\circ$

Ans. [2]

Sol.



$$\begin{aligned} \angle z &= 360^\circ - 80^\circ \\ &= 280^\circ \end{aligned}$$

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

$$280^\circ = 2x$$

$$x = 140^\circ$$

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

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

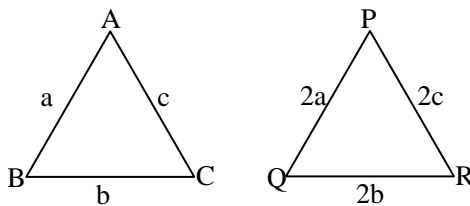
$$x = 40^\circ$$

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  $\Delta ABC$  be  $a, b, c$  & that of  $\Delta PQR$  be  $2a, 2b, 2c$

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

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

$$\begin{aligned} \text{\& Area of } \Delta PQR &= \sqrt{s_2(s_2-2a)(s_2-2b)(s_2-2c)} \\ &= \sqrt{2s_1(2s_1-2a)(2s_1-2b)(2s_1-2c)} \\ &= 4\sqrt{s_1(s_1-a)(s_1-b)(s_1-c)} \end{aligned}$$

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

- 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  $x$  &  $y$ .

$$\begin{aligned} x - y &= 5 && (\text{let } x > y) \\ \text{\& } x^2 - y^2 &= 300 \\ \Rightarrow (x + y)(x - y) &= 300 \\ (x + y) \times 5 &= 300 \\ x + y &= 60 \end{aligned}$$

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

(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,

$$\begin{aligned} D &> 0 \\ (2)^2 - 4(a)(-2) &> 0 \\ 4 + 8a &> 0 \\ a &> \frac{-1}{2} \end{aligned}$$

- 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

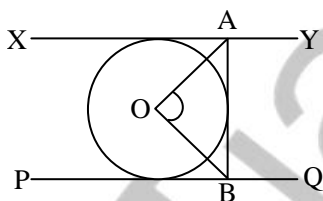
(1) 1                      (2) 2                      (3) 3                      (4) -3

**Ans.** [3]

**Sol.**  $a + b + c = 0$

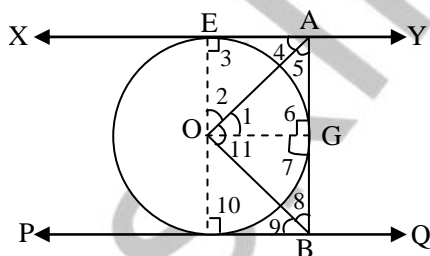
$$\begin{aligned} \text{Now, } & \frac{(a+b)^2}{ab} + \frac{(b+c)^2}{bc} + \frac{(c+a)^2}{ca} \\ &= \frac{(-c)^2}{ab} + \frac{(-a)^2}{bc} + \frac{(-b)^2}{ca} \\ &= \frac{c^2}{ab} + \frac{a^2}{bc} + \frac{b^2}{ca} \\ &= \frac{c^3 + a^3 + b^3}{abc} \\ &= \frac{3abc}{abc} \quad \{ \because a + b + c = 0 \Rightarrow a^3 + b^3 + c^3 = 3abc \} \\ &= 3 \end{aligned}$$

**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



- (1)  $80^\circ$                       (2)  $90^\circ$                       (3)  $70^\circ$                       (4)  $100^\circ$

**[2]**  
**Sol.**



$\angle 3 = \angle 6 = 90^\circ$   
 $\angle 7 = \angle 10 = 90^\circ$   
{Tangent is perpendicular to the point of contact}

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 bisect the angle.

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

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

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

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

Now, In  $\triangle OAB$ ,

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

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

$$\angle AOB = 90^\circ$$

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

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

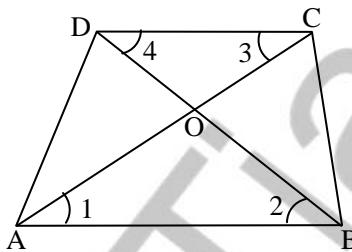
$$(\text{length} \times \text{breadth} \times \text{height})^2 = a^2 \times b^2 \times c^2$$

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

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

54. [4]

**Sol.**



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

$AB \parallel DC$

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

$\angle 1 = \angle 3$  [Alternate interior angles are equal]

$\angle 2 = \angle 4$

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

$\Rightarrow \frac{\text{ar.} \triangle AOB}{\text{ar.} \triangle COD} = \left(\frac{AB}{DC}\right)^2$  [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 pastoral communities of Raikas. Raikas & Maru Raikas 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) 10<sup>th</sup> April, 1919                      (2) 13<sup>th</sup> April, 1919                      (3) 14<sup>th</sup> April, 1919                      (4) 18<sup>th</sup> April, 1919

**Ans.** [2]

**Sol.** Jalliawala 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
(A)	Kaveri	(i)	Nasik
(B)	Godavari	(ii)	Betul
(C)	Tapi	(iii)	Brahmagiri
(D)	Krishna	(iv)	Mahabaleshwar

**Code :**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
(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 ?

- (A) Kerala                      (B) West Bengal                      (C) Jammu and Kashmir (D) 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) 131<sup>st</sup>                      (2) 133<sup>rd</sup>                      (3) 137<sup>th</sup>                      (4) 157<sup>th</sup>

**Ans.** [2]

**Sol.** 133<sup>rd</sup> 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
(A)	Waler	(i)	Jharkhand
(B)	Dahiya	(ii)	Himalayan region
(C)	Khil	(iii)	Madhya Pradesh
(D)	Kuruwa	(iv)	S.E. Rajasthan

**Code :**

	A	B	C	D
(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, Malasiya, Greece | (2) Malaysia, Greece, India, Argentina |
| (3) India, Argentina, Greece, Malasiya | (4) Greece, Malasiya, India, Argentina |

**Ans.** [3]

**Sol.** India -1950  
Argentina – 1951  
Greece – 1952  
Malasiya - 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 :
- (A) A democratic government is a better government because it is a more accountable form of government
  - (B) Democracy improves the quality of decision making
  - (C) Democracy provides a method to deal with the differences and conflicts
  - (D) 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 -

- (A) There are two or more levels (or tiers) of government
- (B) Different tiers of government govern the same citizens, but each tier has its own jurisdiction
- (C) The existence and authority of each tier of government is constitutionally guaranteed
- (D) 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 -

	List-I		List-II
(A)	Power is shared among different organs of government such as the legislature, executive and judiciary	(i)	Community Government
(B)	Power is shared among different social groups	(ii)	Horizontal distribution of power
(C)	The fundamental provisions of the constitution cannot be unilaterally changed by one level of government	(iii)	In 1992
(D)	The constitutionalisation of 3rd tier of Indian democratic system	(iv)	Federalism

**Code :**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
(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 -

	List-I		List-II
(A)	Union list	(i)	Computer software
(B)	State list	(ii)	Banking
(C)	Concurrent list	(iii)	Education
(D)	Residuary powers	(iv)	Police

**Code :**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
(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) 24<sup>th</sup> December                      (2) 24<sup>th</sup> November                      (3) 24<sup>th</sup> September                      (4) 24<sup>th</sup> October

**Ans.** [1]

**Sol.** 24<sup>th</sup> 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.** 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)  $8 \times 10^{23}$               (2)  $6.02 \times 10^{23}$               (3)  $1.51 \times 10^{23}$               (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 Majistrate.

**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.

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