

# THE RADIANT ACADEMY

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## NATIONAL TALENT SEARCH EXAMINATION (NTSE-2021) STAGE -1

**STATE: RAJASTHAN**

**PAPER : SAT**

**Date: 13/12/2020**

**Max. Marks: 100**

### SOLUTIONS

**Time allowed: 120 mins**

1. Group of vector quantities are :

(1) Displacement, velocity, time

(2) Area, density, mass

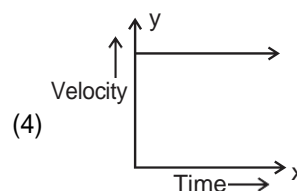
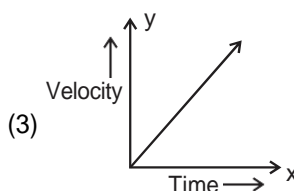
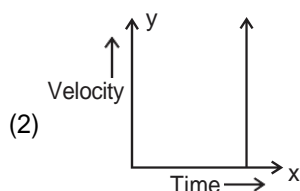
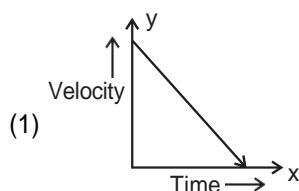
(3) Speed, length, impulse

(4) Velocity, acceleration, force

**Ans. (4)**

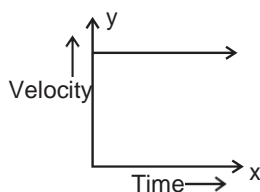
**Sol.** Velocity, acceleration and force are vector quantities.

2. The velocity-time graph of an object moving with uniform velocity is :



**Ans. (4)**

**Sol.** V-T graph for uniform velocity is a straight line parallel to time axis.



3. If force, momentum and displacement are represented by A, B and C respectively then the term  $\frac{AC}{B}$  will represent :

(1) Momentum

(2) Acceleration

(3) Velocity

(4) Displacement

**Ans. (3)**

**Sol.** 
$$\frac{AC}{B} = \frac{\text{Force} \times \text{Displacement}}{\text{Momentum}}$$

$$= \frac{m \times a \times s}{m \times v}$$

$$= \frac{v \times s}{t \times v}$$

$$\therefore a = \frac{v - 0}{t}$$

$$= \frac{s}{t} = \frac{\text{Displacement}}{\text{Time}} \times \text{Velocity}$$

4. The mass of a person on earth surface is 60 kg then his mass on moon will be :  
 (1) 60 kg                      (2) 360 kg                      (3) 20 kg                      (4) 10 kg

**Ans. (1)**

**Sol.** Mass remains same every where.

5. On halved the distance between two masses, the gravitational force between them will be :  
 (1) Half                      (2) One-fourth                      (3) Fourtimes                      (4) Double

**Ans. (3)**

**Sol.**  $F \propto \frac{1}{r^2}$

Distance is reduced to half. So force becomes four times.

6. If the speed of wave is 250 m/s and its wavelength is 50 cm then the frequency will be :  
 (1) 5 Hz                      (2) 500 Hz                      (3) 50 Hz                      (4) 12500 Hz

**Ans. (2)**

**Sol.**  $V = f \times \lambda$

$$250 = f \times \frac{50}{100}$$

$$f = 500 \text{ Hz}$$

7. An object of mass 10 gm is moving with an acceleration of 10 m/s<sup>2</sup>. Force acting on the object will be :  
 (1) 1 N                      (2) 0.1 N                      (3) 1000 N                      (4) 100 N

**Ans. (2)**

**Sol.**  $F = ma$

$$F = \frac{10}{1000} \times 10 = \frac{1}{10} = 0.1 \text{ N}$$

8. Lens formula is :

(1)  $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

(2)  $\frac{1}{v} + \frac{1}{2u} = \frac{1}{f}$

(3)  $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

(4)  $\frac{1}{v} - \frac{1}{2u} = \frac{1}{f}$

**Ans. (3)**

**Sol.** As per lens formula

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

9. Focal length of a lens is 50 cm. In dioptr power of lens will be :  
 (1) 0.02                      (2) 2                      (3) 0.2                      (4) 50

**Ans. (2)**

**Sol.**  $P = \frac{100}{f(\text{cm})}$

$$P = \frac{100}{50} = 2 \text{ D}$$



10. Correct relation between radius of curvature (R) and Focal length (F) of spherical mirror is :

- (1)  $F = \frac{R}{2}$                                       (2)  $R = F$                                       (3)  $R = 2F$                                       (4)  $R = (F)^2$

**Ans. (3)**

**Sol.** In spherical mirror  $F = \frac{R}{2}$

$$R = 2F$$

11. Refraction from denser to rarer medium for a light ray, the value of angle of refraction at the condition of critical angle is :

- (1)  $0^\circ$                                       (2)  $180^\circ$                                       (3)  $45^\circ$                                       (4)  $90^\circ$

**Ans. (4)**

**Sol.** Critical angle is the angle of incidence for which angle of refraction is  $90^\circ$ , when light travels from denser to rarer medium

12. The resistance of a bulb marked '220V, 10W' is :

- (1)  $242 \phi$                                       (2)  $4840 \phi$                                       (3)  $121 \phi$                                       (4) Zero

**Ans. (2)**

**Sol.**  $P = \frac{V^2}{R}$

$$R = \frac{V^2}{P} = \frac{220 \times 220}{10} = 4840 \blacktriangle$$

13. A person of mass 100kg reaches a height of 5 meters in 10 seconds. Find the power used by the person ( $g = 10 \text{ m/s}^2$ )

- (1) 500 watt                                      (2) 250 watt                                      (3) 5000 watt                                      (4) 50 watt

**Ans. (1)**

**Sol.** Power =  $\frac{\text{work done}}{\text{time}}$

$$P = \frac{mgh}{t} = \frac{100 \times 10 \times 5}{10} = 500W$$

14. Correct order of compressibility is :

- (1) Solid > Liquid > Gas (2) Solid > Gas > Liquid (3) Gas > Liquid > Solid (4) Gas > Solid > Liquid

**Ans. (3)**

**Sol.** Order of intermolecular distance in three states of matter is

$$\text{Gas} > \text{Liquid} > \text{Solid}$$

Therefore, gases are more compressible than liquids.

15. Number of molecules present in 0.25 moles of water are :

- (1)  $3.011 \times 10^{23}$                                       (2)  $30.11 \times 10^{23}$                                       (3)  $1.5055 \times 10^{23}$                                       (4)  $15.055 \times 10^{23}$

**Ans. (3)**

**Sol.** Mole =  $\frac{\text{Number of molecules}}{N_A}$

$$\begin{aligned} \text{Number of molecules} &= \text{Mole} \times N_A \\ &= 0.25 \times 6.022 \times 10^{23} \\ &= 1.5055 \times 10^{23} \end{aligned}$$

16. Substance having equivalent number of molecules as in 9g of water is :  
 (1) 12 g of Magnesium      (2) 12 g of carbon      (3) 17 g of Ammonia      (4) 11 g of Carbondioxide

Ans. (1)

Sol. Moles of water =  $\frac{9}{18}$

No. of molecules of water =  $0.5 N_A$

In option (1), moles of Mg =  $\frac{12}{24} = \frac{1}{2}$

No. of atoms of Mg =  $\frac{1}{2} \times N_A$

17. Atomic number of element symbol Unt is :  
 (1) 101                              (2) 102                              (3) 103                              (4) 104

Ans. (3)

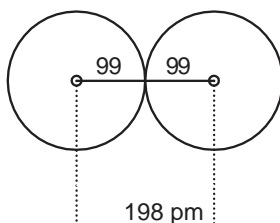
Sol. According to trivial naming of elements above 100 atomic number, the name of element having atomic number 103 is 'Un nil trium'

Hence symbol → Unt

18. Atomic radius of chlorine is 99 pm. Distance between nuclei of its two atoms in molecule will be :  
 (1) 1.98 pm                      (2) 49.5 pm                      (3) 99 pm                      (4) 198 pm

Ans. (4)

Sol. Atomic radius of Cl is 99 pm

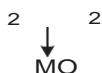


Therefore internuclear distance between two atoms is 198 pm

19. Molecular formula of chloride of a metal 'M' is  $MCl_2$ . Molecular formula of oxide of 'M' will be :  
 (1) MO                              (2)  $M_2O$                               (3)  $MO_2$                               (4)  $M_2O_3$

Ans. (1)

Sol. Formula of chloride of metal 'M' is  $MCl_2$  means metal ion is  $M^{2+}$  So formula of its oxide is MO



20. Suitable method for separation of pure naphthalene from sandy naphthalene is :  
 (1) Filtration                      (2) Crystallisation                      (3) Sublimation                      (4) Distillation

Ans. (3)

Sol. We can separate pure naphthalene from sandy naphthalene by sublimation as naphthalene is sublimable in nature.

21. pH of the solution having hydrogen ion concentration  $[H^+] = 1 \times 10^{-4}$  mol/L will be :  
 (1) 3                                      (2) 4                                      (3) 7                                      (4) 10

**Ans. (2)**

**Sol.**  $[H^+] = 10^{-4}$  mol/L  
 $pH = -\log [H^+]$   
 $= -\log [10^{-4}]$   
 $= -[-4 \log 10]$   
 $= 4$

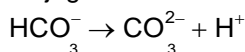
So, pH of the solution having hydrogen ion concentration  $[H^+] = 10^{-4}$  mol/L is 4.

22. Conjugate acid-base pair is :  
 (1)  $HCO_3^-, CO_3^{2-}$                       (2)  $NH_4^+, NH_2^-$                       (3)  $OH^-, H_2O_2$                       (4)  $NO_2^-, NO_3^-$

**Ans. (1)**

**Sol.** Conjugate acid has one more proton than its conjugate base.

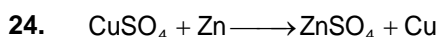
Conjugate Acid = Conjugate base +  $H^+$



23. Gas used for precipitation of pure common salt (NaCl) from saturated solution of common salt is :  
 (1)  $H_2$                                       (2)  $Cl_2$                                       (3) HCl                                      (4)  $CO_2$

**Ans. (3)**

**Sol.** NaCl has dissolved impurities like  $MgCl_2$  and  $CaCl_2$ . To obtain pure NaCl from this saturated solution, HCl gas is passed. Due to common ion effect, more NaCl will get precipitated.



Correct statement related to the above reaction is -

- (1) Zn is less reactive as compared to Cu                      (2) Zn is more reactive as compared to Cu  
 (3) Reactivity of Cu and Zn is equal                      (4) Zn is displaced by Cu

**Ans. (2)**

**Sol.** Zinc is more reactive than copper. So, Zinc will displace copper from its salt solution.

25. Useful substance in preparation of freezing mixture is-  
 (1) NaOH                                      (2) NaCl                                      (3)  $NaHCO_3$                                       (4)  $CaSO_4 \cdot 2H_2O$

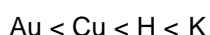
**Ans. (2)**

**Sol.** When sodium chloride is mixed with ice, it decreases the freezing point of ice. So, mixture of NaCl and Ice is commonly known as freezing mixture.

26. Correct increasing order of reactivity of elements is-  
 (1) Au, Cu, K, H                                      (2) Au, Cu, H, K                                      (3) Cu, Au, K, H                                      (4) Cu, Au, H, K

**Ans. (2)**

**Sol.** On the basis of reactivity of metals towards oxygen and water, reactivity of following metals in increasing order is



27. In which of the plant group chitineous cell wall is found.  
 (1) Algae                                      (2) Fungi                                      (3) Thallophyta                                      (4) Bryophyta

**Ans. (2)**

**Sol.** Chitineous cell wall is present in fungi.

28. The light reaction occurs in which part of the chloroplast.

- (1) Stroma (2) Outer wall (3) Grana (4) None of these

**Ans. (3)**

**Sol.** Light reaction of photosynthesis occurs in grana part of chloroplast.

29. Lack of which element occurs when Algal Bloom is formed in a waterbody.

- (1) Oxygen (2) Nitrogen (3) Hydrogen (4) Calcium

**Ans. (1)**

**Sol.** Eutrophication causes algal bloom which leads to hypoxic condition (lack of oxygen) in water body.

30. The plant group called "pollution indicator" is.

- (1) Bryophyta (2) Lichen (3) Gymnosperm (4) Pteridophyta

**Ans. (2)**

**Sol.** Lichen is indicator of sulfur pollution.

31. Genotypic ratio of  $F_2$  generation in monohybrid cross is :

- (1) 3 : 1 (2) 9 : 3 : 3 : 1 (3) 1 : 2 : 1 (4) 1 : 3

**Ans. (3)**

**Sol.** Genotypic ratio of  $F_2$  generation in monohybrid cross is 1 : 2 : 1.

32. Rabi Crop is:

- (1) Oryza sativa (2) Triticum aestivum (3) Pennisetum typhoides (4) Zea mays

**Ans. (2)**

**Sol.** Triticum aestivum (wheat) is Rabi Crop.

33. Kevla Devi National Park is situated at-

- (1) Karnataka (2) Madhya Pradesh (3) Rajasthan (4) Gujarat

**Ans. (3)**

**Sol.** Kevla Devi National Park is located in Rajasthan.

34. Disease caused by Virus, is

- (1) Malaria (2) Diptheria (3) Chicken pox (4) Leprosy

**Ans. (3)**

**Sol.** Chicken Pox is a disease caused by virus.

35. Which of the following is not a member of phylum Arthropoda

- (1) House-fly (2) Earthworm (3) Shrimp (4) Cockroach

**Ans. (2)**

**Sol.** Earthworm is an annelid not an arthropod.

36. DNA synthesis occurs, in which stage of cell cycle.

- (1) G-I phase (2) G-II phase (3) M-phase (4) S-phase

**Ans. (4)**

**Sol.** In cell cycle DNA synthesis occurs in S phase.

37. Example of Fat digesting enzyme is

- (1) Amylase (2) Pepsin (3) Lipase (4) Nucleases

**Ans. (3)**

**Sol.** Lipase is fat digesting enzyme.



38. Indian scientist known for research on cosmic rays and nuclear energy

- (1) Dr. Prafullachandra Roy (2) Chandra Shekhara Venkat Raman  
(3) Dr. Panchanan Maheshwari (4) Dr. Homi Jahangir Bhabha

Ans. (4)

Sol. Dr. Homi Jahangir Bhabha known for research on cosmic rays and nuclear energy.

39. Tal chappar wild life sanctuary is located at

- (1) Alwar (2) Jaipur (3) Churu (4) Kota

Ans. (3)

Sol. Tal Chappar wild life sanctuary is located at Churu.

40. Disease caused by deficiency of vitamin-C is

- (1) Scurvy (2) Night blindness (3) Beri-beri (4) Rickets

Ans. (1)

Sol. Vitamin C deficiency causes scurvy.

41. If polynomials  $3x^3 + x^2 - 4x + P$  and  $2x^3 + Px^2 + 3x - 3$  are divided by  $(x - 2)$  then get the same remainder. What will be the value of P.

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

Ans. (2)

Sol.  $p(x) = 3x^3 + x^2 - 4x + P$

$g(x) = 2x^3 + Px^2 + 3x - 3$

Given :  $p(2) = g(2)$  (By Remainder theorem)

$$\rightarrow 24 + 4 - 8 + p = 16 + 4p + 6 - 3$$

$$\rightarrow 20 + p = 19 + 4p$$

$$\rightarrow 1 = 3p$$

$$\rightarrow \boxed{p = \frac{1}{3}}$$

42. Numerator of a fraction is 3 less than its denominator. If 4 is added to the numerator and 2 is subtracted from the denominator then the numerator becomes 2 times of the denominator. What will be the fraction?

- (1)  $\frac{5}{2}$  (2)  $\frac{4}{5}$  (3)  $\frac{2}{5}$  (4)  $\frac{5}{4}$

Ans. (3)

Sol. Let numerator be 'x' and denominator be 'y'

A.T.Q.

$$\rightarrow x = y - 3$$

$$\rightarrow \frac{x+y}{x-2} = 2$$

Put  $x = y - 3$

$$\rightarrow y + 1 = 2y - 4$$

$$\rightarrow y = 5$$

$$? \quad x = 2$$

$$\text{Required fraction} = \frac{2}{5}$$



43. If each interior angle of a regular polygon is  $165^\circ$  then the number of sides will be-  
 (1) 24 (2) 72 (3) 26 (4) 12

Ans. (1)

Sol. Each interior angle of regular polygon =  $\frac{(n-2) \times 180^\circ}{n}$

$$? \quad 165 = \frac{(n-2) \times 180}{n}$$

$$\rightarrow 11n = 12n - 24$$

$$\boxed{n = 24}$$

44. The measures of Three angles of triangle are in ratio 3 : 4 : 5, then the measure of its greatest angle is-  
 (1)  $55^\circ$  (2)  $65^\circ$  (3)  $80^\circ$  (4)  $75^\circ$

Ans. (4)

Sol. Let the angles be  $3x, 4x, 5x$

$$? \quad \text{greatest angle} = \frac{5x}{12x} \times 180 = 75^\circ$$

45. If area of an equilateral triangle is  $64\sqrt{3} \text{ cm}^2$ . Then its perimeter will be:  
 (1) 24 cm (2) 48 cm (3) 64 cm (4) 32 cm

Ans. (2)

Sol. Area of an equilateral triangle =  $\frac{\sqrt{3}}{4} a^2$

$$? \quad 64\sqrt{3} = \frac{\sqrt{3}}{4} a^2$$

$$? \quad a = 16$$

$$? \quad \text{perimeter} = 3a = 48 \text{ cm}$$

46. Each face of a cube is  $144 \text{ cm}^2$ . If cube is cut by a plane, parallel to it's base in two equal parts, then the total surface area of both the parts will be :  
 (1)  $1152 \text{ cm}^2$  (2)  $1052 \text{ cm}^2$  (3)  $288 \text{ cm}^2$  (4)  $576 \text{ cm}^2$

Ans. (1)

Sol. area of one face of a cube =  $144 \text{ cm}^2$

$$a^2 = 12^2$$

$$? \quad a = 12$$

After cutting dimensions will be 12, 12, 6

$$? \quad \text{Total surface area of one part} = 2(Ah + bh + Ab)$$

$$= 2(12 \times 12 + 12 \times 6 + 12 \times 6) = 576 \text{ cm}^2$$

$$? \quad \text{Total surface area of both parts} = 2 \times 576 = 1152 \text{ cm}^2$$

47. The time does the minute hand of a watch take to describe an angle  $\frac{3}{4} \text{ v}$  radians is :  
 (1) 45 minute 30 second minutes (2) 45 minutes (3) 22 minutes 30 seconds (4) 22

Ans. (3)

Sol. Angle described by watch =  $\frac{-3}{4} \text{ v}$  radian =  $135^\circ$

we know minute hand trace  $360^\circ$  in 60 minutes

$$\text{So, time taken to trace } 135^\circ = \frac{135}{360} \times 60 = 22.5 \text{ min. i.e. 22 min. 30 seconds}$$



48. If  $\operatorname{cosec} A = 2$ , then the value of  $\tan A + \frac{\cos A}{1 + \sin A}$  will be :

(1)  $\frac{1}{2\sqrt{3}}$

(2)  $\frac{2}{\sqrt{3}}$

(3)  $\frac{1}{\sqrt{3}}$

(4)  $2\sqrt{3}$

Ans. (2)

Sol.  $\operatorname{cosec} A = 2$

•  $\tan A + \frac{\cos A}{1 + \sin A}$

By dividing numerator and denominator by  $\cos A$

$= \tan A + \frac{1}{\sec A + \tan A}$

By rationalisation of denominator

$= \tan A + \sec A - \tan A$

$= \sec A$

•  $\operatorname{cosec} A = 2 = \frac{H}{P}$

Let  $H = 2k$

$P = k$

$\rightarrow B = \sqrt{3}k$

?  $\sec A = \frac{H}{B} = \frac{2k}{\sqrt{3}k}$

49. Two poles of height 12 meters and 20 meters are standing on a plane ground. If distance between their feet is 15 meters, then the distance between upper ends of poles will be :

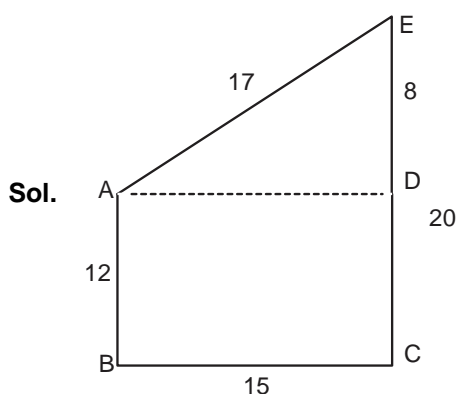
(1) 15 meters

(2) 16 meters

(3) 17 meters

(4) 18 meters

Ans. (3)



Sol.

Using pythagoras theorem in  $\triangle ADE$

?  $AE^2 = ED^2 + AD^2$

$= 8^2 + 15^2$  (AD = BC)

$\rightarrow AE^2 = 17^2$

$\rightarrow AE = 17 \text{ m}$

**50.** Following are the points obtained by a Kabaddi team in various matches

17, 2, 7, 27, 15, 5, 14, 19, 10, 24, 9, 8, 6, 18, 28

the median of the points obtained by the team will be :

- (1) 14                                      (2) 16                                      (3) 15                                      (4) 17

**Ans. (1)**

**Sol.** Arrange the data in ascending order : 2, 5, 6, 7, 8, 9, 10, 14, 15, 17, 18, 19, 24, 27, 28

$$\text{Median} = \frac{(15 + 1)^{\text{th}}}{2} \text{ term} = 8^{\text{th}} \text{ term} = 14$$

**51.** Vaibhav takes 24 minutes to complete one round of a circular path of a sports field. While Rohan takes 18 minutes for the same. Suppose both of them start from the same point and at the same time and go in the same direction. After how much time will they meet again at the starting point?

- (1) 48 minutes                              (2) 24 minutes                              (3) 72 minutes                              (4) 36 minutes

**Ans. (3)**

**Sol.** Time taken by Vaibhav to complete one round = 24 min.

and time taken by Rohan for the same round = 18 min

They will meet again at starting point after LCM (24, 18) i.e. 72 min.

**52.** Discriminant of the quadratic equation  $3\sqrt{3}x^2 + 7x + \sqrt{3} = 0$  will be:

- (1) 49                                      (2) 13                                      (3) 36                                      (4) 62

**Ans. (2)**

**Sol.**  $3\sqrt{3}x^2 + 7x + \sqrt{3} = 0$

We have :  $a = 3\sqrt{3}$ ,  $b = 7$  and  $c = \sqrt{3}$

Hence, discriminant (D) =  $b^2 - 4ac$

$$= (7)^2 - 4(3\sqrt{3})(\sqrt{3})$$

$$= 49 - 36 = 13$$

**53.** If seventh term of an arithmetic progression is 20 and 22<sup>nd</sup> term is 50, then 30<sup>th</sup> term will be :

- (1) 66                                      (2) 68                                      (3) 64                                      (4) 62

**Ans. (1)**

**Sol.** 7<sup>th</sup> term = 20

→  $a + 6d = 20$  ..... (i)

Also, 22<sup>nd</sup> term = 50

→  $a + 21d = 50$  ..... (ii)

From (i) and (ii), we have :  $15d = 30$  →  $d = 2$

then  $a = 20 - 6(2) = 8$

Hence, 30<sup>th</sup> term of AP =  $a + 29d = 8 + 29 \times 2 = 66$

54. If  $\tan 3P = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$ , then the value of P will be: ( $P < 90^\circ$ )  
 (1)  $15^\circ$  and  $45^\circ$                       (2)  $15^\circ$  and  $60^\circ$                       (3)  $15^\circ$  and  $75^\circ$                       (4)  $45^\circ$  and  $60^\circ$

Ans. (3)

Sol.  $\tan 3P = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$

$$\rightarrow \tan 3P = \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} + \frac{1}{2} = \frac{1}{2} + \frac{1}{2}$$

$$\rightarrow \tan 3P = 1$$

Hence,  $\tan 3P = \tan 45^\circ$  and  $\tan 3P = \tan 225^\circ$

$$\rightarrow 3P = 45^\circ \text{ and } 3P = 225^\circ$$

$$\rightarrow P = 15^\circ \text{ and } P = 75^\circ$$

55. If ratio of length of a vertical rod and length of its shadow is  $\sqrt{3}:1$ , then the angle of elevation of sun will be :  
 (1)  $30^\circ$                       (2)  $45^\circ$                       (3)  $60^\circ$                       (4)  $90^\circ$

Ans. (3)

Sol. Let AB : vertical rod

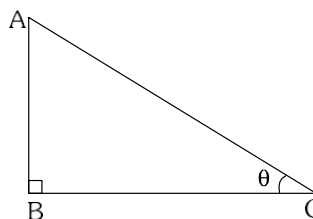
BC : length of its shadow

$$\text{Given : } \frac{AB}{BC} = \frac{\sqrt{3}}{1}$$

$$\rightarrow \tan \theta = 3 \sqrt{3}$$

$$\rightarrow \tan \theta = \tan 60^\circ$$

$$\rightarrow \theta = 60^\circ$$



56. Triangle formed by vertices (2, -2), (-2, 1) and (5, 2) will be :  
 (1) Scalenetriangle                      (2) Equilateraltriangle                      (3) Isosceles triangle                      (4) Right-angle triangle

Ans. (3, 4)

Sol. Let the vertices be A(2, -2), B(-2, 1) and C(5, 2)

$$\text{Now, } AB = \sqrt{(2+2)^2 + (-2-1)^2} = \sqrt{16+9} = 5 \text{ units}$$

$$BC = \sqrt{(-2-5)^2 + (1-2)^2} = \sqrt{49+1} = 5 \text{ units}$$

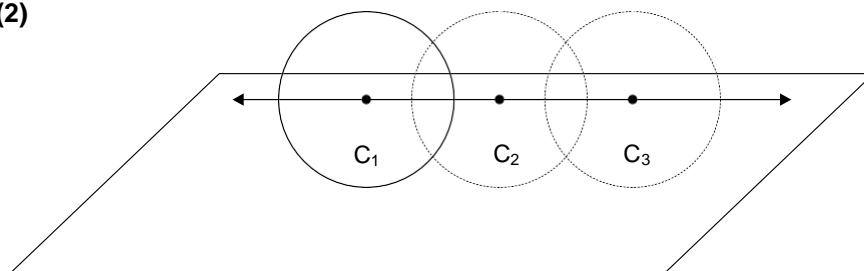
$$AC = \sqrt{(2-5)^2 + (-2-2)^2} = \sqrt{9+16} = 5 \text{ units}$$

We find that  $AB^2 + AC^2 = BC^2$ , hence OABC is a right angled triangle and  $AB = AC$  hence OABC is isosceles triangle also.

57. Locus of centre of rolling circle in a plane will be :  
 (1) circle                      (2) line parallel to the plane  
 (3) curve                      (4) line perpendicular to the plane

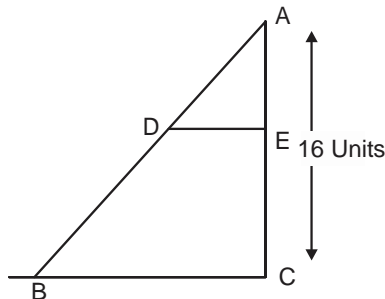
Ans. (2)

Sol.



Hence, locus of centre of rolling circle in a plane will be line parallel to the plane

58. In the given figure  $DE \parallel BC$  and  $\frac{AD}{DB} = \frac{3}{5}$  if  $AC = 16$  units then the value of  $AE$  will be :



(1) 4 units

(2) 5 units

(3) 6 units

(4) 8 units

Ans. (3)

Sol. Given :  $DE \parallel BC$  and  $\frac{AD}{DB} = \frac{3}{5}$

Required : To find  $AE$

Let length of  $AE$  be  $x$  units

So  $CE = (16 - x)$  units

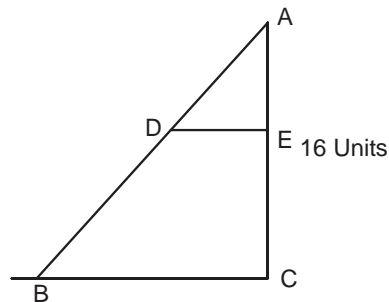
Hence, by Thales' theorem

$$\rightarrow \frac{AD}{DB} = \frac{AE}{CE}$$

$$\rightarrow \frac{3}{5} = \frac{x}{16 - x}$$

$$\rightarrow 48 - 3x = 5x$$

$$\rightarrow x = \frac{48}{8} = 6 \text{ units}$$



59. The length of a minute hand a clock is 6 cm. What will be the area (approximate) of the sector swept by this minute hand with in 45 minutes?

(1) 85.84  $\text{cm}^2$

(2) 14.12  $\text{cm}^2$

(3) 84.85  $\text{cm}^2$

(4) 12.14  $\text{cm}^2$

Ans. (3)

Sol. Length of minute hand of clock = 6 cm

Angle swept in 45 minutes =  $270^\circ$

Hence, area swept by minute hand in 45 minutes

$$= \frac{270^\circ}{360^\circ} \times \pi(6)^2$$

$$= \frac{270^\circ}{360^\circ} \times \pi(36) = 84.85 \text{ cm}^2$$

60. In a single throw of two dice, what will be the probability of getting a total of 8 ?

(1)  $\frac{1}{36}$

(2)  $\frac{5}{6}$

(3)  $\frac{1}{6}$

(4)  $\frac{5}{36}$

**Ans. (4)**

**Sol.** In a single throw of two dice, total number of outcomes = 36

Outcomes for getting a total of 8 are (2, 6), (6, 2), (3, 5), (5, 3), (4, 4)

Hence,  $P(\text{sum of digits on dice is } 8) = \frac{5}{36}$

61. Which period is known as 'Arab spring' ?

(1) 2010-2013

(2) 2007-2010

(3) 2006-2016

(4) 2012-2015

**Ans. (1)**

**Sol.** 2010-13 period is known as Arab spring.

62. Arrange the following events in chronological order and select the correct answer from the codes given below:

(1) Korea War

(2) Swej Crisis

(3) Congo Crisis

(4) Somalia Crisis

(1) 1, 3, 2, 4

(2) 1, 2, 3, 4

(3) 3, 2, 4, 1

(4) 2, 1, 4, 3

**Ans. (2)**

**Sol.** Korea War-1950

Swej Crisis - 1956

Congo Crisis - 1960

Somalia Crisis - 1991

63. Which one of the following is not correctly matched ?

Folk God

Birth Place

(1) Jambhoji – Nagaur

(2) Jasnathji – Bikaner

(3) Ramcharanji – Alwar

(4) Dadu Dayal – Ahmedabad

**Ans. (3)**

**Sol.** Ramcharanji was born in Sodha village of Tonk.

64. Which one of the following was not included among the Axis nations during the First World War ?

(1) Italy

(2) Germany

(3) Hungary

(4) Turkey

**Ans. (1)**

**Sol.** Italy was not included among the Axis nations (central power) during the First World War.

65. Who was the writer of 'Ananda Math'?

(1) Bal Gangadhar Tilak

(2) Bankim Chandra Chatterjee

(3) Dayanand Saraswati

(4) Raja Rammohan Roy

**Ans. (2)**

**Sol.** Bankim Chandra Chatterjee was the writer of 'Ananda Math'.

66. Which one of the following is not correctly matched with reference to the revolution of 1857 ?

- (1) Bhimrao - Karantaka (2) Sultan Baksh - Madras  
(3) Mulgabal Swami - Poona (4) Vijay Kudarat - Kerala

**Ans. (3)**

**Sol.** Mulgabal Swami was from Coimbatore.

67. Dhapi Dadi is related to which village of Sikar peasant movement ?

- (1) Kudan (2) Palthana (3) Katrathal (4) Ghassu

**Ans. (1)**

**Sol.** Dhapi Dadi is related to Kudan village of Sikar peasant movement.

68. Which newspaper compared the Neemuchana massacre to the Jallianwala Bagh massacre ?

- (1) Rajputana (2) Riyasat (3) Rajasthan (4) Kisan

**Ans. (2)**

**Sol.** Riyasat newspaper compared the Neemuchana massacre to the Jallianwala Bagh massacre.

69. Which of the following was first invented ?

- (1) Flying Shuttle Loom (2) WaterFrame (3) Spinning Jenny (4) Powerloom

**Ans. (1)**

**Sol.** Flying Shuttle Loom - 1733

Water Frame - 1769

Spinning Jenny - 1765

Powerloom - 1787

70. Which one of the following places did not Swai Jaisingh build the observatory ?

- (1) Agra (2) Banaras (3) Mathura (4) Ujjain

**Ans. (1)**

**Sol.** Swai Jaisingh build the observatory in Banaras, Mathura, Ujjain, Jaipur and Delhi.

71. Which of the following rulers tomb is situated in the middle of the lake ?

- (1) Babar (2) Sher Shah (3) Akbar (4) Jahangir

**Ans. (2)**

**Sol.** Tomb of Sher Shah Suri is situated in the middle of the lake.

72. Which lake is located in Rajasmand district ?

- (1) Tal Chhapar (2) Nauchouki (3) Tordisagar (4) Navlekha

**Ans. (2)**

**Sol.** Nauchouki is located in Rajasmand district.

73. Which one of the following is a food crop ?

- (1) Sugarcane                      (2) Tobacco                      (3) Barley                      (4) Tea

**Ans. (3)**

**Sol.** Barley is a food crop.

74. Match List-I with List-II and select the correct answer using the codes given below:

List - I (Mineral)		List - II (Producing Regions)	
(A) Copper		(i) Zawar	
(B) Lead - Zinc		(ii) Degana	
(C) Tungsten		(iii) Ghotaru	
(D) Natural Gas		(iv) Kho-Dariba	

	A	B	C	D
(1)	iiii	ii	iv	i
(2)	ii	iii	i	iv
(3)	i	iv	iii	ii
(4)	iv	i	ii	iii

**Ans. (4)**

**Sol.** (A) Copper                      (i) Kho-Dariba  
 (B) Lead - Zinc                      (ii) Zawar  
 (C) Tungsten                      (iii) Degana  
 (D) Natural Gas                      (iv) Ghotaru

75. Which district in Rajasthan is called as cement city ?

- (1) Chittorgarh                      (2) Kota                      (3) Bundi                      (4) Pratapgarh

**Ans. (1)**

**Sol.** Chittorgarh district in Rajasthan is called as cement city.

76. Which of the following is the highest Literacy-rate district of Rajasthan ?

- (1) Ajmer                      (2) Jaipur                      (3) Kota                      (4) Udaipur

**Ans. (3)**

**Sol.** Kota is the highest Literacy-rate district of Rajasthan.

77. Which of the following is ferrous metallic mineral ?

- (1) Tin                      (2) Cobalt                      (3) Gold                      (4) Bauxite

**Ans. (2)**

**Sol.** Cobalt is ferrous metallic mineral.

78. Which is the major source of rainwater storage in the Shekhawati region ?

- (1) Khadin                      (2) Tanka                      (3) Nadi                      (4) Johad

**Ans. (4)**

**Sol.** Johad is the major source of rainwater storage in the Shekhawati region.

79. Latitudinal extension of India is

- (1) 8°4' Northern latitude to 37°4' Northern latitude      (2) 8°4' Northern latitude to 37°6' Northern latitude  
(3) 8°2' Northern latitude to 37°8' Northern latitude      (4) 8°5' Northern latitude to 37°5' Northern latitude

**Ans. (2)**

**Sol.** Latitudinal extension of India is 8°4' Northern latitude to 37°6' Northern latitude.

80. Which of the following rivers does not fall in the Bay of Bengal ?

- (1) Kaveri                      (2) Mahanadi                      (3) Narmada                      (4) Godawari

**Ans. (3)**

**Sol.** Narmada river does not fall in the Bay of Bengal.

81. Wath is "Kall Vaishaki"?

- (1) Cyclones in the Arabian sea  
(2) Rainfall due to mediterranean cyclone in winter season  
(3) Rainfall on the Malabar coast in summer season  
(4) Dust storm in West Bengal region during summer season

**Ans. (4)**

**Sol.** Kall Vaishaki is dust storm in West Bengal region during summer season.

82. Who coined the slogan "Jo sir sante Roonkh rahe to bhi sasto Jaan"?

- (1) Smt. Amrita Devi      (2) Smt. Jaana Bai      (3) Smt. Sushila Devi      (4) Smt. Harsha Devi

**Ans. (1)**

**Sol.** Smt. Amrita Devi coined the slogan "Jo sir sante Roonkh rahe to bhi sasto Jaan".

83. When was the unification of Rajasthan completed?

- (1) 30<sup>th</sup> March, 1949      (2) 15<sup>th</sup> May, 1948      (3) 26<sup>th</sup> January, 1950      (4) 1<sup>st</sup> November, 1956

**Ans. (4)**

**Sol.** On 1<sup>st</sup> November, 1956 the unification of Rajasthan completed.

84. From which district of Rajasthan, the modern three-tier of Panchayati Raj sytem was launched on October 2<sup>nd</sup>, 1959?

- (1) Ajmer                      (2) Nagour                      (3) Jaipur                      (4) Bikaner

**Ans. (2)**

**Sol.** From Nagour district of Rajasthan, the modern three-tier of Panchayati Raj sytem was launched on October 2<sup>nd</sup>, 1959.

85. When was the constitution of India adopted, enacted and spirited?

- (1) 26<sup>th</sup> November, 1949      (2) 26<sup>th</sup> October, 1948      (3) 26<sup>th</sup> January, 1950      (4) 26<sup>th</sup> January, 1949

**Ans. (1)**

**Sol.** On 26<sup>th</sup> November, 1949 the constitution of India adopted, enacted and spirited.



**86.** In which schedule of Indian constitution the functions of municipal councils were listed by the 74th constitutional amendment?

- (1) In 8<sup>th</sup> Schedule                      (2) In 12<sup>th</sup> Schedule                      (3) In 10<sup>th</sup> Schedule                      (4) In 9<sup>th</sup> Schedule

**Ans. (2)**

**Sol.** In 12<sup>th</sup> Schedule of Indian constitution the functions of municipal councils were listed by the 74th constitutional amendment.

**87.** Where did the 18<sup>th</sup> summit of 'SAARC' take place in November, 2014?

- (1) Nepal                                      (2) New Delhi                                      (3) Bhutan                                      (4) Maldiv

**Ans. (1)**

**Sol.** The 18<sup>th</sup> summit of 'SAARC' take place in November, 2014 in Nepal (Kathmandu)

**88.** Match List-I with List-II Related to Fundamental Rights and choose the correct from given codes

**List-I**

- (A) Right to Equality  
(B) Right against Exploitation  
(C) Right to Education and culture  
(D) Right to Freedom or Liberty

**List-II**

- (i) Article 19 to 22  
(ii) Article 29 to 30  
(iii) Article 14 to 18  
(iv) Article 23 to 24

Codes :

- |     |       |       |       |       |
|-----|-------|-------|-------|-------|
|     | (A)   | (B)   | (C)   | (D)   |
| (1) | (ii)  | (iii) | (iv)  | (i)   |
| (2) | (iii) | (iv)  | (ii)  | (i)   |
| (3) | (i)   | (ii)  | (iii) | (iv)  |
| (4) | (iv)  | (i)   | (ii)  | (iii) |

**Ans. (2)**

**Sol.** (A) Right to Equality                                      (i) Article 14 to 18  
(B) Right against Exploitation                                      (ii) Article 23 to 24  
(C) Right to Education and culture                                      (iii) Article 29 to 30  
(D) Right to Freedom or Liberty                                      (iv) Article 19 to 22

**89.** What can be maximum number of members of Rajya Sabha as per constitutional provision?

- (1) 245                                      (2) 233                                      (3) 250                                      (4) 230

**Ans. (3)**

**Sol.** 250 is maximum number of members of Rajya Sabha as per constitutional provision.

**90.** According to which article of Indian constitution 'Money Bills' can be proposed in Lok Sabha only?

- (1) 109                                      (2) 107                                      (3) 105                                      (4) 103

**Ans. (1)**

**Sol.** According to article 109 of Indian constitution 'Money Bills' can be proposed in Lok Sabha only.



91. Who was the right to casting vote if there are equal votes in favour and in against on a question in the state Legislative Assembly?

- (1) The Governor (2) The Chief Minister  
(3) The Speaker of State Legislative Assembly (4) The Deputy Speaker of State Legislative Assembly

**Ans. (3)**

**Sol.** The speaker has right to casting vote if there are equal votes in favour and in against on a question in the state Legislative Assembly.

92. How many members can be maximum in the Council of Minister according to 91<sup>st</sup> constitutional amendment?

- (1) 10% of total number of members of legislative assembly  
(2) 25% of total number of members of legislative assembly  
(3) 20% of total number of members of legislative assembly  
(4) 15% of total number of members of legislative assembly

**Ans. (4)**

**Sol.** According to 91<sup>st</sup> constitutional amendment the maximum members in the council of minister can be 15% of total number of members of legislative assembly.

93. Till what age can the Judges of high court hold his post?

- (1) 62 years (2) 60 years (3) 65 years (4) 68 years

**Ans. (1)**

**Sol.** 62 years is maximum age for the Judges of high court.

94. The nation having a mixed economy is

- (1) China (2) India (3) Japan (4) France

**Ans. (2)**

**Sol.** The nation having a mixed economy is India.

95. The Green revolution started in

- (1) 1966-67 (2) 1970-74 (3) 1988-89 (4) 2001-02

**Ans. (1)**

**Sol.** The Green revolution started in 1966-67.

96. The Central bank of India is

- (1) State Bank (2) Indian Industrial Development Bank  
(3) Export - Import Bank (4) Reserve Bank of India

**Ans. (4)**

**Sol.** The Central bank of India is Reserve Bank of India.

97. The money is deposited for a fixed period of time in this account

- (1) Fixed deposit account (2) Saving bank account  
(3) Current account (4) Recurring deposit account

**Ans. (1)**

**Sol.** The money is deposited for a fixed period of time in fixed deposit account.

**98.** When the benefits of development reach the people of all the sections of the society, it is called

- (1) Economic Development (2) Continuous Development  
(3) Assimilated Development (4) Human Development

**Ans. (3)**

**Sol.** When the benefits of development reach the people of all the sections of the society, it is called Assimilated Development.

**99.** The process which increases the role of private sector in economy, is called

- (1) Liberalization (2) Privatization (3) Globalization (4) Swadeshi

**Ans. (2)**

**Sol.** The process which increases the role of private sector in economy, is called Privatization.

**100.** The concept of Relative poverty is comparatively more relevant in these countries-

- (1) Undeveloped countries (2) Under developed countries  
(3) Developing countries (4) Developed countries

**Ans. (4)**

**Sol.** The concept of Relative poverty is comparatively more relevant in developed countries.

\* \* \* \* \*