

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2
SCHOLASTIC APTITUDE TEST (SAT)

1. A segment of DNA contains 1200 nucleotides, of which 200 have adenine base. How many cytosine bases are present in this segment of DNA?
(1) 100 (2) 200 (3) 400 (4) 800

Ans. (3)

Sol. In DNA adenine forms double hydrogen bond with thymine and cytosine form triple hydrogen bond with guanine. So, if adenine are 200 in number, thymine will be 200 also and hence cytosine and guanine will be 400 each out of 1200.

2. You are observing a non-chlorophyllous, eukaryotic organism with chitinous cell wall under a microscope. You shall describe the organism as a
(1) fungus (2) alga (3) protozoas (4) bacterium

Ans. (1)

Sol. Fungus have eukaryotic cells with chitinous cell wall. It shows heterotrophic mode of nutrition because of absence of chlorophyll.

3. Match the items given in column A and Column B, and identify the correct alternative listed below.

Column-A	Column-B
(a) Flying fish	(i) <i>Draco</i>
(b) Flying lizard	(ii) <i>Echidna</i>
(c) Egg laying mammals	(iii) <i>Exocoetus</i>
(d) Flightless bird	(iv) <i>Struthio</i>

- (1) (a)–(i), (b)–(iii), (c)–(ii), (d)–(iv) (2) (a)–(iii), (b)–(i), (c)–(ii), (d)–(iv)
(3) (a)–(iii), (b)–(i), (c)–(iv), (d)–(ii) (4) (a)–(i), (b)–(iii), (c)–(iv), (d)–(ii)

Ans. (2)

Sol. Flying fish – Exocoetus
Flying lizard – Draco
Egg laying mammal – Echidna
Flightless bird – Struthio

4. Which one of the following statements about cell organelles and their function is correct?
(1) Mitochondria are associated with anaerobic respiration.
(2) Smooth endoplasmic reticulum is involved in protein synthesis.
(3) Lysosomes are important in membrane biogenesis.
(4) Golgi bodies are involved in packaging and dispatching of materials.

Ans. (4)

Sol. Golgi body is involved in packaging and dispatching of materials.

5. A leguminous plant grown in an autoclaved, sterilized soil fails to produce root nodules because–
(1) autoclaved soil is not good for root growth. (2) autoclaved soil is devoid of bacteria.
(3) autoclaving reduces N_2 content of soil. (4) plants cannot form root hairs in such a soil.

Ans. (2)

Sol. When soil is autoclaved and sterilized, it leads to death of microorganisms (rhizobium bacteria). When leguminous plant is grown in this soil it fail to produce nodules due to absence of rhizobium bacteria.

6. The causative agent of the disease ‘sleeping sickness’ in human beings is an
(1) intracellular parasite found in RBC (2) extracellular parasite found in blood plasma.
(3) intracellular parasite found in WBC. (4) extracellular parasite found on the surface of platelets

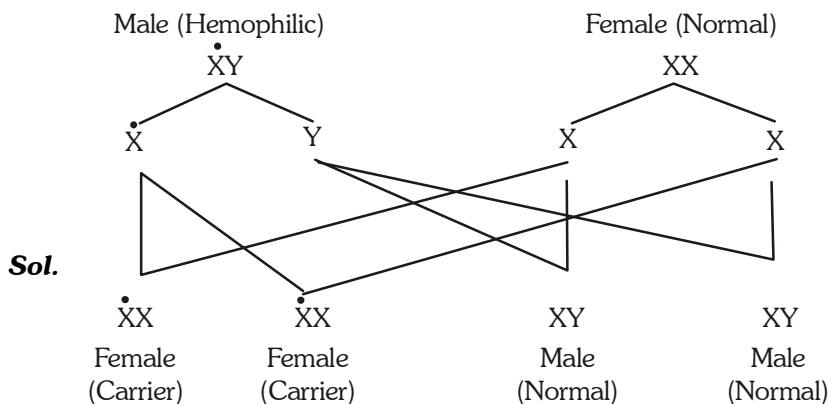
Ans. (2)

Sol. Causative agent of the disease “sleeping sickness” in human being is a protozoan, Trypanosoma specie which is an extracellular parasite found in blood plasma.

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7. The gene of hemophilia is present on X chromosome. If a hemophilic male marries a normal female, the probability of their son being hemophilic is
 (1) nil (2) 25% (3) 50% (4) 100%

Ans. (1)



8. Abundance of coliform bacteria in a water body is indicative of pollution from
 (1) petroleum refinery (2) metal smelter
 (3) fertilizer factory (4) domestic sewage

Ans. (4)

Sol. Domestic sewage contains faecal matter, having coliform bacteria (eg. *E. coli*). If a water body is having coliform bacteria, it is indication of pollution from domestic sewage.

9. Prolonged exposure to the fumes released by incomplete combustion of coal may cause death of a human because of—
 (1) inhalation of unburnt carbon particles (2) continuous exposure to high temperature
 (3) increased level of carbon monoxide (4) increased level of carbon dioxide

Ans. (3)

Sol. Incomplete combustion of coal produces carbon monoxide which is highly toxic and cause death of human.

10. The phenomenon of normal breathing in a human being comprises
 (1) an active inspiratory and a passive expiratory phase
 (2) a passive inspiratory and an active expiratory phase
 (3) both active inspiratory and expiratory phases
 (4) both passive inspiratory and expiratory phases

Ans. (1)

Sol. Inspiration during breathing is done by contraction of muscles of ribs and diaphragm, so it is a active process. While during expiration or exhalation muscles of ribs and diaphragm relaxes. So it is passive process.

11. Which one of the following statements is true with respect to photosynthesis?
 (1) Oxygen evolved during photosynthesis comes from CO_2 .
 (2) Chlorophyll a is the only photosynthetic pigment in plants.
 (3) Photosynthesis occurs in stem of some plants.
 (4) Photosynthesis does not occur in red light.

Ans. (3)

Sol. Stems of some plants adapted for photosynthesis having chlorophyll in their cells.

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- 12.** The girth of stem increases due to the activity of
 (1) lateral meristem (2) apical meristem
 (3) intercalary meristem (4) apical and intercalary meristem

Ans. (1)

Sol. Girth / diameter of plants stem increases due to activity of lateral meristem.

- 13.** Which one of the following represents the correct sequence of reflex action?
 (1) Receptor → Sensory nerve → motor nerve → spinal cord → muscle
 (2) Receptor → motor nerve → spinal cord → sensory nerve → muscle
 (3) Receptor → sensory nerve → spinal cord → muscle → motor nerve
 (4) Receptor → sensory nerve → spinal cord → motor nerve → muscle

Ans. (4)

Sol. Correct sequence of path of reflex action is.

Receptor → sensory nerve → spinal cord → motor nerve → muscle or effector.

- 14.** In human female, immature eggs are for the first time seen in ovary
 (1) at puberty (2) before birth, at the fetus stage
 (3) during the first menstrual cycle (4) after the first year of birth

Ans. (2)

Sol. In human female, egg development starts at fetus stage. So immature eggs are first seen in ovary before birth at foetus stage.

- 15.** What happens when a fixed amount of oxygen gas is taken in a cylinder and compressed at constant temperature?
 (a) Number of collisions of oxygen molecules at per unit area of the wall of the cylinder increase.
 (b) Oxygen (O₂) gets converted into ozone (O₃).
 (c) Kinetic energy of the molecules of oxygen gas increases.
 (1) a and c (2) b and c (3) c only (4) a only

Ans. (4)

Sol. With the increase in pressure the number of collision increases as their is decrease in volume (at constant temp.)

- 16.** The solubility of a substance S in water is 28.6% (mass by volume) at 50°C. When 50 mL of its saturated solution at 50°C is cooled to 40°C, 2.4 g of solid S separates out. The solubility of S in water at 40°C (mass by volume) is:
 (1) 2.4% (2) 11.9% (3) 26.2% (4) 23.8%

Ans. (4)

Sol. 100 ml of solution contains — 28.6 g of solute

50 ml of solution contains — 14.3 g of solute

& 2.4 g solute separates when the solution is cooled from 50° to 40°C.

So, solute left in solution = 11.9 g (14.3 – 2.4) in 50 ml

$$\text{So, } \frac{m}{V} \% = \frac{11.9}{50} \times 100 = 23.8\%$$

- 17.** What mass of CO₂ will be formed when 6 g of carbon is burnt in 32 g of oxygen?
 (1) 38 g (2) 12 g (3) 26 g (4) 22 g

Ans. (4)

Sol. C + O₂ → CO₂

so, molar ratio is 1 : 1 : 1 and $\frac{1}{2}$ mole $\left(\frac{6}{12}\right)$ of carbon is given,

so CO₂ formed will also be $\frac{1}{2}$ mole and mass will be 22 g.

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18. The law of conservation of mass is valid for which of the following ?

(a) Reactions involving oxidation.

(b) Nuclear reactions.

(c) Endothermic reactions.

(1) a and c

(2) a and b

(3) b and c

(4) b only

Ans. (1)

Sol. Reactions involving oxidation and Endothermic reactions involves only change in energy, keeping the mass constant. Thus following the law of mass conservation.

19. How many sub-atomic particles are present in an α -particles used in Rutherford's scattering experiment ?

No. of Protons No. of Neutrons No. of Electrons

(1) 4 0 0

(2) 2 0 2

(3) 2 2 0

(4) 2 2 1

Ans. (3)

Sol. α -particles is Helium nucleus (He^{2+})

so, no. of protons = 2

no. of electrons = 0

no. of neutrons = 2

20. A certain sample of element Z contains 60% of ^{69}Z and 40% ^{71}Z . What is the relative atomic mass of element Z in this sample ?

(1) 69.2

(2) 69.8

(3) 70.0

(4) 70.2

Ans. (2)

Sol. Average atomic mass = $\frac{\% \text{ of first isotope} \times \text{mass of first isotope} + \% \text{ of second isotope} \times \text{mass of second isotope}}{100}$

$$\frac{60 \times 69 + 40 \times 71}{100} = 69.8 = \text{avg. atomic mass}$$

21. Compound A on strong heating in a boiling tube gives off reddish brown fumes and a yellow residue with a few drops of sodium hydroxide solution, a white precipitate appeared. Identify the cation and anion present in the compound A.

(1) Copper (II) and nitrate

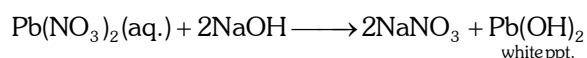
(2) Lead (II) and chloride

(3) Zinc and sulphate

(4) Lead (II) and nitrate

Ans. (4)

Sol. Compound A is Lead (II) Nitrate.



so, the ions are Lead (II) and Nitrate.

22. A substance A reacts with another substance B to produce the product C and a gas D. If a mixture of the gas D and ammonia is passed through an aqueous solution of C, baking soda is formed. The substances A and B are

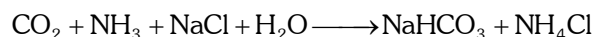
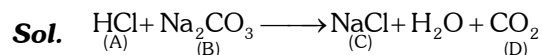
(1) HCl and NaOH

(2) HCl and Na_2CO_3

(3) Na and HCl

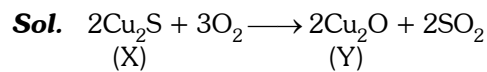
(4) Na_2CO_3 and H_2O

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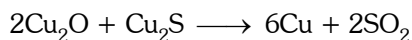
Ans. (2)

23. A metal occurs in nature as its ore X which on heating in air converts to Y. Y reacts with unreacted X to give the metal. The metal is

- (1) Hg (2) Cu (3) Zn (4) Fe

Ans. (2)

Copper Cuprous
glance oxide



24. Assertion (A) : Nitrate ores are rarely available.

Reason (R) : Bond dissociation energy of nitrogen is very high.

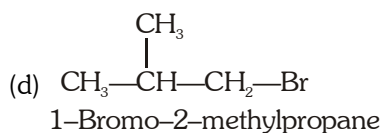
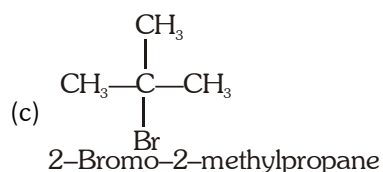
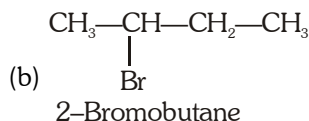
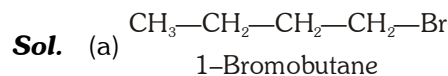
- (1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are correct but R is not the correct explanation of A.
(3) A is correct and R is false.
(4) Both A and R are false.

Ans. (1)

Sol. The bond dissociation energy of N_2 is high because of the presence of triple bond which requires high amount of energy to get broken.

25. The number of structural isomers of the compound having molecular formula $\text{C}_4\text{H}_9\text{Br}$ is

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

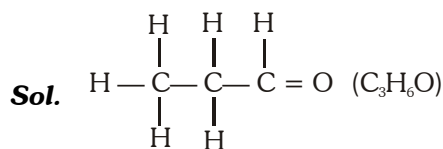
Ans. (3)

26. The total number of electrons and the number of electrons involved in the formation of various bonds present in one molecule of propanal ($\text{C}_2\text{H}_5\text{CHO}$) are respectively.

- (1) 32 and 20 (2) 24 and 20 (3) 24 and 18 (4) 32 and 18

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Ans. (1)



Total no. of electrons are $3 \times 6 + 6 \times 1 + 1 \times 8 = 32$

Total no. of bonds are 10 and each bond contains $2e^-$

SO total e^- involved in bonding = $10 \times 2 = 20$

27. Consider following as a portion of the periodic table from Group No. 13 to 17. Which of the following statement/s is/are true about the elements shown in it ?

- (I) V, W, Y and Z are less electropositive than X.
 (II) V, W, X and Y are more electronegative than Z.
 (III) Atomic size of Y is greater than that of W.
 (IV) Atomic size of W is smaller than that of X.

			V	Z
W				Y
X				

(1) I, II and III

(2) II and III

(3) I and IV

(4) III and IV

Ans. (3)

Sol. W = Al, X = In, V = O, Z = F, Y = Cl

- (I) Down the group electropositivity increases and along the period from left to right electropositive character decreases. So X is most electropositive.
 (II) Z = Fluorine is the most electronegative element.
 (III) Along a period (left to right) size decreases because of increase in nuclear charge. So $W > Y$ (atomic size).
 (IV) Down the group size increases as the no. of shell increases. So $W < X$.

28. A man running with a uniform speed 'u' on a straight road observes a stationary bus at a distance 'd' ahead of him. At that instant, the bus starts with an acceleration 'a'. The condition that he would be able to catch the bus is :

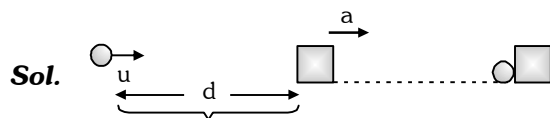
(1) $d \leq \frac{u^2}{a}$

(2) $d \leq \frac{u^2}{2a}$

(3) $d \leq \frac{u^2}{3a}$

(4) $d \leq \frac{u^2}{4a}$

Ans. (2)



Velocity of bus after 't' time

$$v = at$$

Velocity of bus should be less than the velocity of man when they meet

$$u > at$$

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$$t < \frac{u}{a}$$

distance travelled by bus = distance by man

$$d + \frac{1}{2}at^2 = ut$$

$$t \leq \frac{u}{a}$$

$$d = ut - \frac{1}{2}at^2$$

$$d \leq u \times \frac{u}{a} - \frac{1}{2} \times \frac{u^2}{a^2}$$

$$d \leq \frac{u^2}{a} - \frac{u^2}{2a}$$

$$d \leq \frac{u^2}{2a}$$

- 29.** A ball is thrown vertically upwards with a given velocity 'v' such that it rises for T seconds ($T > 1$). What is the distance traversed by the ball during the last one second of ascent (in meters) ? (Acceleration due to gravity is $g \text{ m/s}^2$).

(1) $\frac{1}{2}gT^2$

(2) $vT + \frac{1}{2}g[T^2 - (T-1)^2]$

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

(4) $\frac{1}{2}g[T^2 - (T-1)^2]$

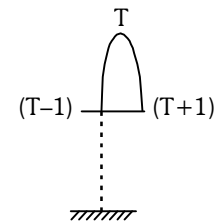
Ans. (3)

Sol. Distance travelled in last one second of ascent is equal to the distance travelled in first one second of descent.

Distance travelled in one second of descent

$$S = \frac{1}{2} \times g(1)^2 = \frac{g}{2}$$

Distance travelled in last second = $\frac{g}{2}$



- 30.** The radius of a planet A is twice that of planet B. The average density of the material of planet A is thrice that of planet B. The ratio between the values of acceleration due to gravity on the surface of planet A and that on the surface of planet B is :

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

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

(3) $\frac{4}{3}$

(4) 6

Ans. (4)

Sol. $r_A = 2r_B$
 $d_A = 3d_B$

$$a_A = \frac{GM}{r_A^2} = \frac{Gd_A \times \frac{4}{3}\pi r_A^3}{r_A^2} = Gd_A \frac{4}{3}\pi r_A$$

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$$a_B = \frac{GM}{r_B^2} = \frac{Gd_B \times \frac{4}{3} \pi r_B^3}{r_B^2} = Gd_B \frac{4}{3} \pi r_B$$

$$\frac{a_A}{a_B} = \frac{Gd_A \times \frac{4}{3} \pi r_A}{Gd_B \times \frac{4}{3} \pi r_B} = \frac{d_A}{d_B} \times \frac{r_A}{r_B}$$

$$\frac{a_A}{a_B} = 3 \times 2 \Rightarrow \frac{a_A}{a_B} = 6$$

- 31.** A small spherical ball of mass 'm' is used as the bob of a pendulum. The work done by the force of tension on its displacement is W_1 . The same ball is made to roll on a frictionless table. The work done by the force of normal reaction is W_2 . Again the same ball is given a positive charge 'g' and made to travel with a velocity v in a magnetic field B. The work done by the force experienced by the charged ball is W_3 . If the displacements in each case are the same, we have

(1) $W_1 < W_2 < W_3$

(2) $W_1 > W_2 > W_3$

(3) $W_1 = W_2 = W_3$

(4) that W_1, W_2, W_3 cannot be related by any equation

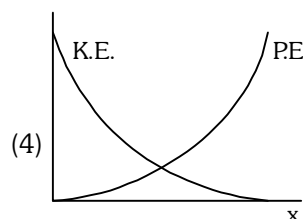
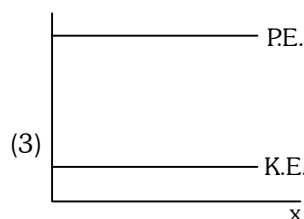
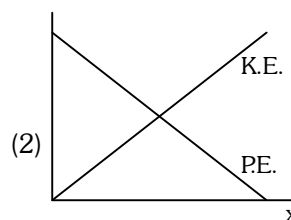
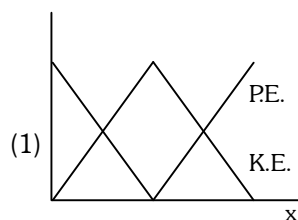
Ans. (3)

Sol. In all the 3 cases force is perpendicular to displacement so work done = 0

So all the forces are equal

$$W_1 = W_2 = W_3$$

- 32.** The variation in the kinetic energy (K.E.) and the potential energy (P.E.) of a particle moving along the x-axis are shown in the graphs below. Which one of the following graphs violates the law of conservation of energy?



Ans. (4)

Sol. For the conservation of energy at all position $K.E. + P.E. = \text{constant}$ in fourth graph rate of decrease of K.E. is not equal to rate of increase of P.E. So it violates the law of conservation.

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- 33.** The disc of a siren containing 60 holes rotates at a constant speed of 360 rotations per minute. The emitted sound is in unison with a tuning fork of frequency :
- (1) 270 Hz (2) 360 Hz (3) 480 Hz (4) 540 Hz

Ans. (2)

Sol. Number of holes in the disk determines the number of waves produced on each rotation. The total no. of waves (or puffs) per second determines the frequency of the sound.

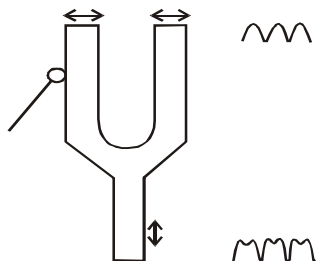
So frequency = 360 Hz

- 34.** A tuning fork is excited by striking it with a padded hammer. What would be the nature of the vibrations executed by the prongs as well as the stem of the fork respectively? (The reference direction is that of the propagation of the sound wave.)

- (1) Both vibrate longitudinally
 (2) Both vibrate transversely
 (3) The prongs vibrate longitudinally whereas the stem vibrates transversely
 (4) The prong vibrate transversely whereas the stem vibrates longitudinally

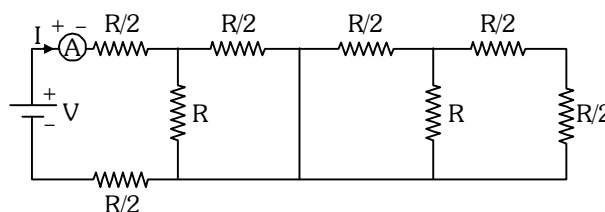
Ans. (3)

Sol.



The prongs vibrate longitudinally whereas the stem vibrates transversely from reference direction of propagation of the sound wave.

- 35.** Find the reading of the ammeter in the circuit given below:



- (1) $\frac{V}{2R}$ (2) $\frac{3V}{4R}$ (3) $\frac{2V}{7R}$ (4) $\frac{11V}{R}$

Ans. (2)

Sol. At point a and b circuit is short circuited.

$$\text{So } R_{\text{eq}} = \frac{R}{2} + R \parallel \left(\frac{R}{2} + \frac{R}{2} \right)$$

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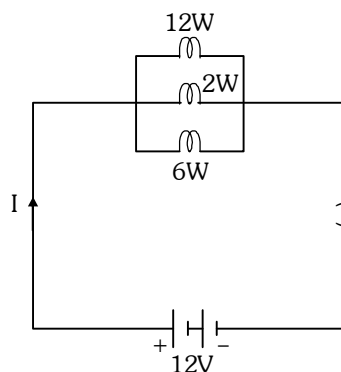
$$= \frac{R}{2} + \frac{R \times \frac{R}{2}}{R + \frac{R}{2}} + \frac{R}{2}$$

$$= R + \frac{\frac{R^2}{2}}{\frac{3R}{2}} = R + \frac{R}{3} = \frac{4R}{3}$$

$$= R + \frac{\frac{R}{2}}{\frac{3R}{2}} = R + \frac{R}{3} = \frac{4R}{3}$$

$$I = \frac{V}{R_{eq}} = \frac{V}{\frac{4R}{3}} = \frac{3V}{4R}$$

- 36.** Three bulbs with individual power ratings of 12W, 2W and 6W respectively are connected as per the circuit diagram below. Find the amount of heat dissipated by each in 10 seconds.



- (1) 8J, 1.33J, 4J (2) 120J, 20J, 60J (3) 10J, 0.277J, 2.5J (4) 12J, 1.66J, 5J

Ans. (2)

Sol. Heat dissipated by each bulb in 10 seconds

$$H = P \times t$$

$$H_1 = 12W \times 10 \text{ sec.} = 120J$$

$$H_2 = 2W \times 10 \text{ sec.} = 20J$$

$$H_3 = 6W \times 10 \text{ sec.} = 60J$$

- 37.** Which of the following can produce a magnetic field ?

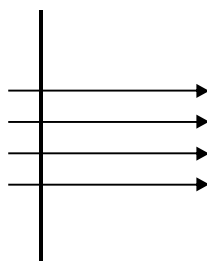
- (1) Electric charges at rest (2) Electric charges in motion
(3) Only by permanent magnets (4) Electric charges whether at rest or in motion

Ans. (2)

Sol. Magnetic field is produced by moving charge.

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- 38.** A wire is lying horizontally in the north-south direction and there is a horizontal magnetic field pointing towards the east. Some positive charges in the wire move north and an equal number of negative charges move south. The direction of force on the wire will be :



- (1) east (2) down, into the page (3) up, out of the page (4) west

Ans. (2)

Sol. By using Fleming's left hand rule direction of force is down, into the page.

- 39.** Match the following :

<i>Phenomenon</i>	<i>Reason</i>
(i) Rainbow	A. Scattering of light
(ii) Twinkling of stars	B. Dispersion of light
(iii) Blue colour of sky	C. Fluctuation of the refraction index in atmosphere layers
(iv) Advancement of sunrise and delay of sunset	D. Refraction of light

(1) (i)-B, (ii)-D, (iii)-A, (iv)-C

(2) (i)-B, (ii)-C, (iii)-A, (iv)-D

(3) (i)-B, (ii)-A, (iii)-C, (iv)-D

(4) (i)-D, (ii)-B, (iii)-A, (iv)-C

Ans. (2)

Sol. Rainbow → Dispersion of light
Twinkling → Fluctuation of the refractive index
Blue colour of sky → Scattering of light
Advancement of sunrise and delay sunset → Refraction of light

- 40.** A person is suffering from both near sightedness and far sightedness. His spectacles would be made of
- two convex lenses with the upper lens having a larger focal length than the lower lens.
 - two concave lenses with the upper lens having a smaller focal length than the lower lens.
 - a concave lens as the upper lens and a convex lens as the lower lens
 - a convex lens as the upper lens and a concave lens as the lower lens

Ans. (1)

Sol. Upper part of spectacles used for viewing long distance object so concave lens is used while lower part is used for reading books so convex lens is used.

- 41.** LCM of two numbers x and y is 720 and the LCM of numbers 12x and 5y is also 720. The number y is
- (1) 180 (2) 144 (3) 120 (4) 90

Ans. (2)

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2
SCHOLASTIC APTITUDE TEST (SAT)

Sol. $12x = 2^2 \times 3^1 \times x$

$5y = 5 \times y$

$720 = 2^4 \times 3^2 \times 5^1$

i.e. y is not a multiple of 5.

Clearly y is 144.

42. When a natural number x is divided by 5, the remainder is 2. When a natural number y is divided by 5, the remainder is 4. The remainder is z when x + y is divided by 5. The value of $\frac{2z-5}{3}$ is

(1) -1

(2) 1

(3) -2

(4) 2

Ans. (1)

Sol. $x = 5m + 2$

$y = 5n + 4$

$\therefore x + y = 5(m + n) + 6$

$= 5(m + n + 1) + 1$

But given that when x + y is divided by 5 remainder is z

$\therefore z = 1$

Now, $\frac{2z-5}{3} = \frac{2 \times 1 - 5}{3} = -1$

43. If the zeroes of the polynomial $64x^3 - 144x^2 + 92x - 15$ are in A.P, then the difference between the largest and the smallest zeroes of the polynomial is

(1) 1

(2) $\frac{7}{8}$

(3) $\frac{3}{4}$

(4) $\frac{1}{2}$

Ans. (1)

Sol. Let zeroes are

$a - d, a, a + d.$

so $3a = \frac{144}{64} \Rightarrow a = \frac{48}{64} = \frac{3}{4}$

$a(a^2 - d^2) = \frac{15}{64}$

$\frac{3}{4} \left(\frac{9}{16} - d^2 \right) = \frac{15}{64}$

$\frac{9}{16} - d^2 = \frac{5}{16}$

$d^2 = \frac{4}{16} \Rightarrow d = \pm \frac{1}{2}$

So zeroes are

$\frac{3}{4} - \frac{1}{2}, \frac{3}{4}, \frac{3}{4} + \frac{1}{2}$

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SCHOLASTIC APTITUDE TEST (SAT)

$$\Rightarrow \frac{1}{4}, \frac{3}{4}, \frac{5}{4}$$

$$\text{difference } \frac{5}{4} - \frac{1}{4} = \frac{4}{4} = 1$$

44. x and y are two non-negative numbers such that $2x + y = 10$. The sum of the maximum and minimum values of $(x + y)$ is

(1) 6

(2) 9

(3) 10

(4) 15

Ans. (4)**Sol.** $2x + y = 10$

So, $2x + y + y = 10 + y$

$2(x + y) = 10 + y$

$$x + y = 5 + \frac{y}{2}$$

So, $(x + y)_{\max}$ when y is maximum & maximum value of y will be 10.

So $(x + y)_{\max} = 5 + 5 = 10$

& $(x + y)_{\min}$ when $y = 0$

$(x + y)_{\min} = 5$

So, sum of $(x + y)_{\max}$ & $(x + y)_{\min} = 15$

45. The number of integral solutions of the equation $7\left(y + \frac{1}{y}\right) - 2\left(y^2 + \frac{1}{y^2}\right) = 9$ is

(1) 0

(2) 1

(3) 2

(4) 3

Ans. (2)

$$\text{Sol. } 7\left(y + \frac{1}{y}\right) - 2\left(y^2 + \frac{1}{y^2}\right) - 9 = 0$$

$$7\left(y + \frac{1}{y}\right) - 2\left(y + \frac{1}{y}\right)^2 + 4 - 9 = 0$$

$$2\left(y + \frac{1}{y}\right)^2 - 7\left(y + \frac{1}{y}\right) + 5 = 0$$

Let $y + \frac{1}{y} = a$

$\Rightarrow 2a^2 - 7a + 5 = 0$

$\Rightarrow 2a^2 - 5a - 2a + 5 = 0$

$\Rightarrow a(2a - 5) - 1(2a - 5) = 0$

$\Rightarrow (2a - 5)(a - 1) = 0$

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i.e. $a = \frac{5}{2}, a = 1$

Now, $y + \frac{1}{y} = \frac{5}{2}$

$$2y^2 - 5y + 2 = 0$$

$$2y^2 - 4y - y + 2 = 0$$

$$2y(y - 2) - 1(y - 2) = 0$$

$$(y - 2)(2y - 1) = 0$$

$$y = 2, y = \frac{1}{2}$$

So $y = 2$ is only integral solution

$$y + \frac{1}{y} = 1$$

$$y^2 - y + 1 = 0$$

$$y = \frac{1 \pm \sqrt{1 - 4 \times 1 \times 1}}{2 \times 1}$$

y is unreal.

- 46.** A circle with area $A \text{ cm}^2$ is contained in the interior of a larger circle with area $(A + B) \text{ cm}^2$ and the radius of the larger circle is 4 cm. If $A, B, A+B$ are in arithmetic progression, then the diameter (in cm) of the smaller circle is

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

(2) $\frac{4\sqrt{3}}{3}$

(3) $\frac{8\sqrt{3}}{3}$

(4) $2\sqrt{3}$

Ans. (3)

Sol. Let the radius of the smaller circle is r

$$\therefore A = \pi r^2$$

$$A + B = 16\pi \Rightarrow B = 16\pi - \pi r^2$$

Given that $A, B, A+B$ are in A.P.

$$(A) + (A + B) = 2B$$

$$\Rightarrow B = 2A$$

$$\Rightarrow 16\pi - \pi r^2 = 2\pi r^2$$

$$\Rightarrow r^2 = \frac{16}{3}$$

$$\Rightarrow r = \frac{4\sqrt{3}}{3} \Rightarrow D = \frac{8\sqrt{3}}{3}$$

- 47.** Each of the sides of a triangle is 8 cm less than the sum of its other two sides. Area of the triangle (in cm^2) is

(1) 8

(2) $8\sqrt{3}$

(3) 16

(4) $16\sqrt{3}$

Ans. (4)

Sol. Given that the sides are x, y, z

$$x + y - 8 = z$$

$$y + z - 8 = x$$

$$x + z - 8 = y$$

solving equation $x = y = z = 8$

$$\text{Area} = \frac{\sqrt{3}}{4} \times 8^2 = 16\sqrt{3}$$

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SCHOLASTIC APTITUDE TEST (SAT)

48. If $\operatorname{cosec} x - \cot x = \frac{1}{3}$, where $x \neq 0$, then the value of $\cos^2 x - \sin^2 x$ is

- (1) $\frac{16}{25}$ (2) $\frac{9}{25}$ (3) $\frac{8}{25}$ (4) $\frac{7}{25}$

Ans. (4)

Sol. $\operatorname{cosec} x - \cot x = \frac{1}{3}$

$\therefore \operatorname{cosec} x + \cot x = 3$

Solving $\operatorname{cosec} x = \frac{10}{6}$

$\sin x = \frac{3}{5}$

$\Rightarrow \cos x = \frac{4}{5}$

$\therefore \cos^2 x - \sin^2 x = \frac{7}{25}$

49. A sector with acute central angle θ is cut from a circle of diameter 14 cm. The area (in cm^2) of the circle circumscribing the sector is

- (1) $\frac{22}{7} \sec^2 \frac{\theta}{2}$ (2) $\frac{77}{2} \sec^2 \theta$
(3) $\frac{7}{2} \cos^2 \frac{\theta}{2}$ (4) $\frac{77}{2} \sec^2 \frac{\theta}{2}$

Ans. (4)

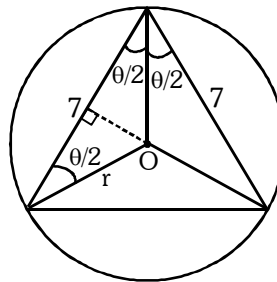
Sol. Now $\cos \frac{\theta}{2} = \frac{7}{2 \times r}$

$r = \frac{7}{2} \sec \frac{\theta}{2}$

Area of circle = πr^2

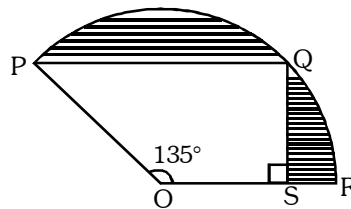
$= \frac{22}{7} \times \frac{49}{4} \times \sec^2 \frac{\theta}{2}$

$= \frac{77}{2} \sec^2 \frac{\theta}{2}$



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SCHOLASTIC APTITUDE TEST (SAT)

- 50.** In the figure, PQSO is a trapezium in which $PQ \parallel OS$, $\angle POS = 135^\circ$ and $\angle OSQ = 90^\circ$. Points P, Q and R lie on a circle with centre O and radius 12 cm. The area of the shaded part, in cm^2 , is



(1) $61\frac{2}{7}$

(2) $61\frac{5}{7}$

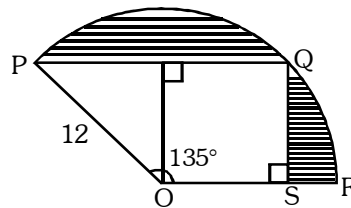
(3) $73\frac{5}{7}$

(4) $73\frac{2}{7}$

Ans. (2)**Sol.** $QS = OS = 6\sqrt{2}$ and $PQ = 12\sqrt{2}$

Area of shaded region

$$\begin{aligned} &= \frac{135^\circ}{360^\circ} \times \pi \times (12)^2 - \frac{1}{2} \times 18\sqrt{2} \times 6\sqrt{2} \\ &= \frac{3\pi \times 144}{8} - 108 \\ &= 61\frac{5}{7} \text{ cm}^2 \end{aligned}$$



- 51.** A solid sphere is cut into identical pieces by three mutually perpendicular planes passing through its centre. Increase in total surface area of all the pieces with respect to the total surface area of the original sphere is

(1) 250%

(2) 175%

(3) 150%

(4) 125%

Ans. (3)**Sol.** Three mutually perpendicular planes will cut sphere into eight identical pieces.

$$\text{Now one identical piece surface Area} = \frac{3}{4}\pi r^2 + \frac{\pi r^2}{2}$$

$$\text{Total new surface Area} = 8 \times \frac{5}{4}\pi r^2 = 10\pi r^2$$

$$\text{and original surface Area} = 4\pi r^2$$

$$\text{Ratio \%} = \frac{6\pi r^2}{4\pi r^2} \times 100\% = 150\%$$

- 52.** A right circular cylinder has its height equal to two times its radius. It is inscribed in a right circular cone having its diameter equal to 10 cm and height 12 cm, and the axes of both the cylinder and the cone coincide. Then, the volume (in cm^3) of the cylinder is approximately

(1) 107.5

(2) 118.6

(3) 127.5

(4) 128.7

Ans. (3)

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SCHOLASTIC APTITUDE TEST (SAT)

$$PC = \frac{2 \tan x}{1 + \tan x}$$

Now $PQ^2 = QC^2 + PC^2$

$$= (1 - \tan x)^2 + \frac{(2 \tan x)^2}{(1 + \tan x)^2}$$

$$PQ^2 = \frac{(1 - \tan^2 x)^2 + 4 \tan^2 x}{(1 + \tan x)^2} = \frac{(1 + \tan^2 x)^2}{(1 + \tan x)^2}$$

$$PQ = \frac{1 + \tan^2 x}{1 + \tan x}$$

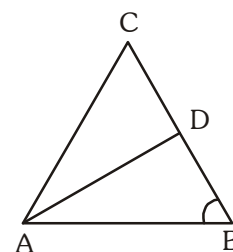
Now Perimeter = PQ + QC + PC

$$= \frac{1 + \tan^2 x}{1 + \tan x} + 1 - \tan x + \frac{2 \tan x}{1 + \tan x}$$

$$\Rightarrow \frac{1 + \tan^2 x + 1 - \tan^2 x + 2 \tan x}{1 + \tan x} = \frac{2 + 2 \tan x}{1 + \tan x} = 2$$

54. In the figure, ABC is a triangle in which AD bisects $\angle A$, $AC = BC$, $\angle B = 72^\circ$ and $CD = 1$ cm. Length of BD (in cm) is

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



Ans. (3)

Sol. i.e. $AD = 1$ cm. ($AD = CD$)
 $AB = AD \Rightarrow AB = 1$ cm.

Now $\frac{AC}{AB} = \frac{CD}{BD}$

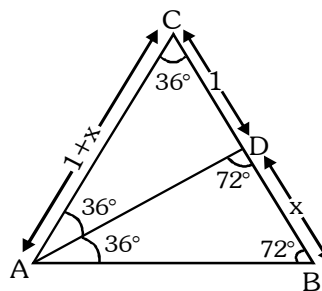
$$\Rightarrow \frac{1+x}{1} = \frac{1}{x}$$

$$\Rightarrow x + x^2 - 1 = 0$$

$$\Rightarrow x^2 + x - 1 = 0$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(1)(-1)}}{2} = \frac{-1 \pm \sqrt{5}}{2}$$

$$BD = \frac{\sqrt{5}-1}{2}$$

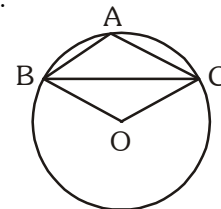


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SCHOLASTIC APTITUDE TEST (SAT)

55. In the figure, BC is a chord of the circle with centre O and A is a point on the minor arc BC.

Then, $\angle BAC - \angle OBC$ is equal to

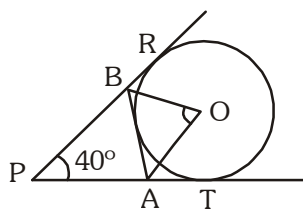
- (1) 30° (2) 60°
(3) 80° (4) 90°



Ans. (4)

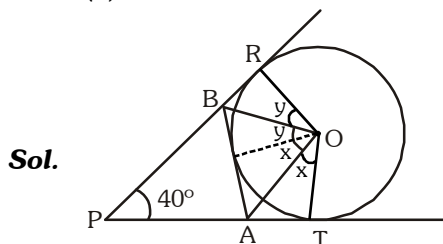
Sol. Let $\angle BOC = 2x$
then $\angle BAC = 180^\circ - x$
and $\angle OBC = 90^\circ - x$
Now $\angle BAC - \angle OBC = 180^\circ - x - 90^\circ + x$
 $= 90^\circ$

56. In the figure, $\triangle APB$ is formed by three tangents to the circle with centre O. If $\angle APB = 40^\circ$, then the measure of $\angle BOA$ is



- (1) 50° (2) 55° (3) 60° (4) 70°

Ans. (4)



Sol.

From figure $2x + 2y = 140^\circ$
 $\angle BOA = x + y = 70^\circ$

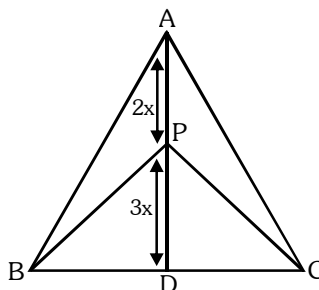
57. $(5, -10)$, $(-15, 15)$ and $(5, 5)$ are the coordinates of vertices A, B and C respectively of $\triangle ABC$ and P is a point on median AD such that $AP : PD = 2 : 3$. Ratio of the areas of the triangles PBC and ABC is

- (1) 2 : 3 (2) 3 : 4 (3) 3 : 5 (4) 4 : 5

Ans. (3)

Sol. $\frac{\Delta BPD}{\Delta BAD} = \frac{\Delta CPD}{\Delta CAD} = \frac{3}{5}$

i.e. $\frac{\Delta BPC}{\Delta BAC} = \frac{3}{5}$

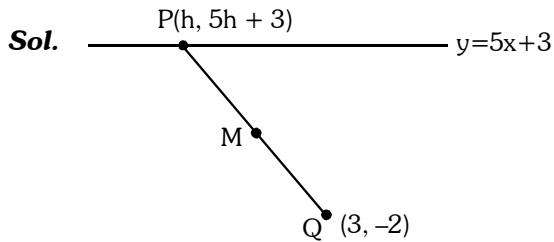


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SCHOLASTIC APTITUDE TEST (SAT)

58. P is a point on the graph of $y = 5x + 3$. The coordinates of a point Q are (3, -2). If M is the mid point of PQ, then M must lie on the line represented by

- (1) $y = 5x + 1$ (2) $y = 5x - 7$ (3) $y = \frac{5}{2}x - \frac{7}{2}$ (4) $y = \frac{5}{2}x + \frac{1}{2}$

Ans. (2)



i.e. M is $\left(\frac{3+h}{2}, \frac{5h+1}{2}\right)$

Clearly M must lie on the line
 $y = 5x - 7$

59. Three - digit numbers formed by using digits 0, 1, 2 and 5 (without repetition) are written on different slips with distinct number on each slip, and put in a bowl. One slip is drawn at random from the bowl. The probability that the slip bears a number divisible by 5 is

- (1) $\frac{5}{9}$ (2) $\frac{4}{9}$ (3) $\frac{2}{3}$ (4) $\frac{1}{3}$

Ans. (1)

Sol. Total three digit numbers are : $3 \times 3 \times 2 = 18$
Now numbers divisible by 5 are : $2 \times 3 \times 1 + 2 \times 2 \times 1 = 10$
So probability is $= \frac{10}{18} = \frac{5}{9}$

60. The mean of fifteen different natural numbers is 13. The maximum value for the second largest of these numbers is
(1) 46 (2) 51 (3) 52 (4) 53

Ans. (2)

Sol. $x_1 + x_2 + x_3 + \dots + x_{15} = 15 \times 13 = 195$
to set the second largest and largest first thirteen natural numbers are
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
So $x_{14} + x_{15} = 195 - \frac{13 \times 14}{2}$
Now, $x_{14} = 51$ and $x_{15} = 53$ i.e. 51.

61. Assertion (A) : During eighteenth century France witnessed the emergence of a middle class.

Reason (R) : The emergence of the middle class happened on account of royal patronage.

- (1) A is true, R is false.
(2) A is false, R is true.
(3) Both A and R are true but R is not the correct explanation of A.
(4) Both A and R are true and R is the correct explanation of A.

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SCHOLASTIC APTITUDE TEST (SAT)

Ans. (1)

Sol. The emergence of the middle class happened because industrial revolution.

62. Assertion (A) : The lives of pastoralists in India underwent dramatic changes under colonial rule.

Reason (R) : In most areas the lands regularly used by pastoralists for grazing were taken over by the colonial state and given to select individuals for cultivation.

- (1) A is true, R is false
(2) A is false, R is true
(3) Both A and R are true but R is not the correct explanation of A.
(4) Both A and R are true and R is the correct explanation of A.

Ans. (4)

Sol. In most areas the lands regularly used by pastoralists for grazing were taken over by the colonial state and given to select individuals for cultivation.

63. Assertion (A) : By the early twentieth century, America became the biggest supplier of wheat to Europe.

Reason (R) : The expansion of the railways during the period greatly facilitated the transport of grain.

- (1) A is true, R is false
(2) A is false, R is true
(3) Both A and R are true but R is not the correct explanation of A.
(4) Both A and R are true and R is the correct explanation of A.

Ans. (4)

Sol. The spread of railways made it easy to, transport the grain from the wheat growing regions to the eastern coast for export.

64. Match the following table and choose the correct response from the options given thereafter.

Column-I

- A. 1910
B. 1930
C. 1907
D. 1887

Column-II

- I. Establishment of Tonkin Free School.
II. Formation of French Indo-China.
III. Completion of the trans-Indo-China rail network.
IV. Formation of the Vietnamese Communist Party.

- (1) A-III, B-IV, C-I, D-II (2) A-IV, B-III, C-II, D-I (3) A-III, B-I, C-IV, D-I (4) A-IV, B-I, C-II, D-III

Ans. (1)

65. Arrange the following Indian novels in accordance with their year of writing/publication

- a. Indulekha
b. Rajasekhara Caritramu
c. Yamuna Paryatan
d. Pariksha-Guru

- (1) c, b, d, a (2) a, d, b, c (3) c, d, b, a (4) a, b, d, c

Ans. (1)

Sol. a. Indulekha published in → 1889
b. Rajasekhara Caritramu published in → 1878
c. Yamuna Paryatan published in → 1857
d. Pariksha-Guru published in → 1882

66. The main features of April Theses during the Bolshevik Revolution were :

- (1) Closing the war, shifting of banks, land pooling by government.
(2) Formation of labour government, bank nationalisation and land distribution.
(3) Communist government, land fragmentation and merger of banks.
(4) Ending the war, bank nationalisation and land transfer.

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SCHOLASTIC APTITUDE TEST (SAT)

Ans. (4)

Sol. april thesis were three demands of Lenin
(1) Land to be transferred to the Peasants
(2) Bank be Nationalised
(3) World war first be brought to close.

67. Mahatma Gandhdi changed his dressing style from Western to Indian over a period of time. Match thsoe changes as givne Column-I and Column-II and choose the correct response from the option given thereafter

	Column-I		Column-II
A	Suit	I.	1915
B	Lungi-Kurta	II.	1890
C	Peasant Dress	III.	1921
D	Short Dhoti	IV.	1913

(1) A-II, B-IV, C-I, D-III
(3) A-III, B-IV, C-I, D-II

(2) A-II, B-I, C-IV, D-III
(4) A-IV, B-III, C-I, D-II

Ans. (1)

Sol.

- When Gandhiji went to London to study law as a boy of 19 in 1888, he dressed in a western suit.
- In Durban in 1913, Gandhiji first appeared in a lungi and kurta.
- On his return to India in 1915 he decided to dress like Kathiawadi peasants.
- Only in 1921 he adopted short dhoti.

68. In late 19th and early 20th centuries, nationalism captured the imagination of the Indian people through a variety of cultural processes. Which of the following was not a part of those processes ?

- (1) Rewriting history to show India's continuous progress from the ancient to the modern times.
- (2) Creation of different images of Bharat Mata.
- (3) Recording, collection and publication of folk tales and folk songs.
- (4) Designing flags as inspiring symbols of nationalism.

Ans. (1)

69. Choose the correct response from the given options.

Nomadic people move over long distances because

- (1) By temperament they do not like to settle down in any one place.
- (2) They constantly look for good pastureland for their cattle.
- (3) They follow a life style which is very different from the settled communities.
- (4) Economically they are too poor to own land.

Ans. (2)

70. Choose the correct response from the given options.

In 19th century England grain production grew as quickly as the population because

- (1) Farmers used simple agricultural technology to greater effect.
- (2) Radical innovations were made in agricultural technology.
- (3) Larger and larger areas were brought under cultivation.
- (4) Increasing number of poor people found work as agricultural labourers.

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SCHOLASTIC APTITUDE TEST (SAT)

Ans. (3)

Sol. In 19th century England grain production. This increase in food production was made possible not by any radical innovations in agricultural technology, but by bringing newlands under cultivation. They turned larger and larger areas into agricultural fields.

71. Choose the correct response from the given options.

By the late 19th century Indians began searching for a national dress because they wanted to

- (1) Show that in terms of dress they were not inferior to the British.
- (2) Get rid of the blame of blindly aping the West.
- (3) Define the cultural identity of the nation.
- (4) Cultuarlly synthesize the traditions of the East and the West.

Ans. (3)

Sol. By the late 19th century Indians began searching for a national dress because they wanted to define the cultural identity of the nation.

72. Choose the correct response from the given options.

The unification of Germany in 1871, for a change, demonstrated.

- (1) The triumph of the democractic aspirations of the German middle class.
- (2) The fulfilment of the liberal initiative to nation–building.
- (3) The power of the common people, das volk.
- (4) The dominance of the state power and conservatives success in mobilising nationalist sentiments.

Ans. (4)

Sol. The unification of Germany in 1871, for a change, demonstrated the dominance of the state power and conservatives success in mobilising nationalist sentiments.

73. Choose the correct response from the given options.

The formation of the ‘United Kingdom of Great Britain’ in 1707 meant, in effect.

- (1) Equal representation of all the British Isles in the British Parliament.
- (2) Recognition to the ethnic identities of the Welsh, the Scot and the Irish.
- (3) The cessation of conflicts between the Catholics and the Protestants.
- (4) The dominance of England on Scotland through the English supremacy in Parliament.

Ans. (4)

Sol. The dominance of England on Scotland through the English supremacy in Parliament.

74. Choose the correct response from the given option.

Many within the congress wre initially opposed to the idea of non-cooperation because–

- (1) They did not think that British rule in Indian would collapse if Indians refused to cooperate.
- (2) They were not yet sure of Gandhiji’s ability to successfully lead a nationwide movement.
- (3) They were reluctant to boycott the council election scheduled for November 1920.
- (4) They did not agree with Gandhiji’s proposal to carry the movement forward in stages.

Ans. (3)

Sol. Many within the congress wre initially opposed to the idea of non-cooperation because they were reluctant to boycott the council election scheduled for November 1920.

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2 SCHOLASTIC APTITUDE TEST (SAT)

- 75.** Choose the correct response from the given options.
The main reason why the society of Revolutionary and Republican Women was set up during the French Revolution was because.
- (1) women wanted laws that would help improve their lives.
 - (2) Women wanted the same political rights as men.
 - (3) Women wanted their interests to be properly represented in the new government.
 - (4) Women wanted access to education, training for jobs, and wages on par with men.

Ans. (2)

Sol. The main reason why the society of Revolutionary and Republican Women was set up during the French Revolution was because they wanted the same political rights as men.

- 76. Assertion (A) :** The El Nino, a cold ocean current flows along the coast of Peru during Christmas.
Reason (R) : The presence of the El Nino leads to an increase in sea-surface temperatures and weakening of the trade winds in the region.
- (1) Both A and R are true and R explains. A.
 - (2) Both A and R are true but R does not explain A.
 - (3) A is true and R is false.
 - (4) A is false and R is true.

Ans. (4)

Sol. The El Nino, a warm ocean current flows along the coast of Peru during Christmas.

- 77. Assertion (A) :** Air temperature decreases from the equator towards the poles.
Reason (R) : As one move from the sea level to higher altitudes, the atmosphere becomes less dense and temperature decreases.
- (1) Both A and R are true and R explains. A.
 - (2) Both A and R are true but R does not explain A.
 - (3) A is true and R is false.
 - (4) A is false and R is true.

Ans. (2)

Sol. Air temperature decreases from the equator towards the poles because of varying insolation. Insolation is different at different areas because of inclination of earth from its vertical axis.

- 78.** Match List-I (local name of shifting cultivation) with List-II (States/Region) and select the correct answer using the code given below:

List-I (Local name of shifting)

- A. Dahiya
- B. Kumari
- C. Bringa
- D. Kuruwa

List-II (States/Region)

- I. Jharkhand
- II. Madhya Pradesh
- III. Odisha
- IV. Western Ghats

- (1) A-III, B-IV, C-II, D-I (2) A-II, B-IV, C-III, D-I (3) A-I, B-III, C-IV, D-II (4) A-I, B-IV, C-III, D-II

Ans. (2)

- 79. Assertion (A) :** Most nuclear power stations in India have been constructed near sources of water.
Reason (R) : Nuclear power stations require a great quantity of water cooling purposes.

- (1) Both A and R are true and R explains A.
- (2) Both A and R are true but R does not explain A.
- (3) A is true and R is false
- (4) A is false and R is true

Ans. (1)

Sol. Nuclear power stations require a great quantity of water cooling purposes.

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2 SCHOLASTIC APTITUDE TEST (SAT)

80. Assertion (A) : Peninsular rocks contain many reserves of coal, metallic minerals, mica and many other non-metallic minerals.

Reason (R) : Sedimentary rocks on the western and eastern flanks of the peninsula, in Gujarat and Assam have most of the ferrous minerals.

- (1) Both A and R are true and R explains A.
 (2) Both A and R are true but R does not explain A.
 (3) A is true and R is false
 (4) A is false and R is true

Ans. (3)

Sol. Ferrous minerals are found in igneous rocks.

81. Which one of the following states has common borders with the least number of countries ?

- (1) Uttarakhand (2) West Bengal (3) Arunachal Pradesh (4) Sikkim

Ans. (1)

82. Match List-I (Rivers) with List-II (National Waterways) and select the correct answer using the code given below:

List-I (Rivers)

- A. Ganga
 B. Brahmaputra
 C. Godavari and Krishan
 D. Mahanadi and Brahmani

List-II (National Waterways)

- I. National Waterway No. 4
 II. National Waterway No. 1
 III. National Waterway No. 5
 IV. National Waterway No. 2

- (1) A-I, B-II, C-III, D-IV (2) A-II, B-III, C-IV, D-I (3) A-IV, B-III, C-II, D-I (4) A-II, B-IV, C-I, D-III

Ans. (4)

83. Match List-I (Rivers) with List-II (Tributaries) and select the correct answer using the code given below:

List-I (Rivers)

- A. Godavari
 B. Ganga
 C. Krishna
 D. Brahmaputra

List-II (Tributaries)

- I. Lihit
 II. Koyana
 III. Wainganga
 IV. Son

- (1) A-II, B-III, C-IV, D-I (2) A-II, B-I, C-III, D-IV (3) A-III, B-IV, C-II, D-I (4) A-I, B-III, C-IV, D-II

Ans. (3)

84. Arrange these hills/ranges from north to south direction

- I. Zaskar Range
 II. Shiwalik Range
 III. Karakoram Range
 IV. Ladakh Range

- (1) II, IV, I, II (2) III, I, IV, II (3) I, II, III, IV (4) IV, III, I, II

Ans. (1)

85. Match List-I (Rivers) with List-II (Origin) and select the correct answer using the codes given below:

List-I (Rivers)		List-II (origin)	
A.	Godavari	I.	Cardamom Hills
B.	Krishna	II.	Amarkantak Hills
C.	Narmada	III.	Nasik Hills
D.	Vaigai	IV.	Mahabaleshwar

- (1) A-IV, B-III, C-I, D-II (2) A-III, B-IV, C-II, D-I (3) A-I, B-II, C-IV, D-III (4) A-II, B-I, C-III, D-IV

Ans. (2)

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2
SCHOLASTIC APTITUDE TEST (SAT)

86. Assertion (A) : In India, most migrations have been from rural to urban areas.

Reason (R) : The urban areas offer greater employment opportunities and better living conditions.

- (1) Both A and R are true and R explains A (2) Both A and R are true but R does not explain A
(3) A is true and R is false (4) A is true and R is false

Ans. (1)

Sol. Urban areas have more employment opportunities because of presence of industries and service sector units. Urban areas also have better living conditions because of the presence of numerous hospitals and educational institutions.

87. Arrange these hills from west to east direction

- A. Khasi hills B. Garo hills C. Naga hills D. Jaintia Range
(1) C, A, B, D (2) D, B, A, C (3) A, B, C, D (4) B, A, D, C

Ans. (4)

88. Assertion (A) : The Earth does not receive an equal amount of solar energy at all latitudes.

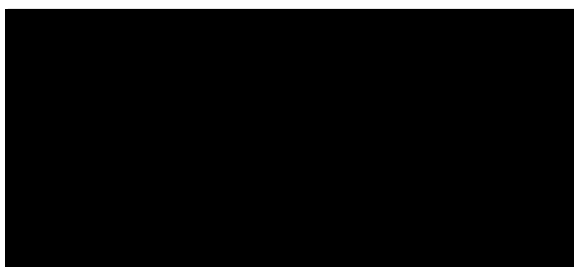
Reason (R) : As one goes from low altitude to high altitude temperature decreases because atmosphere becomes less dense.

- (1) Both A and R are true and R explains A (2) Both A and R are true but R does not explain A
(3) A is true and R is false (4) A is false and R is true

Ans. (2)

Sol. The Earth does not receive an equal amount of solar energy because of varied latitude, not because of altitude's position.

89. Match the vegetation zones in Column -I with the associated mean annual average temperature (in degree Celsius) in Column-II.



- (1) A-II, B-I, C-III, D-IV (2) A-II, B-III, C-IV, D-I (3) A-II, B-IV, C-III, D-I (4) A-IV, B-II, C-III, D-I

Ans. (1)

Sol.

Vegetation Zones	Mean annual Average Temp. (in degree C)	Mean Temp. in Jan. in degrees C	Remarks
Tropical	Above 24°C	Above 18°	No Frost
Sub-tropical	17°C to 24°C	10°C to 18°C	Frost is rare
Temperate	7°C to 17° C	-1°C to (-10) °C	Frost some snow
Alpine	Below 7°C	Below -1°C	Snow

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2

SCHOLASTIC APTITUDE TEST (SAT)

90. Match the given crops with their major producing areas shown on the map of India.



- A. Wheat
- B. Coffee
- C. Rice
- D. Tea

(1) A-I, B-IV, C-III, D-II (2) A-I, B-II, C-III, D-IV (3) A-III, B-II, C-I, D-IV (4) A-IV, B-III, C-I, D-II

Ans. (2)

- Sol.** (I) Himachal Pradesh, Uttarakhand and Uttar Pradesh are important for the production of wheat
 (II) Coffee cultivation is confined to the Nilgiri in Karnataka, Kerala and Tamil Nadu.
 (III) In states like West Bengal and Odisha, three crops of paddy are grown in a year.
 (IV) Major tea producing states are Assam and hills of Darjeeling

91. Which of the following statement/s is/are true about federal system ?

- a. All federations have a similar scheme of distribution of powers.
- b. The origins of different federations are dissimilar.
- c. Federalism promotes unity at the cost of diversity.
- d. Federalism promotes unity in diversity.

(1) Only b (2) a and c (3) b and d (4) a, b and c

Ans. (3)

Sol. The origins of different federations are dissimilar as it is decided by historical, cultural and political conditions of a country. Federalism promotes unity in diversity as it gives the chance to different communities to lead the government in their majority areas.

92. I do not contest elections, but I try to influence the political process. I have a specific policy agenda. I have no interest in seeking political power. Who am I ?

- (1) Bureaucracy (2) Court (3) Pressure group (4) Media

Ans. (3)

Sol. Pressure groups are organisations that attempt to influence government policies. But unlike political parties, pressure groups do not aim to directly control or share political power.

93. Which of the following statements/s is/are true?

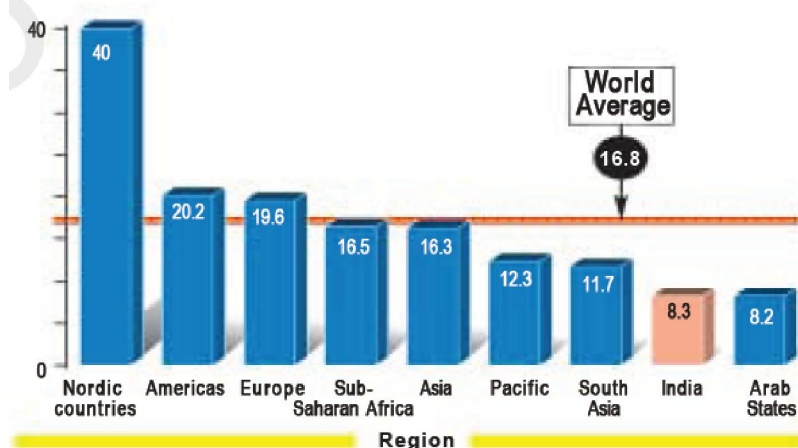
- a. India is among the bottom group of nations in the world when it comes to the representation of women in legislatures.
- b. Women in the Arab countries are most active in public life.
- c. India has lesser representation of women in legislatures as compared to Sub-Saharan Africa.
- d. The share of women in legislative assemblies in India is lower than that of their representation in Parliament.

(1) a and b (2) b and c (3) a, b and d (4) a, c and d

Ans. (4)

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2 SCHOLASTIC APTITUDE TEST (SAT)

Sol. Women in national parliaments in different regions of the world (in%)



Note: Figures are for the per cent of women in the directly elected chambers of parliament in 2006
Source: <http://www.ipu.org/wmn-e/world.htm>

94. Which of the following issues has been most successfully addressed by the Indian democracy?
(1) Social inequality (2) Economic inequality (3) Political inequality (4) Natural inequality

Ans. (3)

Sol. Political inequality has been most successfully addressed by the Indian democracy as every adult has got voting rights in India.

95. Match List I (Leaders) with List II (Political parties) and select the answer using the codes given below.

	List I		List II
I.	E.M.S. Namboodiripad	a.	Bahujan Samaj Party
II.	Sheikh Abdullah	b.	Telugu Desam
III.	N.T. Rama Rao	c.	Communist Party of India (Marxist)
IV.	Kanshi Ram	d.	Jammu & Kashmir National Conference

- | | | | |
|--------|-----|------|-----|
| (1) Ic | IId | IIIa | IVb |
| (2) Ib | IId | IIIc | IVa |
| (3) Ib | IId | IIIa | IVd |
| (4) Ic | IId | IIIb | IVa |

Ans. (4)

Sol. I. E.M.S. Namboodiripad was Chief minister of Kerala who belonged to Communist Party of India (Marxist).
II. Sheikh Abdullah was Chief minister of Jammu & Kashmir who belonged to Jammu & Kashmir National Conference.
III. N.T. Rama Rao belonged to Telugu Desam Party.
IV. Kanshi Ram was founder of Bahujan Samaj Party.

96. Economic growth is growth in

- | | |
|--------------------------------|--------------------------------|
| (1) value of total output | (2) value of total investment |
| (3) value of industrial output | (4) value added of all sectors |

NATIONAL TALENT SEARCH EXAMINATION 2015 Stage-2
SCHOLASTIC APTITUDE TEST (SAT)

Ans. (4)

Sol. G.D.P. is value of all final goods and services produced within the country.

97. Mahatma Gandhi National Rural Employment Guarantee Act aims at providing

- (1) employment to rural people in government offices.
- (2) 200 days of work/year in rural areas
- (3) 100 days of wage employment in a year to rural households
- (4) 365 days work in rural areas

Ans. (3)

Sol. Mahatma Gandhi National Rural Employment Guarantee Act aims at providing 100 days of wage employment in a year to rural households.

98. A landless worker in a village takes a king loan of two bags of rice from the village landlord. The condition is that she will repay the loan in two and half bags of rice at the end of one year. The interest paid equals

- (1) the difference between the money value of rice between now and at the end of the year.
- (2) 31.25 percent of the original amount of loan.
- (3) 25 percent of the original amount of loan.
- (4) the difference between the rates of interest charged by banks between now and at the end of the year.

Ans. (3)

Sol. Principal = 2 bags of Rice

$$\text{Amount} = 2\frac{1}{2} \text{ bags of Rice}$$

$$\text{Interest} = \text{Amount} - \text{Principal}$$

$$= \frac{1}{2} \text{ bags of Rice} = 25 \text{ percent of the original amount (two bags) of loan.}$$

99. Non-market activity is

- (1) a state of unemployment
- (2) producing for self consumption
- (3) selling the products nearby temples
- (4) selling the products through the Regulated Market

Ans. (2)

Sol. Self consumption is not a market activity.

100. A typical farmer's capital includes tractor, turbines, plough, seeds, fertilisers, pesticides and cash in hand. Which of these combinations can be classified as working capital?

- (1) Tractor, turbines and plough
- (2) Seeds, fertilisers, pesticides and cash in hand
- (3) Plough, seeds, fertilisers and pesticides
- (4) Plough, seeds, fertilisers, pesticides and cash in hand

Ans. (2)

Sol. Raw materials and money in hand are called **working capital**. Unlike tools, machines and buildings, these are used up in production.