SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

1. Suppose a mutant of a photosynthetic alga has dysfunctional mitochondria. It would affect its ability to perform
(1) glycolysis. (2) anaerobic respiration. (3) aerobic respiration. (4) photosynthesis.

Ans. ***(3)***

Sol. Mitochondria is site of cellular aerobic respiration.

2. Cow has a special stomach as compared to that of a lion in order to
(1) absorb food in better manner. (2) digest cellulose present in the food.
(3) assimilate food in a better way. (4) absorb large amount of water.

Ans. ***(2)***

Sol. Cow is dependent on fodder which is rich in cellulose. To digest cellulose special microbes are present in its stomach.

3. When touched, the leaflets of Touch-me-not plant are closed. Closing of leaflets starts from the point of contact to the leaflets away. The leaflets are closed due to
(1) change in turgor pressure. (2) specialized proteins.
(3) growth hormone retardation. (4) capillary action.

Ans. ***(1)***

Sol. Due to exit of water from the cell, turgor pressure changes and leaflets of this touch me not plant get closed.

4. Pancreas is composed of
(1) Only exocrine cells. (2) Only endocrine cells.
(3) Both endocrine and exocrine cells. (4) Nephrons.

Ans. ***(3)***

Sol. Pancreas is a Heterocrine gland which secretes hormones as well as digestive enzymes.

5. The human embryo gets nutrition from the mother blood with the help of a special organ called
(1) Zygote. (2) Ovary. (3) Oviduct. (4) Placenta.

Ans. ***(4)***

Sol. Placenta is connection between mother and foetus from which foetus receives nourishment from mother.

6. Hormones produced in one part of the organism reach the distantly located target via
(1) muscles. (2) bone. (3) cartilage. (4) blood.

Ans. ***(4)***

Sol. Hormones are directly poured in blood and transferred through it.

7. Which of the following are characteristic features of cells of meristematic tissue ?
(1) Actively dividing cells with dense cytoplasm, thick cell wall and prominent nuclei.
(2) Actively dividing cells with dense cytoplasm, thin cell wall and no vacuoles.
(3) Actively dividing cells with little cytoplasm, thin cell wall and prominent nuclei.
(4) Actively dividing cells with thin cytoplasm, thin cell wall and no vacuoles.

Ans. ***(2)***

Sol. Cells of meristematic tissue are metabolically more active so they divide rapidly they have dense cytoplasm, prominent nucleus and have thin cell wall. Vacuole is absent in it.

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8. Which one of the following animals is different from others in not having the paired gill pouches ?
(1) Whale. (2) Water snake. (3) Star fish. (4) Sea horse.

Ans. ***(1 and 2)***

Sol. Whale is mammal so it does not have gill pouches and respire through Lungs. Water snake is reptile which also respire through lungs.

9. In the symbiotic relationship between a bacterium and a root of legume the
(1) bacteria provide N_2 and the plant roots provide Carbon.
(2) roots provide NH_4 and bacteria provide Carbon.
(3) bacteria provide NH_4 and the roots provide Carbon.
(4) bacteria provide N_2 and the roots provide NH_4.

Ans. ***(3)***

Sol. Rhizobium bacterium provides NH_4 and receives Carbon for food from Legume roots.

10. Which of the following is a result of biological magnification ?
(1) Top level predators may be most harmed by toxic chemicals in environment.
(2) Increase in carbon dioxide.
(3) The green-house effect will be most significant at the poles.
(4) Energy is lost at each tropic level of a food chain.

Ans. ***(1)***

Sol. In biomagnification non degradable pesticides increases with each trophic level so top level predators are harmed most.

11. Which one of the following signifies *exsitu* conservation ?
(1) National parks and Biosphere reserves
(2) Wild animals in their natural habitats
(3) Inhabitants of natural ecosystems
(4) Conservation methods practiced in Zoo and Botanical garden

Ans. ***(4)***

Sol. In ex situ conservation wildlife is conserved in Botanical garden and zoo

12. What is the main reason for increase in temperature in a glass house ?
(1) Sunlight is completely absorbed by plants in the glass house.
(2) Radiation fails to escape from the glass house completely.
(3) Plants do not utilize sunlight in a glass house.
(4) Plants produce heat inside the glass house.

Ans. ***(2)***

Sol. Due to high CO_2 concentration and water vapours radiation fail to escape from greenhouse so temperature increases in the glass house. In this respect, atmosphere is working like the glass in a greenhouse, which is why this phenomenon is called greenhouse effect.

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13. Match the items in ***column I*** with those in ***column II***, and select the correct choice.

Column I	***Column II***
A. Small pox	I. Bacteria
B. Cholera	II. Virus
C. Malaria	III. Deficiency of minerals
D. Anaemia	IV. Female mosquito

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

Ans. ***(2)***

Sol. A. Small pox is caused by Virus
B. Cholera is caused by Bacteria
C. Malaria caused by Plasmodium, and transmitted by female anopheles mosquito.
D. Anaemia caused by Deficiency of minerals, specifically iron deficiency.

14. In the experiment conducted by mendel, RRyy (round, green) and rrYY (wrinkled, yellow) seeds of pea plant were used. In the F_2 generation 240 progeny were produced, out of which 15 progeny has specific characteristics. What were the characteristics ?

(1) Round and green. (2) Round and yellow. (3) Wrinkle and yellow. (4) Wrinkle and green.

Ans. ***(4)***

Sol. RRyy rrYY
Ry rY
RrYy ..... f_1 generation

In dihybrid cross phenotypic ratio is

Round yellow	:	Round Green	:	Wrinkle yellow	:	Wrinkled green
9		3		3		1

Minimum number of progeny is of wrinkled green plants.

15. Total number of neutrons in five moles of water molecule is:

(1) 3.011×10^{24} (2) 2.409×10^{25} (3) 3.111×10^{25} (4) 2.711×10^{25}

Ans. ***(2)***

Sol. In 1 mole water only O atom contains neutrons = 8
5 mole water contain neutrons $=8 \times 5 = 40$ mole
Total no. of neutrons $= 8 \times 5 \times 6.022 \times 10^{23}$
$= 2.409 \times 10^{25}$

16. The metal used to recover copper from aqueous solution of copper sulphate is

(1) Na (2) Ag (3) Hg (4) Fe

Ans. ***(4)***

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Sol. The metal used to recover Cu from copper sulphate is Fe as Fe is highly reactive than Cu. It can displace Cu from copper sulphate easily.

$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

Na can also displace Cu but Fe can displaced more easily as Fe can loose 2 electrons and they are easily gained by Cu^{2+}

17. Four substances were thoroughly mixed with water separately to obtain mixtures A, B, C and D. Some of their properties .are given below;

I. Path of a beam of light passing through it was visible in A, B and D but invisible in C.

II. On leaving undisturbed, the particles of the substance settle down in A but not in B, C and D.

III. The solute particles are visible to naked eye in A but invisible in B, C and D.

Which of the following is correct about A, B, C and D?

(1) A, B and D are colloids. C is a solution.
(2) A is a suspension, B and D are colloids. C is a solution.
(3) A is a colloid. B, C and D are solutions.
(4) A is a suspension. B, C and D are colloids.

Ans. ***(2)***

Sol. On leaving undisturbed the particles of substance A settle down ,so it is suspension.
Particles of C cannot be seen by naked eye so it is solution.

Rest B and D are colloids.

18. ***Assertion (A):*** Aluminium foil cannot be used in α-particle scattering experiment.

Reason (R): Aluminium is highly malleable metal.

(1) Both A and R are correct. R is the correct reason for A.
(2) Both A and R are correct but R is not the correct reason for A.
(3) A is correct and R is incorrect.
(4) A is incorrect and R is correct.

Ans. ***(2)***

Sol. Al foil cannot be used in alpha particle scattering experiment. Because Al is lighter than Au, so alpha particle may collapse and cannot rebound back.The assertion is correct and reason is also correct but not the correct explanation for assertion.

19. Magnesium ribbon is rubbed with sand paper before making it to burn. The reason of rubbing the ribbon is to

(1) remove moisture condensed over the surface of ribbon.
(2) generate heat due to exothermic reaction.
(3) remove magnesium oxide formed over the surface of magnesium.
(4) mix silicon from sand paper (silicon dioxide) with magnesium for lowering ignition temperature of the ribbon.

Ans. ***(3)***

Sol. To remove the magnesium oxide layer formed due to oxidation of Mg.

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20. The reaction that differs from the rest of the reactions given is

(1) formation of calcium oxide from limestone.

(2) formation of aluminium from aluminium oxide.

(3) formation of sodium carbonate from sodium hydrogen carbonate.

(4) formation of mercury from mercuric oxide.

Ans. (2)

Sol. Only decomposition of aluminium oxide is electrolytic . Rest all are thermal decomposition.

21. An element X reacts with dilute H_2SO_4 as well as with NaOH to produce salt and $H_2(g)$. Hence, it may be concluded that:

I. X is an electropositive element.

II. oxide of X is basic in nature.

III. oxide of X is acidic in nature.

IV. X is an electronegative element

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

Ans. (1)

Sol. Element X can react with both acid and base. And we know that only metallic oxides can be amphoteric .So non metallic oxides cannot react with acid as well as base.

22. An element X has electronic configuration 2, 8, 1 and another element Y has electronic configuration 2, 8, 7. They form a compound Z. The property that is not exhibited by Z is

(1) It has high melting point.

(2) It is a good conductor of electricity in its pure solid state.

(3) It breaks into pieces when beaten with hammer.

(4) It is soluble in water.

Ans. (2)

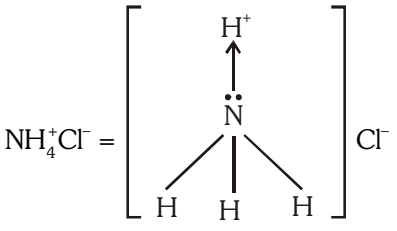
Sol. X and Y can form ionic compound, but ionic compounds conduct electricity only in fused and aqueous state not in solid crystalline state.

23. The compound containing both ionic and covalent bond is

(1) $AlBr_3$ (2) CaO (3) $MgCl_2$ (4) NH_4Cl

Ans. (4)

Sol. There are covalent bonds in ammonium ion and ionic bond between ammonium and chloride ion.



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24. The element that cannot be used as a reducing agent is

(1) carbon (2) aluminium (3) sulphur (4) sodium

Ans. (3)

Sol. Sulphur is a non metal which has tendency to gain electrons .

25. Somebody wanted to calculate the number of moles of oxygen atoms comprising of 9.033×10^{23} number of its atoms. The person further thought to calculate its mass and to find the number of moles of hydrogen atoms required to combine completely with this amount of oxygen to form water.

The number of moles of oxygen atoms, teir mass (in grams) and the number of moles of hydrogen atoms are

(1) 1.5, 3 and 24 respectively (2) 15, 18 and 3 respectively

(3) 0.15, 27, 3 respectively (4) 1.5, 24 and 3 respectively

Ans. (4)

Sol. No. of O atoms given= 9.033×10^{23}

No. of moles of O atoms = $\frac{9.033 \times 10^{23}}{6.022 \times 10^{23}}$ = 1.5 mole

Mass of O = $1.5 \times 16 = 24$ g

No. of H atoms required to react completely with O atoms to form water=double the mole of O atoms.

Thus No. of H atoms required = $1.5 \times 2 = 3$ mole

26. The molecular formula of carboxylic acid that differs from the rest is

(1) $C_{13}H_{26}O_2$ (2) $C_2H_4O_2$ (3) $C_9H_{18}O_2$ (4) $C_7H_{12}O_2$

Ans. (4)

Sol. General formula of carboxylic acid is $C_n H_{2n} O_2$.

All have this general formula except $C_7H_{12}O_2$. Also it is cyclic.

27. Foam of soap always appears white as

(1) it contains large hydrocarbon chains.

(2) it absorbs red portion of the visible light.

(3) it reflects light of all wavelengths.

(4) it has one hydrophobic end, which is insoluble in water.

Ans. (3)

Sol. Because foam reflects light of all wavelengths ,they get mixed and appear white to us.

28. In a neon gas discharge tube, every second 4.8×10^{18} Ne^+ ions move towards the right through a cross-section of the tube, while 'n' electrons move to the left in the same time. If the current in the tube is 1.12 amperes towards the right, n is equal to (given $e = 1.6 \times 10^{-19}$ coulomb)

(1) 1.8×10^{18} (2) 2.2×10^{18} (3) 2.4×10^{19} (4) 2.8×10^{19}

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Ans. ***(2)***

Sol. $I = \frac{Q}{t} = \frac{4.8\times10^{18}\times1.6\times10^{-19} + n\times1.6\times10^{19}}{1}$

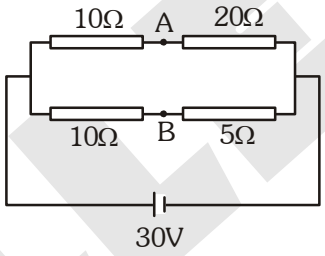
$n = 2.2 \times 10^{18}$

29. Four situations are given below–
I. An infinitely long wire carrying current.
II. A rectangular loop carrying current.
III. A solenoid of finite length carrying current.
IV. A circular loop carrying current.
In which of the above cases will the magnetic field produced be like that of a bar magnet?
(1) I (2) I and III (3) Only III (4) Only IV

Ans. ***(3)***

Sol. Solenoid behave like a bar magnet.

30. In the circuit diagram shown below, V_A and V_B are the potentials at points A and B respectively. Then, $V_A - V_B$ is :



(1) –10 V (2) –20 V (3) 0 V (4) 10 V

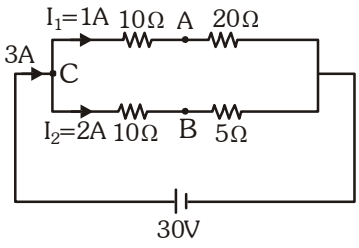
Ans. ***(4)***

Sol. $V_C - V_A = 10$ ....(i)

$V_C - V_B = 20$ ....(ii)

(ii) – (i)

$V_A - V_B = 10$ V



31. ***Assertion (A) :*** Motion of a charged particle under the action of a magnetic field alone is always with constant speed.
Reason (R) : The magnetic force does not have any component either along or opposite to the direction of motion of the charged particle.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion.
(2) Both Assertion and Reason are true, but the reason is not the correct explanation of the assertion.
(3) Assertion is a true statement, but Reason is false.
(4) Both Assertion and Reason are false statements.

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Ans. ***(1)***

Sol. $\vec{F}_B = q(\vec{v} \times \vec{B})$

$F_B \perp v$ Force on charge particle in a uniform magnetic field is perpendicular to the direction of motion of charge. So, speed is always constant.

32. When a charged particle passes through an electric field, which among the following properties change?

I. mass
II. charge
III. velocity
IV. momentum

(1) II and III (2) Only III (3) III and IV (4) I, III and IV

Ans. ***(3)***

Sol. $F = qE$

Charge will experience, force so velocity and momentum charge.

33. A ray of light in air is incident on an equilateral glass prism at an angle θ_i to the normal. After refraction, the light travelled parallel to the base of prism and emerged in air at an angle θ_e to the normal. If the angle between the incident and the emergent rays is 60°, then the refractive index of glass with respect to air is –

(1) 1.33 (2) 1.5 (3) 1.73 (4) 1.66

Ans. ***(3)***

Sol. $\angle r_1 = 90° - 60° = 30°$

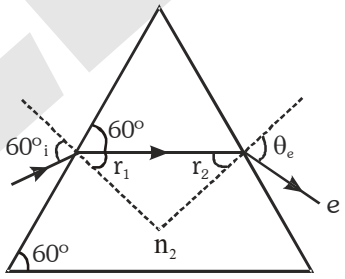
from snell's law

$n_1 \sin i = n_2 \sin r_1$

$1 \times \sin 60° = n_2 \sin 30°$

$n_2 = \dfrac{\sin 60°}{\sin 30°}$

$n_2 = \sqrt{3} = 1.73$



34. You are standing on the shore of a lake. You spot a fish swimming below the lake surface. You want to kill the fish first by throwing a spear and next, by pointing a high-power laser torch. How should you aim the spear and torch, respectively, from the options given below?

I. above the apparent position of the fish
II. below the apparent position of the fish
III. directly at the apparent position of the fish

(1) SPEAR : II ; LASER : III
(2) SPEAR : I ; LASER : II
(3) SPEAR : II ; LASER : II
(4) SPEAR : III ; LASER : III

Ans. ***(1)***

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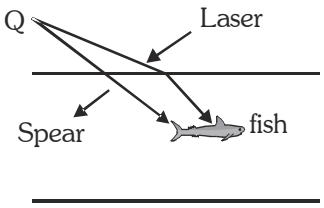
Sol.

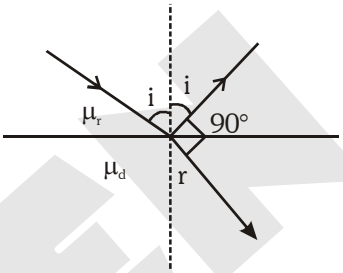


35. A beam of light coming from a rarer medium is partially reflected from the surface of a denser medium and partially refracted into the denser medium. If the reflected and the refracted rays are perpendicular to each other and the ratio of the refractive indices of denser and rarer medium is $\sqrt{3}$, the angle of refraction will be–

(1) 60° (2) 30° (3) 45° (4) 41.5°

Ans. ***(2)***

Sol. $\mu_r \sin i = \mu_d \sin r$



$$\frac{\sin i}{\sin r} = \frac{\mu_d}{\mu_r} = \sqrt{3}$$

$$\frac{\sin i}{\sin\left(\frac{\pi}{2} - i\right)} = \sqrt{3}$$

$\tan i = \sqrt{3} \Rightarrow i = 60°$

$\because$ $r = 90° - 60° = 30°$

36. A person can see clearly only the objects situated in the range 50 cm to 300 cm. He went to an Optometrist who prescribed him a lens of certain power to increase the maximum distance of his vision to infinity, i.e., it corrected the near-sightedness. However, upon using the prescribed lens the person discovered that the near point of his vision has shifted from 50 cm to a distance "d". What is the value of d?

(1) 60 cm (2) 100 cm (3) 40 cm (4) 500 cm

Ans. ***(1)***

Sol. To correct rear sightedness.

$u = \infty$, $v = 300$ cm

By using lens formulla.

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

$$-\frac{1}{300} = \frac{1}{f}$$

Focal length of lens is – 300 cm

So $\frac{1}{-50} - \frac{1}{d} = \frac{1}{-300}$

$d = 60$ cm

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37. A ball of mass m is thrown from a height h with a speed v. For what initial direction of the ball will its speed on hitting the ground be maximum?

(1) horizontally

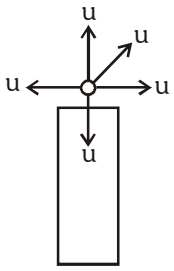
(2) vertically downwards

(3) at an angle of 45° from the vertical in the downward direction

(4) speed does not depend on the direction in which the ball is thrown

Ans. ***(4)***

Sol.



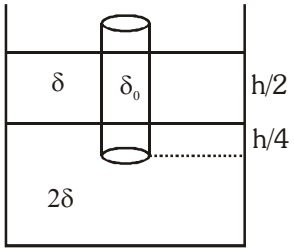
Speed does not depends on the direction because work done by gravity is path independent.

38. A beaker is filled with two non-mixing liquids. The lower liquid has density twice that of the upper one. A cylinder of height h floats with one-fourth of its height submerged in the lower liquid and half of its height submerged in the upper liquid. Another beaker is filled with the denser of the two liquids alone. If the same cylinder is kept in the second beaker, the height of the submerged position would be.

(1) h (2) 3h/4 (3) h/2 (4) h/4

Ans. ***(3)***

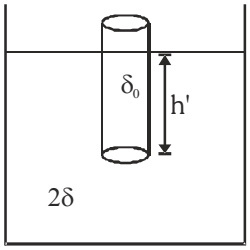
Sol $F_b = wt$



For first beaker

$$2\rho gA\frac{h}{4} + \rho gA\frac{h}{2} = \rho_0 gAh \quad ...(i)$$

For second beaker



$$2\rho gAh' = \rho_0 gAh \quad ...(ii)$$

Form equation (i) and (ii)

$h\rho gA = 2h'\rho gA$

$$\left[h' = \frac{h}{2}\right]$$

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39. A spring-loaded toy sits at rest on horizontal frictionless surface. When the spring releases, the toy breaks into three equal-mass pieces A, B and C, which slide along the surface. Piece A moves off in the negative x-direction, while piece B moves off in the negative y-direction. Which of the three pieces is moving the fastest?

(1) A (2) B
(3) C (4) They move with identical speeds

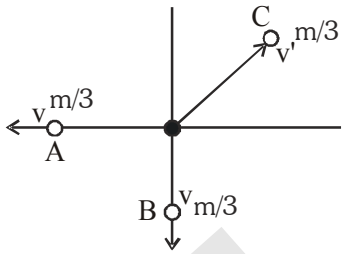
Ans. ***(3)***

Sol. $p_{initial} = p_{final}$ [Conservation of linear momentum]

$$0 = -\frac{m}{3}v\hat{i} - \frac{m}{3}v\hat{j} + \frac{m}{3}\vec{v}'$$

$$v' = \sqrt{2}v$$

So piece C will be most faster.



40. A truck and a car of masses m_1 and m_2 respectively are moving with equal kinetic energies. Equal stopping forces are applied and they come to a halt after travelling further distances x_1 and x_2 respectively. Then

(1) $x_1 = x_2$ (2) $\frac{x_1}{x_2} = \frac{m_1}{m_2}$ (3) $\frac{x_1}{x_2} = \sqrt{\frac{m_1}{m_2}}$ (4) $\frac{x_1}{x_2} = \sqrt{\frac{m_2}{m_1}}$

Ans. ***(1)***

Sol. By work energy theoram

$w = \Delta K{\cdot}E$

$w = K{\cdot}E_F - K{\cdot}E_i$

In both case final K·E is zero so workdone is equal $K{\cdot}E_i$

$K.E_i$ = applied stoping force × distance traveled

Here initial kinetic energy and applied stoping force is same for bus and car so both travel same distance.

$X_1 = X_2$

41. On dividing a natural number by 13, the remainder is 3 and on dividing the same number by 21, the remainder is 11. If the number lies between 500 and 600, then the remainder on dividing the number by 19 is

(1) 4 (2) 6 (3) 9 (4) 13

Ans. ***(1)***

Sol. $N = 13q_1 + 3$

$N = 21\ q_2 + 11$

LCM (13, 21) = 273

Number is $273 \times 2 - 10 = 536$

$536 = 19q_3 + 4$

remainder is 4

42. Expressing $0.\overline{34} + 0.3\overline{4}$ as a single decimal, we get

(1) $0.67\overline{88}$ (2) $0.6\overline{89}$ (3) $0.6\overline{878}$ (4) $0.6\overline{87}$

Ans. ***(4)***

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Sol. $0.\overline{34} + 0.3\overline{4} = \frac{34}{99} + \frac{34-3}{90}$

$= \frac{34}{99} + \frac{31}{90}$

$= \frac{1}{9}\left[\frac{34}{11} + \frac{31}{10}\right] = \frac{1}{9}\left[\frac{34\times10 + 31\times11}{11\times10}\right]$

$= \frac{1}{9}\left[\frac{340+341}{110}\right] = \frac{681}{990}$

$= 0.687878787.....$

$= 0.6\overline{87}$

43. If the value of a quadratic polynomial p(x) is 0 only at x = –1 and p(–2) = 2, then the value of p(2) is

(1) 18 (2) 9 (3) 6 (4) 3

Ans. ***(1)***

Sol. $p(x) = k(x+1)^2$

$p(-2) \Rightarrow k(-2+1)^2 = 2$

$k = 2$

$p(x) = 2(x+1)^2$

$p(2) = 2(2+1)^2 = 2\times9 = 18$

44. The graphs of the equations x – y = 2 and kx + y = 3, where k is a constant, intersect at the point (x, y) in the first quadrant, if and only if k is

(1) equal to –1 (2) greater than –1 (3) less than $\frac{3}{2}$ (4) lying between –1 and $\frac{3}{2}$

Ans. ***(4)***

Sol. $x - y - 2 = 0 \Rightarrow x = y + 2$

$kx + y - 3 = 0$

$k(y+2) + y - 3 = 0 \Rightarrow y = \frac{3-2k}{k+1} > 0$

$\Rightarrow \quad \frac{2k-3}{k+1} < 0 \Rightarrow -1 < k < \frac{3}{2}$

45. If α and β are the roots of the quadratic equation $x^2 - 6x - 2 = 0$ and if $a_n = \alpha^n - \beta^n$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is

(1) 6.0 (2) 5.2 (3) 5.0 (4) 3.0

Ans. ***(4)***

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

Sol. $x^2 - 6x - 2 = 0$, $\alpha^2 = 6\alpha + 2$ and $\beta^2 = 6\beta + 2$

$a_n = \alpha^n - \beta^n$

$a_{10} = \alpha^{10} - \beta^{10}$, $a_8 = \alpha^8 - \beta^8$, $a_9 = \alpha^9 - \beta^9$

$$\Rightarrow \quad \frac{a_{10} - 2a_8}{2a_9} = \frac{(\alpha^{10} - \beta^{10}) - 2(\alpha^8 - \beta^8)}{2(\alpha^9 - \beta^9)}$$

$$\Rightarrow \quad \frac{\alpha^8(\alpha^2 - 2) + \beta^8(2 - \beta^2)}{2(\alpha^9 - \beta^9)}$$

$$\Rightarrow \quad \frac{\alpha^8(6\alpha + 2 - 2) + \beta^8(2 - 6\beta - 2)}{2(\alpha^9 - \beta^9)}$$

$$\Rightarrow \quad \frac{6\alpha^9 - 6\beta^9}{2(\alpha^9 - \beta^9)} \Rightarrow \frac{6}{2} = 3$$

46. If $S_1, S_2, S_3, ..., S_r$ are the sums of first n terms of r arithmetic progressions whose first terms are 1, 2, 3, ...and whose common differences are 1, 3, 5, ... respectively, then the value of $S_1 + S_2 + S_3 + ... + S_r$ is

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

Ans. (2)

Sol. $S_1 = 1 + 2 + 3 + ...$n term

$S_2 = 2 + 5 + 8 + ...$n term

$S_3 = 3 + 8 + 13 + ...$n term

$S_r = r + (3r - 1) + (5r - 1) + ...$n term

$$S_1 = \frac{n(n+1)}{2}$$

$$S_2 = \frac{n}{2}[2 \times 2 + (n-1)3] = \frac{n}{2}[3n+1]$$

$$S_3 = \frac{n}{2}[2 \times 3 + (n-1)5] = \frac{n}{2}[5n+1]$$

$$S_r = \frac{n}{2}[2r + (n-1)(2r-1)] = \frac{n}{2}[2r + 2nr - n - 2r + 1]$$

$$= \frac{n}{2}[n(2r-1)+1]$$

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

$S_1 + S_2 + ...+ Sr = \frac{n}{2}[n + 3n + 5n + ... + n(2r-1) + r]$

$\Rightarrow \frac{n}{2}[n(1 + 3 + 5 + ... + (2r-1)) + r]$

$\Rightarrow \frac{n}{2}[nr^2 + r] = \frac{nr}{2}(nr + 1)$

47. A person walks towards a tower. Initially when he starts, angle of elevation of the top of the tower is 30°. On travelling 20 metres towards the tower, the angle changes to 60°. How much more has he to travel to reach the tower?

(1) $10\sqrt{3}$ metres (2) 10 metres (3) 20 metres (4) $\frac{10}{\sqrt{3}}$ metres

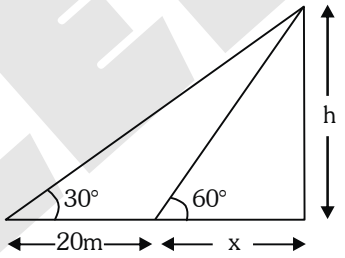
Ans. ***(2)***

Sol. $\tan 30° = \frac{h}{20 + x}$, $\tan 60° = \frac{h}{x}$

$= \frac{20 + x}{\sqrt{3}} = \sqrt{3}\,x$

$= 20 + x = 3x$

$= x = 10$ m



48. If cosec x – sin x = a and sec x – cos x = b, then

(1) $(a^2b)^{\frac{2}{3}} + (ab^2)^{\frac{2}{3}} = 1$ (2) $(ab^2)^{\frac{2}{3}} + (a^2b^2)^{\frac{2}{3}} = 1$

(3) $a^2 + b^2 = 1$ (4) $b^2 - a^2 = 1$

Ans. ***(1)***

Sol. cosec x – sin x = a and sec x – cos x = b

a = cos x cot x and b = sinx tan x

$a^2b = \cos^2x \cot^2x \sin x \tan x = \cos^3x$

$ab^2 = \cos x \cot x \sin^2x \tan^2x = \sin^3x$

$(a^2b)^{\frac{2}{3}} + (ab^2)^{\frac{2}{3}} = (\cos^3 x)^{\frac{2}{3}} + \left(\sin^3 x\right)^{\frac{2}{3}} = \cos^2 x + \sin^2 x = 1$

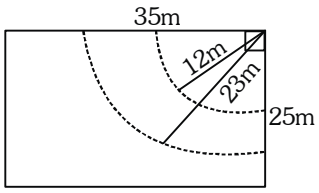
SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

49. A calf is tied with a rope of length 12 m at a corner of a rectangular field of dimensions 35m × 25m. If the length of the rope is increased to 23 m, then the additional grassy area in which the calf can graze is: (Take $\pi = \frac{22}{7}$)

(1) 280.0 m^2 (2) 300.0 m^2 (3) 302.5 m^2 (4) 312.5 m^2

Ans. ***(3)***

Sol. Additional grassy area $\frac{\pi}{4}\left[(23)^2 - (12)^2\right]$



$$= \frac{\pi}{4}[(23+12)(23-12)]$$

$$\Rightarrow \quad \frac{22}{7\times 4}[35\times 11]$$

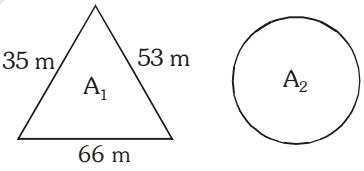
$$\Rightarrow \quad \frac{22\times 11\times 5}{4} = 302.5\,m^2$$

50. If Anish is moving along the boundary of a triangular field of sides 35 m, 53 m and 66 m and you are moving along the boundary of a circular field whose area is double the area of the triangular field, then the radius of the circular field is: (Take $\pi = \frac{22}{7}$)

(1) $14\sqrt{3}$jm (2) $3\sqrt{14}$m (3) $28\sqrt{3}$m (4) $7\sqrt{3}$m

Ans. ***(1)***

Sol. $r = \frac{35+53+66}{2} = 77$



$A_1 = \sqrt{77\times 42\times 11\times 24}$

$= \sqrt{7\times 11\times 7\times 6\times 11\times 6\times 4}$

$A_1 = 7 \times 11 \times 6 \times 2$

$A_1 = 924\ m^2$

$A_2 = 2A_1$

$A_2 = 2 \times 924 = 1848\ m^2$

$1848 = \frac{22}{7}\times r^2$

$r^2 = \frac{1848\times 7}{22} = 588$

$r = 14\sqrt{3}\,m$

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

51. A circular metallic sheet is divided into two parts in such a way that each part can be folded in to a cone. If the ratio of their curved surface areas is 1 : 2, then the ratio of their volumes is

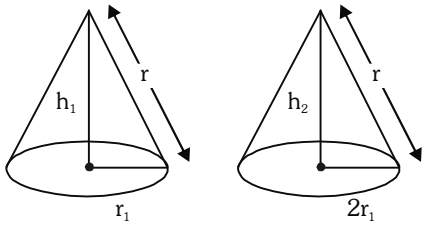
(1) 1 : 8 (2) $1:\sqrt{6}$ (3) $1:\sqrt{10}$ (4) 2 : 3

Ans. ***(3)***

Sol. Let radius of circle is r .

i.e. slant height of both cone is r

radius of cone are r_1 and r_2



$\frac{\pi r(r_1)}{\pi r(r_2)} = \frac{1}{2} \Rightarrow 2r_1 = r_2$

$C_1 = 2\pi r$, $C_2 = 4\pi r_1$

$2\pi r_1 + 4\pi r_1 = 2\pi r$

$6\pi r_1 = 2\pi r$

$\therefore 3r_1 = r$

$h_1 = \sqrt{r^2 - r_1^2} = \sqrt{8}\, r_1$ & $h_2 = \sqrt{r^2 - 4r_1^2} = \sqrt{5} r_1$

$\frac{v_1}{v_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi_2^2 h_2} \Rightarrow \left(\frac{r_1}{r_1}\right)^2 \times \left(\frac{h_1}{h_2}\right)$

$= \frac{1}{4} \times \frac{\sqrt{8} r_1}{\sqrt{5} r_1} \Rightarrow \frac{2\sqrt{2}}{4\sqrt{5}} \Rightarrow \frac{1}{\sqrt{10}}$

$V_1 : V_2 = 1 : \sqrt{10}$

52. A solid metallic block of volume one cubic metre is melted and recast into the form of a rectangular bar of length 9 metres having a square base. If the weight of the block is 90 kg and a biggest cube is cut off from the bar, then the weight of the cube is

(1) $6\frac{1}{3}$kg (2) $5\frac{2}{3}$kg (3) $4\frac{2}{3}$kg (4) $3\frac{1}{3}$kg

Ans. ***(4)***

Sol. volume of solid block = 1 m^3

$\therefore$ volume of rectangular bar = 1m^3

$9 \times a^2 = 1\ m^3$

$a^2 = \frac{1}{9} m^2$

$\therefore$ $a = \frac{1}{3} m$

$\therefore$ weight of largest cube = volume × density

$= \left(\frac{1}{3}\right)^3 \times 90$

$= \frac{90}{27} kg = 3\frac{1}{3} kg$

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

53. Two circles with centres P and R touch each other externally at O. A line passing through O cuts the circles at T and S respectively. Then,

(1) PT and RS are of equal length.
(2) PT and RS are perpendicular to each other
(3) PT and RS are intersecting
(4) PT and RS are parallel

Ans. ***(4)***

Sol. $\angle ROS = \angle POT$ (V.O.A.)

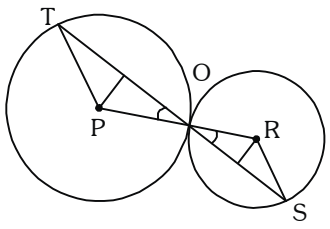
and $\angle ROS = \angle RSO$ (OR = RS)

Also $\angle POT = \angle PTO$

$\therefore \quad \angle PTO = \angle OSR$

But these are alternate angles

Hence PT||RS



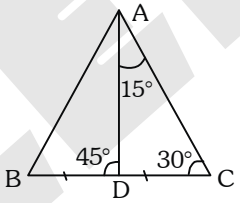
54. If in a triangle ABC, D is the mid-point of side BC, $\angle ADB = 45°$ and $\angle ACD = 30°$, then $\angle BAD$ and $\angle ABC$ are respectively equal to

(1) 15°, 105°
(2) 30°, 105°
(3) 30°, 100°
(4) 60°, 100°

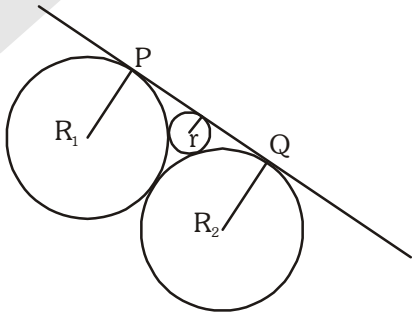
Ans. ***(2)***

Sol. According to question

$\angle BAD + \angle ABC = 135°$



55. Three circles with raddii R_1, R_2 and r touch each other externally as shown in the adjoining figure. If PQ is their common tangent and $R_1 > R_2$, then which of the following relations is correct?

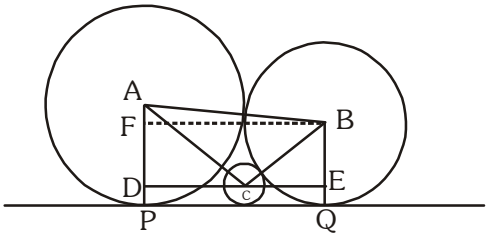


(1) $R_1 - R_2 = r$
(2) $R_1 + R_2 = 2r$
(3) $\frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{r}$
(4) $\frac{1}{\sqrt{R_1}} + \frac{1}{\sqrt{R_2}} = \frac{1}{\sqrt{r}}$

Ans. ***(4)***

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

Sol. From figure



$DC = \sqrt{(r+R_1)^2-(R_1-r)^2}$

$= \sqrt{4rR_1}$

$= 2\sqrt{rR_1}$

$CE = \sqrt{4rR_2} = 2\sqrt{rR_2}$

$AB^2 - AF^2 = BF^2$

$(R_1 + R_2)^2 - (R_1 - R_2) = BF^2$

$4R_1 \cdot R_2 = BF^2$

$BF = 2\sqrt{R_1 \cdot R_2}$

Now ,

BF = DE

$2\sqrt{R_1 \cdot R_2} = 2\sqrt{r}\left(\sqrt{R_1}+\sqrt{R_2}\right)$

$\frac{1}{\sqrt{R_1}}+\frac{1}{\sqrt{R_2}}=\frac{1}{\sqrt{r}}$

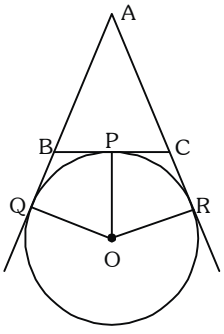
56. ABC is a triangle in which AB = 4 cm, BC = 5 cm and AC = 6 cm. A circle is drawn to touch side BC at P, side AB extended at Q and side AC extended at R. The, AQ equals

(1) 7.0 cm (2) 7.5 cm (3) 6.5 cm (4) 15.0 cm

Ans. ***(2)***

Sol. We know AQ = AR, BQ = BP, CP = CR

(length of tangents from external point to a circle are equal.)



$\therefore$ Perimeter of ΔABC

= AB + BC + CA = AQ + AR

= 4 + 5 + 6 = 2AQ

15 = 2AQ

AQ = 7.5

57. The centre of the circle passing through the pints (6, –6), (3, –7) and (3, 3) is

(1) (3, 2) (2) (–3, –2) (3) (3, –2) (4) (–3, 2)

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

Ans. ***(3)***

Sol. OA = OB

$= (x-3)^2+(y-3)^2 = (x-3)^2+(y-7)^2$

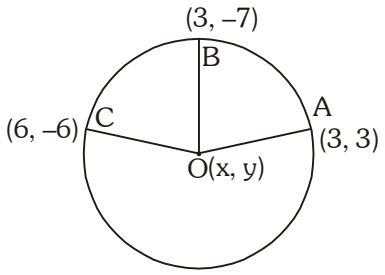
$\Rightarrow (y-3)^2 = (y+1)^2$

$\Rightarrow (y-3)^2 = (y+7)^2 = 0$

$\Rightarrow [(y-3)+(y+7)][(y-3)-(y-7)] = 0$

$\therefore \quad 2y + 4 = 0$

$y = -2$



Similarly, OB = OC

$\Rightarrow (x=3)^2+(y+7)^2 = (x-6)^2+(y+6)^2$

$\Rightarrow x^2 - 6x - 9 + 25 = x^2 - 12x + 36 + 16$

$6x = 52 - 34$

$x = 3$

Required centre = (3, –2)

58. If the line segment joining (2, 3) and (–1, 2) is divided internally in the ratio 3 : 4 by the graph of the equation x + 2y = k ,the value of k is –

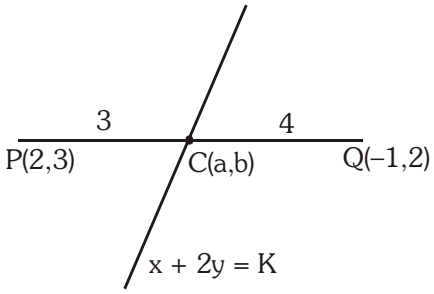
(1) $\frac{5}{7}$ (2) $\frac{31}{7}$ (3) $\frac{36}{7}$ (4) $\frac{41}{7}$

Ans. ***(4)***

Sol. Now, C(a, b) divides the line PQ in the ratio 3 : 4.

Then by section formula,

$a = \frac{3(-1)+4(2)}{3+4}$ and $b = \frac{3(2)+4(3)}{3+4}$



$a = \frac{5}{7}$ and $b = \frac{18}{7}$

Since C(a, b) satisfies the line x + 2y = K, then a + 2b = K

$\Rightarrow K = \frac{5}{7} + \frac{2(18)}{7}$

$K = \frac{41}{7}$

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

59. the mean of three positive numbers is 10 more than the smallest of the numbers and 15 less than the largest of the three. If the median of the three numbers is 5, then the mean of squares of the numbers is–

(1) $108\frac{2}{3}$ (2) $116\frac{2}{3}$ (3) $208\frac{1}{3}$ (4) $216\frac{2}{3}$

Ans. ***(4)***

Sol. Three numbers are x, 5, y

$$\frac{x+5+y}{3} = x + 10$$

$x + 5 + y = 3x + 30$

$y = 2x + 25$ ..... (1)

$$\frac{x+5+y}{3} = y - 15$$

$x + 5 + y = 3y - 45$

$x + y = 2y - 45$

$x - 15 = 2(2x + 25) - 45$

$x + 5 = 4x + 50 - 45$

$x = 0$

$\therefore$ $y = 25$

Required Mean $= \frac{0^2 + 5^2 + 25^2}{3}$

$= \frac{650}{3}$

$= 216\frac{2}{3}$

60. Three dice are thrown simultaneously. The probability of getting a total of at least 5 of the numbers appearing on their tops is

(1) $\frac{5}{54}$ (2) $\frac{7}{54}$ (3) $\frac{49}{54}$ (4) $\frac{53}{54}$

Ans. ***(4)***

Sol. Total number of case = 216

Favourable cases of getting total less than 5 are {(2,1,1), (1,2,1), (1,1,2), (1,1,1)}

Probability of getting total at least 5 = 1 – Probability of getting a total less than 5.

$$= 1 - \frac{4}{216}$$

$$= \frac{53}{54}$$

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

61. Match the following

A.	Livre	I.	A tax levied by the Church
B.	Manor	II.	An estate of Lord's lands and his mansions
C.	Tithe	III.	Tax to be paid directly to the State
D.	Taille	.IV.	Unit of currency

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

Ans. ***(Bonus)***

Sol. Livre – Unit of currecty

Manor – An estate of Lord's lands and his mansions

Tithe – A tax levied by the Church

Taille – Tax to be paid directly to the state.

62. ***Assertion (A) :*** After the 1905 revolution in Russia, Duma or the first elected consultative Parliament came into existence.

Reason (R) : The power of Tsar was curbed by it

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true R is false

(4) A is false R is true

Ans. ***(3)***

Sol. Duma was the first elected consultative Parliament. The power of Tsar war not curbed by it.

63. Arrange in correct chronological order

I. Dawes Plan

II. Crashing of the Wall Street Exchange

III. Birth of Weimar Republic

IV. Creation of Gestapo (Secret State Police)

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

Ans. ***(4)***

Sol. I. Dawes Plan 1922

II. Crashing of the Wall Street Exchange 1929

III. Birth of Weimar Republic 1919

IV. Creation of Gestapo (Secret State Police) During Hitlers rule.

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

64. Assertion (A) : Cricket as a game has a long and strong rural connection.

Reason (R) : The time limit of a match and vagueness about the size of Cricket ground is a result of the rhythms of village life.

(1) Both A and R are True and R is correct explanation of A

(2) Both A and R are True but R is not correct explanation of A

(3) A is True R is False

(4) A is False R is True

Ans. ***(1)***

65. ***Assertion (A) :*** In the 17th and 18th Century merchants from the towns in Europe started financing peasants and artisans in the country side for production for them.

Reason (R) : In the urban centres powerful crafts and trade guilds with monopoly rights restricted the entry of new people into the trade.

(1) Both A and R are True and R is correct explanation of A

(2) Both A and R are True but R is not correct explanation of A

(3) A is True and R is False

(4) A is False and R is True

Ans. ***(1)***

66. ***Assertion (A) :*** Colonial Forest Act changed the lives of villagers across the country

Reason (R) : Now the villagers could comfortably make use of the forest resources for everyday needs

1. Both A and R are true and R is the correct explanation of A

2. Both A and R are true but R is not the correct explanation of A

3. A is true and R is false

4. A is false and R is true

Ans. ***(3)***

Sol. villagers could not comfortably make use of the forest resources for everyday needs.

67. Arrange the following events of nineteenth century Europe in ascending order.

I. Unification of Germany

II. Beginning of Greek struggle for independence

III. Unification of Italy

IV. Vienna Peace Settlement

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

Ans. ***(2)***

Sol. I. Unification of Germany 1871

II. Beginning of Greek struggle for independence 1821

III. Unification of Italy 1861

IV. Vienna Peace Settlement 1815

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

68. Arrange the following events in descending order with regard to Nationalist Movement in Indo-China.

I. Creation of Indo-China union
II. Formation of Communist Party in Vietnam
III. Paris Peace Treaty
IV. Declaration of independence by Ho Chi Minh

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

Ans. ***(1)***

Sol. I. Creation of Indo-China union 1887
II. Formation of Communist Party in Vietnam 1930
III. Paris Peace Treaty 1974
IV. Declaration of independence by Ho Chi Minh 1945

69. Find out the correct statements with regard to Rowlatt Act.

I. The Rowlatt Act was passed in 1919.
II. The Act was passed by Imperial Legislative Council.
III. The Act allowed detention of Political prisoners without trial for three years.
IV. Protests against the Act led to Jallianwalla Bagh massacre in April 1920.

(1) Only II and III are correct (2) Only I and III are correct
(3) Only III and IV are correct (4) Only I and II are correct

Ans. ***(4)***

Sol. The Rowlatt Act was passed in 1919.
The Act was passed by Imperial Legislative Council.
The Act allowed detention of Political prisoners without trial for two years.

70. ***Assertion (A) :*** Population growth from the late eighteenth century increased the demand for food grains in Britain.
Reason (R) : 'Corn Laws' introduced by the government helped in reducing the food prices.

(1) Both A and R are True and R is correct explanation of A
(2) Both A and R are True but R is not correct explanation of A
(3) A is True R is False
(4) A is False R is True

Ans. ***(3)***

Sol. 'Corn Laws' introduced by the government increased food prices.

71. Match the following

A. Galley	I. Old name of Tokyo
B. Edo	II. Contained six sheets of text and wood cut illustrations
C. Vellum	III. Metal Frame in which types are laid and the text composed
D. Diamond Sutra	IV. A parachment made from skin of animals

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

Ans. ***(4)***

Sol. Galley - Metal Frame in which types are laid and the text composed
Edo - Old name of Tokyo
Vellum - A parachment made from skin of animals
Diamond Sutra - Contained six sheets of text and wood cut illustrations

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

72. Given below are statements regarding the course of development of Socialism in Europe. Arrange them in chronological sequence.

I. Socialists took over the government in Russia through the October Revolution.
II. Socialists and trade unionists fromed a labour party in Britain and Socialist party in France.
III. The Russian Social Democratic Worker's Party was founded by Socialists who respected Marx's ideas.
IV. Socialists could not succeed in forming a government in Europe and governments continued to be run by conservatives, liberals and radicals.
V. Second Internation was formed to coordinate the efforts of socialists throughout Europe.

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

Ans. ***(1)***

Sol. I. Socialists took over the government in Russia through the October Revolution. (1917)
II. Socialists and trade unionists fromed a labour party in Britain and Socialist party in France. (1905)
III. The Russian Social Democratic Worker's Party was founded by Socialists who respected Marx's ideas. (1898)
IV. Socialists could not succeed in forming a government in Europe and governments continued to be run by conservatives, liberals and radicals. (1914)
V. Second Internation was formed to coordinate the efforts of socialists throughout Europe. (1870s)

73. Hitler's ideology related to the geopolitical concept of *Lebensraum*, or living space implied:

(1) There was no equality between people, but only a racial hierarchy
(2) Only those species survived on earth that could adapt themselves to changing climatic conditions.
(3) New territories had to be acquired for settlement to increase the area of the mother country.
(4) An exclusive racial community of pure Germans to be created by physically eliminating all those who were seen as undesirable.

Ans. ***(3)***

74. During the mid-eighteenth century.

Assertion (A): Indian spinners and weavers were left without work and important centers of textile declined.
Reason (R): Large number of people began boycotting British cloth and started adopting khadi.

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

Ans. ***(2)***

Sol. Mid-20th century large number of people began boycotting British cloth and started adopting khadi

75. ***Assertion (A):*** Mahatma Gandhi called off the Civil Disobedience Movement and entered into a Pact with Irwin in 1931.
Reason (R): Industrial workers in Sholapur attacked structures that symbolized British rule.

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

Ans. ***(1)*** Violence at Sholapur made Gandhiji Call off CDM and entering into Gandhi Irwin Pact.

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

76. ***Assertion (A):*** The latitudinal extent influences the duration of day and night, as one moves from south to north of India.

Reason (R): From Gujarat to Arunachal Pradesh there is a time lag of two hours.

(1) Both A and R are true. R is the correct explanation of A.

(2) Both A and R are true but R is not the correct explanation of A.

(3) A is true and R is false.

(4) A is false and R is true.

Ans. ***(2)***

Sol. Assertion is right and reason is also right. Because longitudinal extent is of 30°.

77. ***Assertion (A) :*** Kharif crops are grown with the onset of monsoon in different parts of India and harvested in September-October.

Reason (R) : Availability of precipitation due to the western temperate cyclones helps in growing of these crops.

(1) Both A and R are true and R explains A

(2) Both A and R are true but R does not explain A

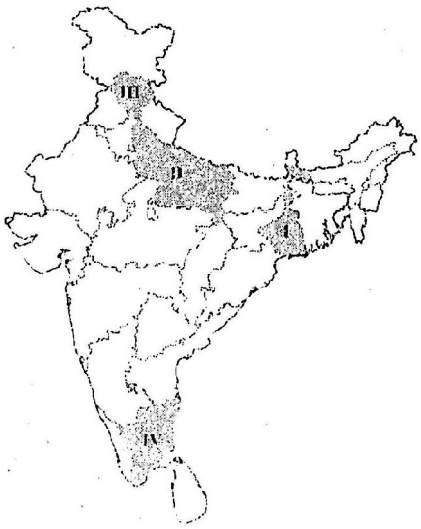
(3) A is true and R is false

(4) A is false and R is true

Ans. ***(3)***

Sol. Rainfall due to western temperate cyclones occurs in winter (Rabi season).

78. Arrange the shaded states shown on the map of India in descending order of population density and select the right code.



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

Ans. ***(3)***

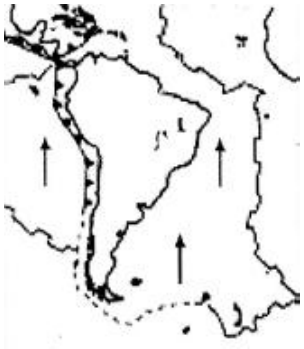
Sol. West-Bengal > UP > Tamil Nadu > Himachal Pradesh.

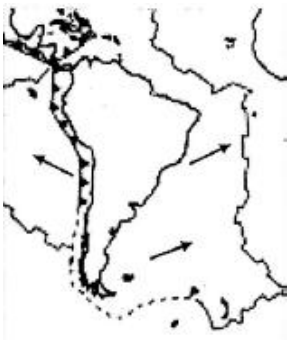
SOLUTION

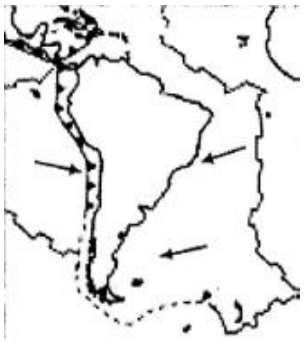
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

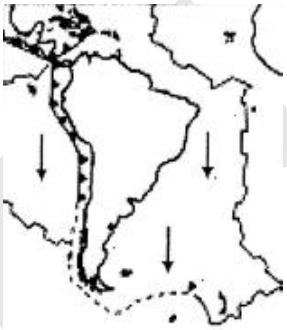
SCHOLASTIC APTITUDE TEST (SAT)

79. Which one of the following figure is showing the correct direction of movement of the South America plate?

(1) 

(2) 

(3) 

(4) 

Ans. ***(3)***

80. Based on the data (elevation and latitude) provided below which of the following tourist centers is most probably indicated? Elevation : 3500 meters Latitude: 34°N

(1) Shillong (2) Mussoorie (3) Kodaikanal (4) Leh

Ans. ***(4)***

Sol. The elevation and latitude given are most close to the Leh.

81. Keeping in mind the location of the following sanctuaries/ national parks ot India, arrange them from south to north: I. Periyar, II. Dachigam, III- Sariska, IV. Kanha

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

Ans. ***(4)***

Sol. I. Periyar - Kerala.

II. Dachigam - J and K.

III- Sariska- Rajasthan.

IV. Kanha - MP.

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

82. Match list I (Revolution) with list II (Area) and select the correct answer using the codes given below :

List I (Revolution)		List II (Area)	
A.	Blue	I.	Dairy development
B.	Green	II.	Fisheries development
C.	White	III.	Food production
D.	Yellow	IV.	Silk production

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

Ans. ***(4)***

Sol. All are correctly matched.

83. Assertion (A) : The availability of water resources varies over space and time in India
Reason (R) : Water availability is governed by variations in seasonal and annual precipitation although water scarcity is aggravated by over-exploitation and unequal access to water among different social groups..
(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. Over-exploitation is a determinant factor of availability of water resources.

84. Match list I (Type of Resources) with list II (Basis of Classification) and select the codes given below :

List I (Type of Resources)		***List II (Basis of Classification***	
A.	Biotic and abiotic	***I.***	Status of development
B.	Renewable and non-renewable	***II.***	Origin
C.	Individual, community, national and international	***III.***	Ownership
D.	Potential, developed, stock and reserves	IV.	Exhaustibility

(1) A-II, B-I, C-II1, 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. ***(3)***

Sol. All are correctly matched.

85. Which one of the following is the correct order of rivers from north to south?
(1) Ravi, Chenab, Jhelum, Indus (2) Indus, Jhelum, Chenab, Ravi
(3) Jhelum, Indus, Ravi, Chenab (4) Chenab, Ravi, Indus, Jhelum

Ans. ***(2)***

Sol. Indus, Jhelum, Chenab, Ravi correct order of rivers from north to south.

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

86. Match list I (National Highways of India) with list II (Description) and select the codes given below :

List I (National Highways of India)		***List II (Description)***	
A.	National Highway Number 1	***1.***	Covers most of Rajasthan
B.	National Highway Number 15	II.	Known as Sher Shah Suri Marg
C.	National Highway Number 7	***III.***	Connects Delhi and Mumbai
D.	National Highway Number 8	IV.	Is the longest National Highway

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

Ans. ***(3)***

Sol. All are clearly specified in the Lifelines of National Economy.

87. Which of the following statement is NOT. true to the context of Mawsynram?

(1) It is considered as the wettest place on the earth
(2) It possesses caves with stalagmites and stalactites
(3) It is located very close to Cherrapunji
(4) It is located very close to the Myanmar border

Ans. ***(4)***

Sol. Mawsynram and Cherrapunji both are located in Meghalaya but Myanmar is not so close.

88. Which one of the following facts about the shaded state shown below is incorrect?

(1) Terrace cultivation is widespread in the hill areas
(2) The state is a major producer of uranium
(3) Population density is well below the national average
(4) More than 80 per cent of the area has forest as the land cover

Ans. ***(2)***

Sol. Uranium is not found in Nagaland.

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

89. The Tropic of Cancer passes through which of the following plateau?

(1) Only Malwa (2) Only Chotanagpur

(3) Only Meghalaya (4) Both Malwa and Chotanagpur

Ans. (4)

Sol. Can be seen easily in India size and location.

90. ***Assertion (A) :*** The Coriolis force is responsible for deflecting winds towards the right in the northern hemisphere and towards the left in the southern hemisphere.

Reason (R) : The pressure and wind system of any area depend on the latitude and altitude of the place.

(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 Coriolis force is produced due to rotation of Earth.

91. Which of the following arguments against prescribing educational qualification for elected representatives are true?

I. Educational qualification will depriye illiterate citizens of the right to contest elections.

II. Relevant qualification for being elected representatives is not education but ability to address people's prob lems.

III Educated elected representatives keep distance from the common people.

IV. It is easier for the educated elected representatives to use power for personal gains.

V. It should be left to the voters to decide how much importance is to.be given to educational qualification of a candidate.

(1) I, II and IV only (2) I, III and V only (3) I, IV and V only (4) I, II and V only

Ans. (4)

Sol. Option III and IV are irrelevent.

92. Which of the following terms were inserted in the Preamble to the Indian Constitution by the 42nd Amendment Act, 1976?

I. Integrity II. Secular III. Socialist IV. Unity

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

Ans. (3)

Sol. Unity was not added by the 42nd Amendment Act.

93. Which of the following international 9(3) institutions has a more democratic way of decision-making on matters of global importance?

(1) General Assembly of the United Nations (2) International Monetary Fund

(3) Security Council of theUnited Nations (4) World Bank

Ans. (1)

Sol. Because in General Assembly all members have 1 vote.

SOLUTION
NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II
SCHOLASTIC APTITUDE TEST (SAT)

94. Which of the following factors have contributed to changes in the caste system?

I. Economic development II. Language III. Education IV. Elections
V. Region

(1) I, III and IV (2) II, IV and V (3) II, III and IV (4) I, III and V

Ans. ***(1)***

Sol. Language and Region are irrelevant.

95. Match List I with List II and select the answer using the codes given below.

List I		***List II***	
A.	Supervises the overall functioning of all the political institutions in the country	***I.***	The Supreme Court
B.	Distributes and redistributes work to the ministers	***II.***	The President
C.	Ministers may have different views but have to own up every decision	III.	The Prime Minister
D.	Determines the constitutionality of any contentious action	IV.	The Cabinet

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

Ans. ***(2)***

Sol. All are correctly matched.

96. Calculate the female literacy rate from the given data.

Gender	***Total Persons***	***Literate Persons***
Males	1200	1050
Females	580	340
Total	1780	1390

(1) 32.5 (2) 19.1 (3) 58.6 (4) 28.3

Ans. ***(3)***

Sol. $\frac{340}{580}\times 100 = \frac{17}{29}\times 100 = 58.6\%$

SOLUTION

NATIONAL TALENT SEARCH EXAMINATION 2016 Stage-II

SCHOLASTIC APTITUDE TEST (SAT)

97. Which of these activities contributes to India's National income?

I. Cooking at home
II. A teacher teaching his children at home
III. A doctor prescribing medicines in a clinic
IV. Cooking in a restaurant

(1) I and II (2) II and III (3) III and IV (4) I and IV

Ans. ***(3)***

Sol. Cooking at home and teaching children at home are not contributing to the National income.

98. In an imaginary economy the monetary value of contributions of primary sector, public, sector, -secondary sector and service sector are Rs. 100, Rs. 25, Rs. 28 and Rs. 77 respectively. The gross domestic product of the economy is

(1) Rs. 100. (2) Rs. 205. (3) Rs. 15(3) (4) Rs. 230.

Ans. ***(2)***

Sol. GDP = Primary sector + secondary sector + service sector.

GDP = 100 + 28 + 77 = 205.

99. Four families in a village, which has only a ration shop, have access to foodgrains as shown in the table. Identify the families that lack food security.

Family	Food requirement in kg	Food grain price/kg	Money available to each family for buying food	Possessing Ration card
A	50	10	600	Yes
B	30	10	330	No
C	20	10	180	Yes
D	40	10	400	Yes

(1) A and B (2) B and C (3) C and D (4) D and A

Ans. ***(2)***

Sol. Source is food security.

100. Robinson Crusoe goes to sea with a net for fishing. Classify the factors of production and choose the appropriate option given below.

Item		***Classification***	
A.	Knowledge of fishing	I.	Physical Capital
B.	Net	II.	Labour
C.	Sea	III.	Human Capital
D.	Swimming	IV.	Land

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

Ans. ***(3)***

Sol. Source is Story of village Palampur.

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