# NATIONAL TALENT SEARCH EXAMINATION-2016 (NTSE- STAGE-II)

**Time : 45 Min.** **Max. Marks : 50**

## SCHOLASTIC APTITUDE TEST (SAT)

**General Instructions :**

1. The question paper contains **100** questions, **40** questions from **Science** (1-40), **20** questions from **Mathematics** (41-60), **40** questions from **Social Science** (61-100), each carries one mark.
2. There will be negative marking. For each wrong answer 1/3 marks will be deducted. No marks will be deducted for unattempted questions.

## SCIENCE

**Q.1** Suppose a mutant of a photosynthetic alga has dysfunctional mitochondria. It would affect its ability to perform –

(1) glycolysis (2) anascrobic respiration

(3) aerobic respiration (4) photosynthesis

**Sol.** **(3)**

**Q.2** Cow has a special stomach as compared to that of 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

**Sol.** **(2)**

**Q.3** When touched, the leaflets of Touch-me-not plant are closed. Closing of leaflets starts form the point of contact to the leaflets away. The leaflets are closed due to –

(1) changer in turgor pressure (2) speciliazed proteins

(3) growth hormone retardation (4) capillary action

**Sol.** **(1)**

**Q.4** Pancreas is composed of -

(1) Only exocrine cells (2) Only endocrine cells

(3) Both (4) Nephron

**Sol.** **(3)**

**Q.5** The human embryo gets nutrition form the mother blood with the help of a special organ called –

(1) Zygote (2) Ovary (3) Oviduct (4) Placenta

**Sol.** **(4)**

**Q.6** Hormones produced in one part of the organism reach the distantly located target via –

(1) muscles (2) bone (3) cartilage (4) blood

**Sol.** **(4)**

**Q.7** Which of the following are characteristic features of cells of meristematic tissue ?
(1) Actively dividing cells with dense cytoplasm, thick cell all 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, then cell wall and no vacuoles

**Sol.** **(2)**

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

**Sol.** **(1)**

**Q.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 bacterial provide Carbon
(3) Bacteria provide $NH_4$ and the roots provide Carbon
(4) Bacteria provide $N_2$ and the roots provide $NH_4$

**Sol.** **(3)**

**Q.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 t will be most significant at the poles
(4) Energy is lost at each tropic level of a food chain

**Sol.** **(1)**

**Q.11** Which one of the following g signifies ex situ 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

**Sol.** **(4)**

**Q.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

**Sol.** **(2)**

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

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| A. | Smalls 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

**Sol.** **(2)**

**Q.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 were produced, out of which 15 progeny had specific characteristics. What wren the characteristics ?

(1) Round and green (2) Round and yellow

(3) Wrinkle and yellow (4) Wrinkle and green

**Sol.** **(4)**

**Q.15** Total number of neutrons in five moles of water molecule is –

(1) $3.011 \times 10^{21}$ (2) $2.409 \times 10^{25}$ (3) $3.111 \times 10^{25}$ (4) $2.711 \times 10^{25}$

**Sol.** **(2)**

One molecule of $H_2O$, contain 8 number of neutrons of oxygen atom only.

So total no. of neutrons in 5 mole of $H_2O$ molecules will be = $5 \times 8 \times 6.022 \times 10^{23} = 2.409 \times 10^{25}$

**Q.16** The metal used to recover copper from an aqueous solution of copper sulphate is -

(1) N a (2) Ag (3) Hg (4) Fe

**Sol.** **(4)**

Being more reactive Fe can displace copper from its salt solution.

$Fe + CuSO_4 (aq.) \rightarrow FeSO_4 + Cu\downarrow$

**Q.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

**Sol.** **(2)**

In colloidal (B, D) and suspension (A) path of light is visible.

Where as in solution (C) particles do not settle down in suspension (A) solute particles are visible to naked eye.

**Q.18** **Assertion (A) :** Aluminum foil cannot be used in $\alpha$-particle scattering experiment.

**Reason (R) :** Aluminum 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.

**Sol.** **(4)**

Al is malleable but being more reactive it forms layer of oxide on its surface on exposing to air.

So it cannot be used for $\alpha$– particle scattering experiment.

**Q.19** Magnesium ribbon is rubbed with sand paper before making 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

**Sol.** **(3)**

$2 Mg + O_2 \rightarrow 2MgO$

**Q.20** The reaction that differs from the rest of the reactions given is –
(1) formation of calcium oxide form limestone
(2) Formation of aluminum from aluminum oxide
(3) Formation of sodium carbonate forum sodium hydrogen carbonate
(4) Formation of mercury from mercuric oxide

**Sol.** **(2)**

$2Al_2O_3 \xrightarrow{\text{Electricity}} 4Al + 3O_2$

$CaCO_3 \xrightarrow{\Delta} CaO + CO_2$

$2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + H_2O + CO_2$

$2HgO \xrightarrow{\Delta} 2Hg + O_2$

**Q.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

**Sol.** **(1)**
Amphoteric oxide can react with both acid and base to from salt and water.
**Ex.** : $Al_2O_3$ & ZnO

**Q.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

**Sol.** **(2)**
X = Na
Y = Cl

**Q.23** The compound containing both ionic and covalent bond is –
(1) $AlBr_3$ (2) CaO (3) $MgCl_2$ (4) $NH_4Cl$

**Sol.** **(4)**

**Q.24** The element that cannot be used as a reducing agent is –
(1) carbon (2) aluminum (3) sulphur (4) sodium

**Sol.** **(3)**

**Q.25** Somebody wanted to calculate the number of moles of oxygen atoms comprising of $9.033 \times 10^{23}$ numb er of its atoms. The person further thought to calculate its mass and to find the number of moles of hydrogen atoms required to combined completely with this amount of oxygen to form water.
The number of moles of oxygen atoms, their 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) 1.5,2 5 and 3 respectively

**Sol.** **(4)**

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

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

Moles of H-atom = $1.5 \times 2 = 3$ moles.

**Q.26** The molecular formula of carbonxylic acid that differs from the rest is -

(1) $C_{13}H_{20}O_2$ (2) $C_2H_2O_2$ (3) $C_9H_{18}O_2$ (4) $C_7H_{12}O_2$

**Sol.** **(4)**

General formula of carboxylic acid is $CnH_{2n}O_2$

**Q.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

**Sol.** **(3)**

**Q.28** In a ncon gas discharge tube, every second $4.8 \times 10^{18}$ $Nc^+$ ions move towards the right trough 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) $1.8 \times 10^{18}$ (2) $2.2 \times 10^{18}$ (3) $2.4 \times 10^{19}$ (4) $2.8 \times 19^{19}$

**Sol.** **(2)**

$I = \frac{q}{t}$

$Q = n_t e$

$I \times 1 = (n + 4.8 \times 10^{18}) \times 1.6 \times 10^{-19}$

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

**Q.29** Four situations are given below :

I. An infinitely long wire carrying current

II. A rectangular loop carrying current

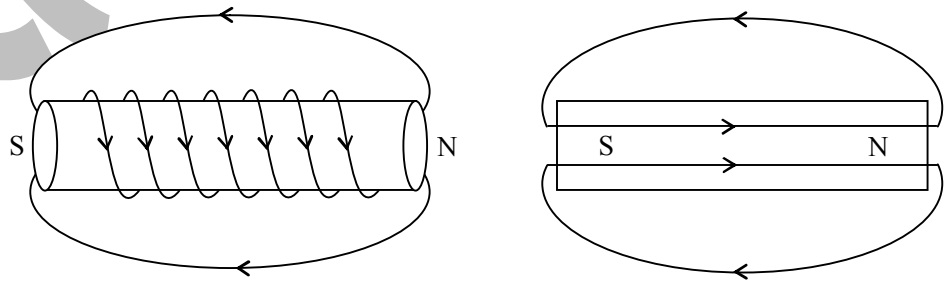
III. A solenoid of finite length carrying current

IV. A circular loop carrying current

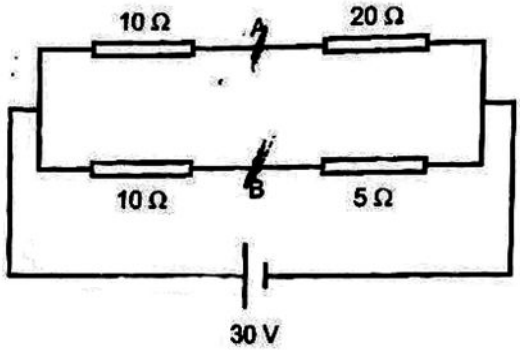
In which of the above cases will the magnetic field produced be like that of a bar magnet ?

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

**Sol.** **(3)**



**Q.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) –10V (2) –20V (3) 0V (4) 10 V

**Sol.** **(4)**

$V_A - 20 + 10 = v_B$ (from KVL)

$V_A - V_B = 10$

**Q.31** **Assertion (A) :** Motion of a charged particle under the action of a magnetic frilled alone is always with constant speed.

**Reason (R) :** The magnetic force does not have an y component either along or opposite to the direction of motion of the charged particles.

(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

**Sol.** **(1)**

Magnetic force act perpendicular to velocity of charged partica. I magnetic field. So there is no component in direction of motion.

**Q.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 & III (2) Only III (3) III & IV (4) I, III & IV

**Sol.** **(3)**

Electric field can change only the velocity of charged particle. So velocity & momentum (mv) will be changed.

**Q.33** A ray of light in air is incident on an equilateral glass prism at an angle $\theta_i$ to the normal. After refraction, the light raveled parallel to the base of primes and emerged in air at an angle $\theta_e$ to the normal. If the angle between the incident and the emergent ray is 60º, then the refractive index of glass with respect to air is –

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

**Sol.** **(3)**

$$\mu = \frac{\sin\left(\frac{\delta m + A}{2}\right)}{\sin\frac{A}{2}} = \frac{\sin\left(\frac{60+60}{2}\right)}{\sin\frac{60}{2}} = \frac{\sin 60}{\sin 30} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = 1.73$$

**Q.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

**Sol.** **(1)**

**Q.35** A beam of light coming from a rarer medium is partially reflected form 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) 60º (2) 30º (3) 45º (4) 41.5º

**Sol.** **(2)**

**Q.36** A person can see clearly on 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

**Sol.** **(1)**

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

(1) horizontally

(2) vertically downwards

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

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

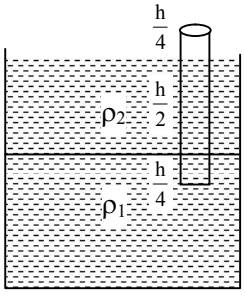
**Sol.** **(4)**

Speed of a body doesn't depend on the direction.

**Q.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) $\frac{3h}{4}$ (3) $\frac{h}{2}$ (4) $\frac{h}{4}$

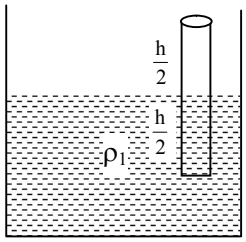
**Sol.** **(3)**



Given $\rho_1 = 2\,\rho_2$

$Mg = \rho v'g + (2\rho v'g)$

$$\sigma \times A \times h \times g = \rho \times A \times \frac{h}{2} \times g + 2\rho + \frac{A \times h}{4} \times g.$$




$\sigma = \rho$

$\sigma v'g = 2\rho \times v'g$

$\sigma \times A \times h \times g = 2\rho \times A \times x \times g$

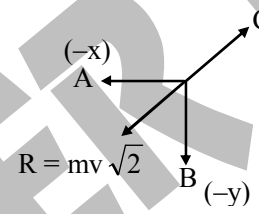
$$x = \frac{h}{2}$$

**Q.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

**Sol.** **(3)**




Should be $mv\sqrt{2}$ from low of momentum conservation.

**Q.40** A truck and a car of masses $m_1$ and $m_2$ respectively are moving with equal kinetic energy. Equal stopping forces are applied and they come to a halt after traveling 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) $\frac{x_1}{x_2} = \sqrt{\frac{m_2}{m_1}}$

**Sol.** **(1)**

Because kinetic energy is equal

So $x_1 = x_2$

**Q.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

**Sol.** **(1)**

Desired No = LCM (13 & 21) k –10

Where k is a natural no. = 273 k –10

Given

$500 < 273\,k - 10 < 600$

$510 < 273\,k < 610$

$\frac{510}{273} < k < \frac{610}{273}$

Therefore k will be 2

Hence no. is $273 \times 2 - 10$

$= 546 - 10$

$= 536$

Remainder = 4

**Q.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) $0.\overline{6878}$ (4) $0.6\overline{87}$

**Sol.** **(4)**

.34343434343.....

.34343434343.....

.68787878787..... $= 0.6\overline{87}$

**'OR'**

$0.\overline{34} = \frac{34}{99}$ & $3.\overline{4} = \frac{31}{90}$

So $.\overline{34} + 3.\overline{4} = \frac{34}{99} + \frac{31}{90} = \frac{681}{990} = 0.6\overline{87}$

**Q.43** If the value of 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

**Sol.** **(1)**

$P(x) = k\,(x + 1)^2$

$P(-2) = k\,(-1)^2 = 2$

$\Rightarrow k = 2$

$\Rightarrow P(x) = 2\,(x + 1)^2$

$P(2) = 2\,(2 + 1)^2 = 18$

**Q.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 $\frac{3}{2}$

**Sol.** **(4)**

$x - y = 2$

$+ \quad \underline{kx + y = 3}$

$(1 + k)x = 5 \quad \Rightarrow \quad x = \dfrac{5}{1+k}$

$\because$ , (x, y) lies in first quadrant therefore, $\dfrac{5}{1+k}$ must be (+) ve,

$\therefore \ \dfrac{5}{1+k} > 0 \Rightarrow 1 + k > 0 \Rightarrow k > -1$ ....(1)

From 1st equation $x = 2 + y$

Substituting in 2nd equation $kx + y = 3$

$\Rightarrow \ k(2 + y) + y = 3$

$y = \dfrac{3-2k}{1+k}$

We know, $y > 0$

$\Rightarrow \ \dfrac{3-2k}{1+k} > 0$

$\Rightarrow \ k \in \left(-1, \dfrac{3}{2}\right)$ ....(2)

From (1) & (2) $k \in \left(-1, \dfrac{3}{2}\right)$

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

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

**Sol.** **(4)**

$x^2 - 6x - 2 = 0$

$\alpha^2 - 6\alpha - 2 = 0$

$\alpha^2 - 2 = 6\alpha$ ....(1)

Similarly $\beta^2 - 2 = 6\beta$ .... (2)

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

$$= \frac{\alpha^8\left(\alpha^2 - 2\right) - \beta^8\left(\beta^2 - 2\right)}{2\left(\alpha^9 - \beta^9\right)}$$ ....(3)

From eq.(1), (2)& (3)

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

**Q.46** If $S_1, S_2, S_3$ .... S, 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 $S_1 + S_2 + S_3 + \ldots\ldots + S$, is

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

**Sol.** **(2)**

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

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

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

$$\vdots$$

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

$$\Rightarrow \quad S_1 + S_2 + \ldots + S_r = \frac{n}{2}\{n+3n+5n+.....+(2r-1)n\} + \frac{n}{2}\{1+1+.....+1\} \text{ r times}$$

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

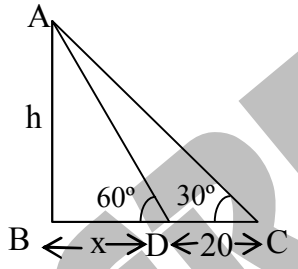
$$= \frac{n}{2}[n\{1+3+5+....+(2r-1)\}+r]$$

$$= \frac{n}{2}[r^2n+r] = \frac{rn}{2}[nr+1]$$

**Q.47** **A** person walks towards a tower. Initially when he starts, angle of elevation of the top of the tower is 30º. On traveling 20 metres towards the tower, the angle changes to 60º. 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

**Sol.** **(2)**




In $\Delta ABC$ $\quad \tan 30^\circ = \frac{h}{20+x} = \frac{1}{\sqrt{3}}$ ……(1)

$\Delta ABD$ $\quad \tan 60^\circ = \frac{h}{BD} = \sqrt{3}$

$h = \sqrt{3}\,x$ ….. (2)

from (2) in (1)

$$\frac{\sqrt{3}x}{20+x} = \frac{1}{\sqrt{3}}$$

$3x = 20 + x \Rightarrow 2x = 20$

$x = 10$ metre.

**Q.48** If cosec x – sin x = a and secx – cosx = b, then

(1) $\left(a^2b\right)^{\frac{2}{3}}+\left(ab^2\right)^{\frac{2}{3}}=1$ (2) $\left(ab^2\right)^{\frac{2}{3}}+\left(a^2b^2\right)^{\frac{2}{3}}=1$ (3) $a^2+b^2=1$ (4) $b^2-a^2=1$

**Sol.** **(1)**

cosec x – sin x = a

$\Rightarrow \frac{1-\sin^2 x}{\sin x}=a$

$\Rightarrow \frac{\cos^2 x}{\sin x}=a$ ….. (1)

Similarly secx – cos x = b

$\Rightarrow \frac{1-\cos^2 x}{\cos x}=b$

$\Rightarrow \frac{\sin^2 x}{\cos x}=b$ … (2)

From (1) $\frac{\cos^4 x}{\sin^2 x}=a^2$ ….(3)

& from (2) $\frac{\sin^4 x}{\cos^2 x}=b^2$ …. (4)

Now, multiplying eq. (2) with eq. (3) & eq. (1) with eq.(4), we get

$a^2b=\cos^3 x$

$\Rightarrow (\cos^3 x)^{2/3}=\cos^2 x=(a^2b)^{2/3}$ …. (5)

& $b^2a=\sin^3 x$

$\Rightarrow (\sin^3 x)^{2/3}=\sin^2 x=(b^2a)^{2/3}$ …. (6)

Now, adding (5) & (6), we get

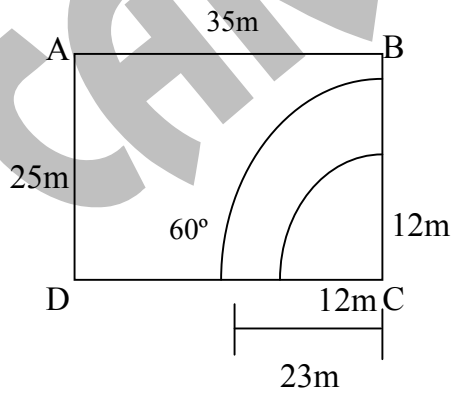
$(a^2b)^{2/3}+(b^2a)^{2/3}=1$

**Q.49** A calf is tied with a rope of length 12m at a corner of a rectangular field of dimensions 35m × 25m. If the length of the rope is increased to 23m, 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 $m^2$

**Sol.** **(3)**




Where r = 12 m

Then area = $\frac{\pi r^2}{4} = \frac{22}{7} \times \frac{12 \times 12}{4} = \frac{792}{7}$ $m^2$

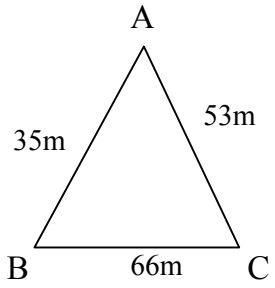
When r = 23m, then area = $\frac{22}{7} \times \frac{23 \times 23}{4} = \frac{54819}{14}$ $m^2$

$\therefore$ Increase in area = $\frac{54819}{14} - \frac{792}{7} = 302.5$ $m^2$

**Q.50** If Anish is moving along the boundary of a triangular field of sides 35, 53m and 66m 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) $14\sqrt{3}$m (2) $3\sqrt{14}$m (3) $28\sqrt{3}$m (4) $7\sqrt{3}$m

**Sol.** **(1)**




S = $\frac{154}{2}$ = 77 m

$\therefore$ are of $\Delta ABC = \sqrt{77 \times 11 \times 24 \times 42} = 924$ $m^2$

So area of circle = 1848 $m^2$

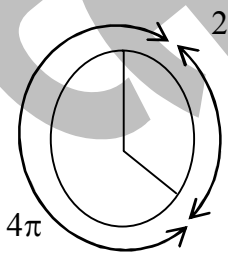
$\frac{2^2}{7} \times r^2 = 1848$

R = $14\sqrt{3}$ m

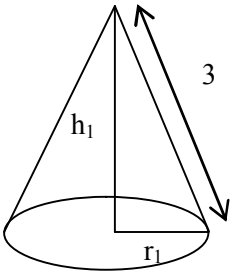
**Q.51** A circular metallic sheet is divided into two parts in such a way that each part can be folded in to a cone. If the ratio of their curved surface areas is 1 : 2, then the ratio of their volumes is

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

**Sol.** **(3)**



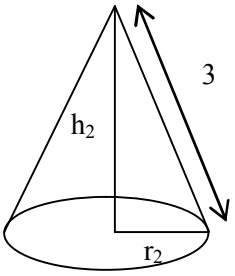

Let radius of circle be 3 units




$2\pi r_1 = 2\pi \Rightarrow r_1 = 1$

$h_1 = \sqrt{3^2 - 1^2} = \sqrt{8}$

$h_1 = \sqrt{8}$




$2\pi r_2 = 4\pi \Rightarrow r_2 = 2$

$h_2 = \sqrt{3^2 - 2^2} = \sqrt{5}$

$h_2 = \sqrt{5}$

$$\frac{v_1}{v_2} = \frac{\frac{1}{3}\pi l^2\sqrt{8}}{\frac{1}{3}\pi 2^2\sqrt{5}} = \frac{1}{\sqrt{10}}$$

**Q.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

**Sol.** **(4)**

$V = 1m^3$

side of square = a

$1 = a^2 \times \ell$ $\ell = 90$ cm

$a = \frac{100}{3}$ c,

Density = $\frac{90}{1} = 90$ kg/m$^3$ = .09 g/cm$^3$

Weight of the cube = $\left(\frac{100}{3}\right)^3 \times 0.09$

$\Rightarrow \frac{100\times100\times100}{27} \times \frac{9}{100}$

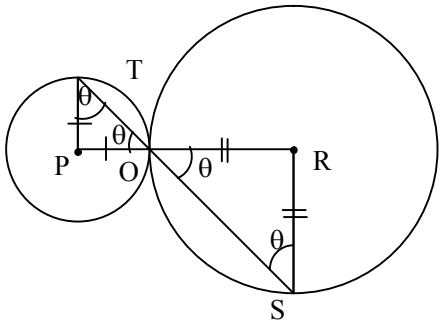
$\Rightarrow \frac{10000}{3}$gm $= \frac{10}{3}$kg $\Rightarrow 3\frac{1}{3}$kg

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

(1) PT and RS are equal length (2) PT and RS are perpendicular to each other

(3) PT and RS are intersecting (4) PT and RS are parallel

**Sol.** **(4)**




$\Delta POT \sim \Delta ROS$ By AAA similarity

$\angle P = \angle R$

Since Alternate interior angles are equal

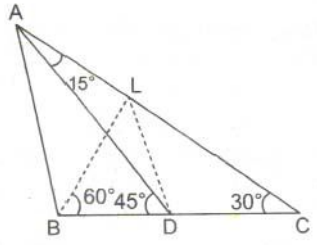
therefore PT || RS

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

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

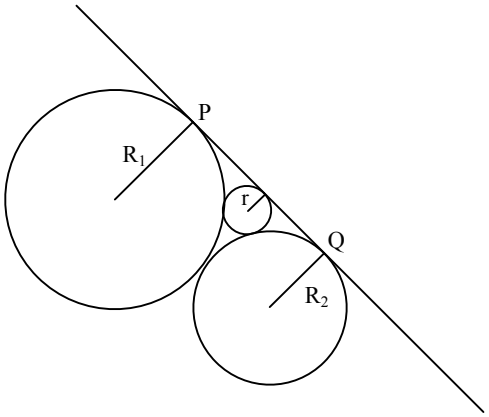
**Sol.** **(2)**

Draw BL perpendicular to AC and join L to D. Since $\angle BCL = 30^\circ$, we get $\angle CBL = 60^\circ$. Since BLC is a right triangle with $\angle BCL = 30^\circ$, we have BL = BC /2 = BD. Thus in $\angle BCD$, we observes that BL = BD and $\angle DBL = 60^\circ$. This implies that BLD is an equilateral triangle and hence LB = LD. Using $\angle LDB = 60^\circ$ and $\angle ADB = 45^\circ$, we get $\angle ADL = 15^\circ$. But $\angle DAL = 15^\circ$. Thus LD = LA. We hence have LD = LA = LB. This implies that L is the circumcentre of the $\Delta$. Thus, $\angle BAD = \frac{1}{2}\angle BLD = \frac{1}{2} \times 60^\circ = 30^\circ$




Since $\angle ADC = 135^\circ$. Which is equal to $\angle BAD + \angle ABC$. Therefore $\angle ABC = 105^\circ$.

**Q.55** Three circles with radii $R_1$, $R_2$ and r tough 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) $\frac{1}{\sqrt{R_1}} + \frac{1}{\sqrt{R_2}} = \frac{1}{\sqrt{r}}$

**Sol.** **(4)**

Length of PS = $\sqrt{(R_1 + r)^2 - (R_1 - r)^2} = 2\sqrt{R_1 r}$ ….(1)

Length of QS = $\sqrt{(R_2 + r)^2 - (R_2 - r)^2} = 2\sqrt{R_2 r}$ ….(2)

Length of PQ = $\sqrt{(R_1 + R_2)^2 - (R_1 - R_2)^2} = 2\sqrt{R_1 R_2}$ ….(3)

PQ = PS + QS ….(4)

By (1), (2), (3) & (4)

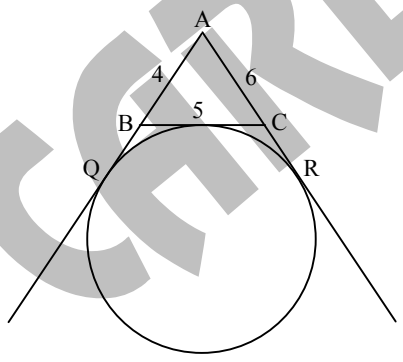
$2\sqrt{R_1 r} + 2\sqrt{R_2 r} = 2\sqrt{R_1 R_2}$

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

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

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

**Sol.** **(2)**




$AQ = \frac{1}{2}$ (Perimeter $\Delta ABC$)

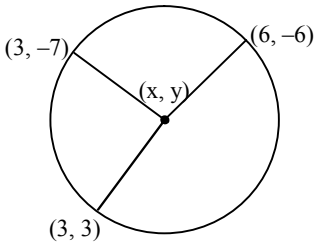
$AQ = \frac{1}{2}(4 + 6 + 5) = \frac{1}{2} \times 15$

$\boxed{AQ = 7.5 \text{ cm}}$

**Q.57** The centre of the circle passing through the points (6, –6), (3, 3) is

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

**Sol.** **(3)**




Points (6, –6), (3, –7) & (3, 3)

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

$y^2 + 9 - 6y = y^2 + 49 + 14y$

$-14y - 6y = 49 - 9$

$-20y = 40$

$y = -2$

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

$(x-6)^2 + 16 = (x-3)^2 + 25$

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

$6x = 18$

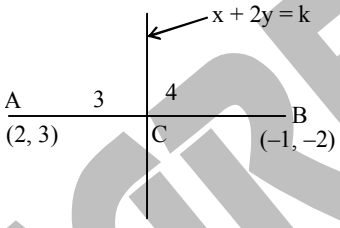
$x = 3$

Center = (3, –2)

**Q.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) $\frac{41}{7}$

**Sol.** **(4)**




Coordinate of $C = \left(\frac{-3+8}{7}, \frac{6+12}{7}\right) = \left(\frac{5}{7}, \frac{18}{7}\right)$

Point C lies on line $x + 2y = k$

So $\frac{5}{7} + 2 \times \frac{18}{7} = k$

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

**Q.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) $208\frac{2}{3}$ (4) $216\frac{2}{3}$

**Sol.** **(4)**

Let x is mean

Then smallest no. $= x - 10$

largest no. $= x + 15$

So series $x - 10, 5, x + 15$ [$\because$ median = 5]

Given $\frac{x-10+5+x+15}{3} = x$

$\Rightarrow 2x + 10 = 3x \Rightarrow x = 10$

Therefore numbers are 0, 5 and 25

$\Rightarrow \frac{0^2+5^2+25^2}{3} = \frac{0+25+625}{3} = \frac{650}{3} = 216\frac{2}{3}$

**Q.60** Three dice are thrown simultaneously. The probability of getting at 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) $\frac{53}{54}$

**Sol.** **(4)**

P(getting atleast 5) = 1 – P(getting less than 5)

4 cases = 1 + 1 + 1

1 + 1 + 2

1 + 2 + 1

2 + 1 + 1

P(getting less than 5) $= \frac{4}{216} = \frac{1}{54}$

P (getting atleast 5) $= 1 - \frac{1}{54} = \frac{53}{54}$

# SOCIAL SCIENCE

**Q.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 (2) A-II, B-IV, C-I, D-III

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

**Sol.** (*)

**Q.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 and R is false
(4) A is false and R is true
**Sol.** **(3)**

**Q.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
**Sol.** **(4)**

**Q.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 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
**Sol.** **(1)**

**Q.65** **Assertion (A) :** In the $17^{th}$ and $18^{th}$ 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 True and R is correct explanation of A
(2) Both A are 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
**Sol.** **(1)**

**Q.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 True and R is correct explanation of A
(2) Both A are 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
**Sol.** **(3)**

**Q.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, III, I, II
**Sol.** **(2)**

**Q.68** Arrange the following events descending order with regard 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

**Sol.** **(4)**

**Q.69** Find out the correct statements with regards 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 of 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

**Sol.** **(4)**

**Q.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 True and R is correct explanation of A
(2) Both A are 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

**Sol.** **(3)**

**Q.71** Match the following

| | | | |
|---|---|---|---|
| A. | Gallery | 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 parchment 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

**Sol.** **(4)**

**Q.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 formed 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 International 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

**Sol.** **(1)**

**Q.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 elimination all those who were seen as undesirable.

**Sol.** **(3)**

**Q.74** During the mid-eighteenth century
**Assertion (A) :** Indian spinners and weaves were left without work and important centres of textile declined
**Reason (R) :** Large number of people began boycotting British cloth and started adopting khadi.
(1) Both A and R True and R is correct explanation of A
(2) Both A are 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

**Sol.** **(2)**

**Q.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 True and R is correct explanation of A
(2) Both A are 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

**Sol.** **(1)**

**Q.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 True and R is correct explanation of A
(2) Both A are 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

**Sol.** **(2)**

**Q.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 cylcones helps in growing of these crops.
(1) Both A and R True and R is correct explanation of A
(2) Both A are 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

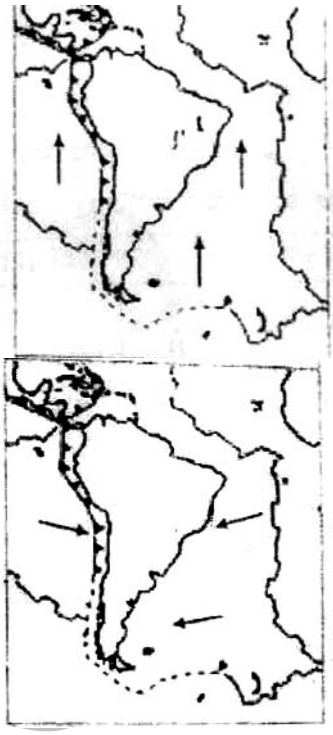
**Sol.** **(3)**

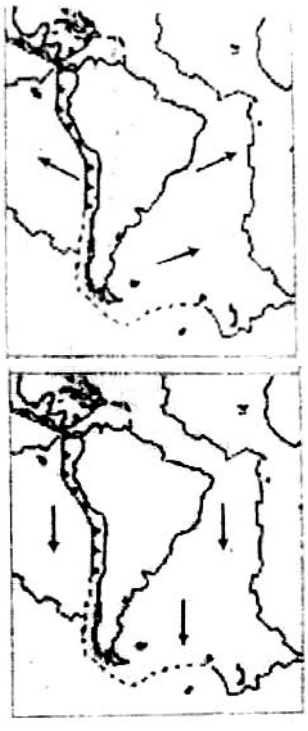
**Q.78** Arrange the shaded states shown on the map of India in descending order of population density and select the right code.


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

**Sol.** **(3)**

**Q.79** Which of the following figure is showing the correct direction of movement of the South American Plate?

(1) 

(2) 

(3) 

(4) 

**Sol.** **(3)**

**Q.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

**Sol.** **(4)**

**Q.81** Keeping in mind the location of the following sanctuaries/national park of 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, II

**Sol.** **(4)**

**Q.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-III, C-VI, 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

**Sol.** **(4)**

**Q.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 True and R is correct explanation of A

(2) Both A are 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

**Sol.** **(1)**

**Q.84** Match list I (Type of Resource) 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. | Stauts 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-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

**Sol.** **(3)**

**Q.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

**Sol.** **(2)**

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

| List I (National Highwasy of India) | | List II (Description ) | |
|---|---|---|---|
| A. | Nationa Highway Number 1 | I. | Covers most of Rajasthan |
| B. | National Highway Number 15 | II. | Known as Sher Shah Suri Marg |
| C. | National Highway Number 7 | III. | Connects Delhi |
| 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

**Sol.** **(3)**

**Q.87** Which of the following statement is NOT true to the context of Mawsynram?
(1) It is considered as the wettest lace on the earth
(2) It ..... with stalagmits and .....
(3) It is located very close to Cherrapunji
(4) It is located very close to the Myanmar border

**Sol.** **(4)**

**Q.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

**Sol.** **(2)**

**Q.89** The topic of Cancer passes through which of the following plateau?
(1) Only Malwa
(2) Only Chotanagpur
(3) Only Maghalaya
(4) Both malwa and Chotanagar

**Sol.** **(4)**

**Q.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 True and R is correct explanation of A
(2) Both A are 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

**Sol.** **(2)**

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

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

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

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

**Sol.** **(4)**

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

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

**Sol.** **(3)**

**Q.93** Which of the following international 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 the United Nations (4) World Bank

**Sol.** **(1)**

**Q.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

**Sol.** **(1)**

**Q.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. | Distributed 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-IV, B-III, C-II, D-I

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

**Sol.** **(2)**

**Q.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

**Sol.** **(3)**

**Q.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

**Sol.** **(3)**

**Q.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 153 (4) Rs 230

**Sol.** **(2)**

**Q.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 bying food grains | 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

**Sol.** **(2)**

**Q.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

**Sol.** **(3)**