

NATIONAL TALENT SEARCH EXAMINATION (FIRST LEVEL) 2018

SCHOLASTIC APTITUDE TEST

(For Students of Class X)

Date : 05/11/2017

Time : 90 Minutes

Max. Marks : 100

(For Blind Candidates Time : 2 Hours)

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open question booklet.

1. Answers are to be given on a **separate answer sheet (OMR sheet.)**
2. Please write your **Roll Number** as allotted to you in the admission card very clearly on **the test-booklet** and darken the appropriate circles on the **answer sheet** as per instructions given.
3. There are 100 questions in this test. All are compulsory. The questions numbers 1 to 13 belong to Physics, 14 to 26 Chemistry, 27 to 33 Botany, 34 to 40 Zoology, 41 to 60 Mathematics, 61 to 71 History, 72 to 82 Geography, 83 to 93 Political Science and 94 to 100 are on Economics subjects.
4. Please follow the instructions given on the answer sheet for marking the answers.
5. If you do not know the answer to any question, do not waste time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and attempt them.
6. Since the time allotted for this question paper is very limited, you should make the best use of it by not spending too much time on any one question.
7. **Rough work** can be done **on the given Blank Pages at the back of the booklet** but not on the answer sheet/loose paper.
8. Every correct answer will be awarded one mark. There will be no negative marking.
9. **Please return the Answer sheet (OMR) only to the invigilator after the test.**
10. Hindi version of the question paper will be considered as final in case of any dispute arising out of variation in translated version.

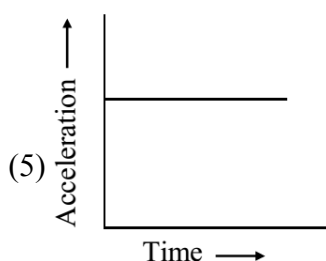
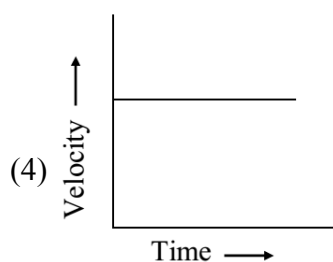
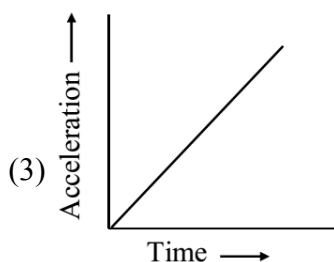
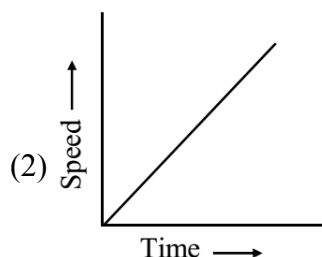
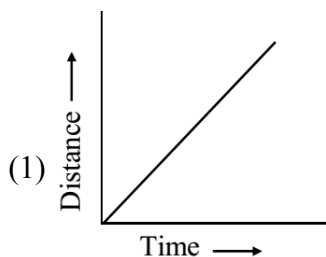


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1. Consider the following five graphs (note the axes carefully). Which of the following represents motion at constant speed?



- (1) D only (2) D and E (3) A, B and C (4) A and D

Ans. (4)

Sol. (1) Slope of distance time graph gives speed which is constant.

(2) Velocity is constant so speed will also be constant.

2. A bullet of mass 50 gm is horizontally fired with a velocity 100 ms^{-1} from a gun of mass 10 kg. What will be the recoil velocity of the gun?

- (1) 100 ms^{-1} (2) 500 ms^{-1} (3) 0.5 ms^{-1} (4) zero

Ans. (3)

Sol. $m_b = 50 \times 10^{-3} \text{ kg}$

$v_b = 100 \text{ m/s}$

$m_g = 10 \text{ kg}$

Considering gun & bullet system at rest before fire.

Apply momentum conservation

$$0 = (50 \times 10^{-3} \times 100) + (10 \times v_g)$$

$$v_g = -\frac{5}{10} = -0.5 \text{ m/s}$$

3. A ball is shot vertically upward with a given initial velocity. It reaches a maximum height of 100 m. If on a second shot, the initial velocity is doubled then the ball will reach a maximum height of:

- (1) 70.7 m (2) 141.4 m (3) 200 m (4) 400 m

Ans. (4)

Sol. $100 = \frac{u^2}{2g}$ $H' = \frac{(2u)^2}{2g} = \frac{4u^2}{2g} = 4(100) = 400 \text{ m}$

4. Let M denotes the mass of earth and let R denotes its radius. The ratio g/G at earth's surface is :
 (1) R^2/M (2) M/R^2 (3) M/R (4) R/M

Ans. (2)

Sol. $g = \frac{GM}{R^2} \Rightarrow \frac{g}{G} = \frac{M}{R^2}$

5. The unit 'hertz' is same as :

- (1) second (2) second^{-1} (3) metre (4) metre^{-1}

Ans. (2)

Sol. $f = \frac{1}{T} \Rightarrow \text{Hertz} = \frac{1}{\text{second}}$

6. A sound wave has a frequency of 10 kHz and wavelength 3 mm. How much time will it take to travel 3 metre
 (1) 0.1 sec (2) 1 sec (3) 10 sec (4) 0.01 sec

Ans. (1)

Sol. $v = f\lambda \Rightarrow \frac{d}{t} = f\lambda \Rightarrow t = \frac{3}{10 \times 10^3 \times 3 \times 10^{-3}}$

$\Rightarrow t = 0.1 \text{ sec}$

7. The size of image formed by a concave mirror is same as the size of object. The position of the object will be :
 (1) at F (2) between F and C
 (3) at C (4) between C and infinity

Ans. (3)

Sol. When object position is at centre of curvature, real, inverted and same size image will be formed at same position.

8. A convex lens has focal length of 30 cm. If an object is placed at a distance of 15 cm from it then the magnification produced by the lens is :
 (1) 6.66 (2) 0.5 (3) 1 (4) 2

Ans. (4)

Sol. $f = 30 \text{ cm}$
 $u = -15 \text{ cm}$

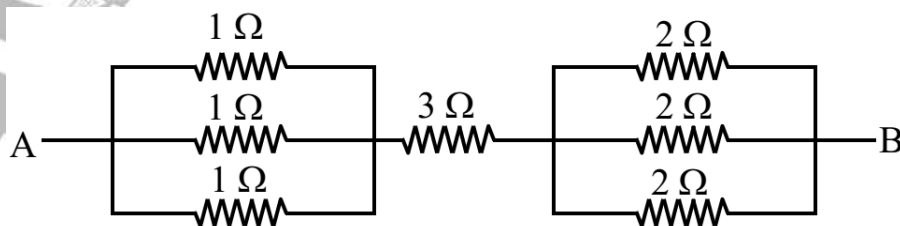
$m = \frac{f}{f+u} = \frac{30}{30-15} = 2$

9. The electrical resistivity of a conducting wire is K . If its length and area of cross section are doubled then the new resistivity of the wire will be :
 (1) K (2) $2K$ (3) $K/2$ (4) $K/4$

Ans. (1)

Sol. $\rho = K$
 ρ does not depend on length and area of cross section.

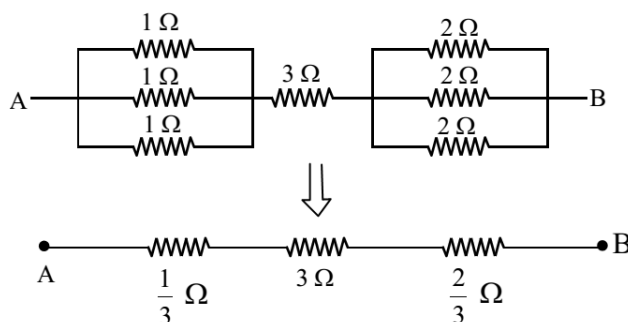
10. What is the equivalent resistance of the given circuit between points A and B ?



- (1) $10\ \Omega$ (2) $4\ \Omega$ (3) $\frac{14}{3}\ \Omega$ (4) $\frac{17}{6}\ \Omega$

Ans. (2)

Sol.



$$R_{AB} = \frac{1}{3} + 3 + \frac{2}{3} = 4\Omega$$

11. 4 bulbs rated 100 W each, operate for 6 hours per day. What is the cost of the energy consumed in 30 days at the rate of Rs. 5 /kWh ?

(1) Rs. 360 (2) Rs. 90 (3) Rs. 120 (4) Rs. 400

Ans. (1)

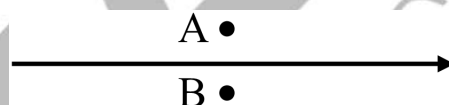
Sol. Total power $P = 4 \times 100 = 400 \text{ W}$

$$\text{Energy} = Pt = \frac{400 \times 6 \times 30}{1000} \text{ kWh}$$

$$= 72 \text{ kWh}$$

$$\text{Cost of energy} = 72 \times 5 = \text{Rs. } 360$$

12. An electric current is passed through a straight wire. Magnetic compasses are placed at the points A and B. True statement is

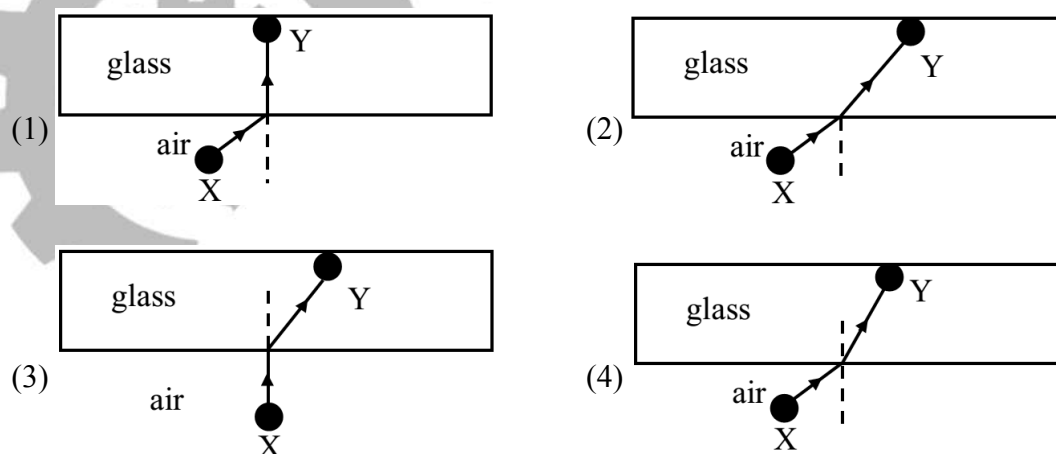


- (1) their needles will not deflect
 (2) only one of the needles will deflect
 (3) both the needles will deflect in the same direction
 (4) the needles will deflect in the opposite direction

Ans. (4)

Sol. Magnetic field due to straight wire will be in opposite direction on both side of wire.

13. Which diagram below illustrates the path of a light ray as it travels from a given point X in air to another given point Y in glass?



Ans. (4)

Sol. Light bends towards normal as it enters from rarer medium to denser.

14. Conjugate base of HCl in the following reaction is
 $\text{HCl (aq)} + \text{H}_2\text{O} \rightarrow \text{Cl}^- \text{ (aq)} + \text{H}_3\text{O}^+$
 (1) H_3O^+ (2) H_2O (3) Cl^- (4) HCl

Ans. (3)

Sol. When an acid loses a hydrogen ion, its conjugates base is produced.
 \therefore When HCl loses its hydrogen ion & forms Cl^- , which is the conjugate base.

15. The chemical formula of Plaster of Paris is :
 (1) CaSO_4 (2) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (3) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ (4) $\text{CaSO}_4 \cdot \text{H}_2\text{O}$

Ans. (3)

Sol. Chemical name of POP is calcium sulphate hemi-hydrate.

\therefore The chemical formula of POP is $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$.

16. Which type of catalyst is ethanol in the following reaction ?
 $\text{CHCl}_3 + \text{O}_2 \xrightarrow{\text{C}_2\text{H}_5\text{OH}} 2\text{COCl}_2 + 2\text{HCl}$
 (1) Positive catalyst (2) Negative catalyst (3) Bio-catalyst (4) Autocatalyst

Ans. (2)

Sol. Alcohol (Ethanol) retards the oxidation of CHCl_3 to COCl_2 .
 \therefore Ethanol is a negative catalyst.

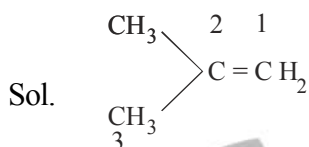
17. Metalloid among the following is :
 (1) lithium (2) sulphur (3) sodium (4) silicon

Ans. (4)

Sol. Silicon is a metalloid.

18. The IUPAC name of $\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{C} = \text{H}_2 \\ \diagdown \\ \text{CH}_3 \end{array}$ is :
 (1) 1, 1-dimethyl-2-ethene (2) 2-methyl-1-propene
 (3) 2,2-dimethyl ethene (4) 2-methyl prop-2-ene

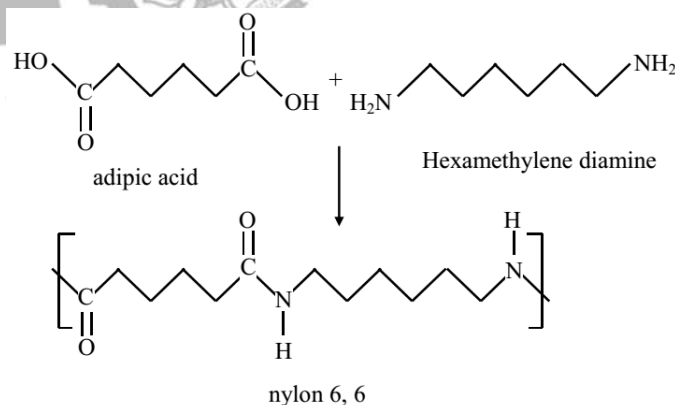
Ans. (2)



The longest carbon chain is of 3 carbon atoms & numbering starts from right hand side.
 \therefore Its correct IUPAC name is 2-methyl-1-propene

19. The polymer formed by condensation of adipic acid and hexamethylene diamine is :
 (1) isoprene (2) rayon (3) terylene (4) nylon-6, 6

Ans. (4)



20. The method for separation of mixture of common salt and ammonium chloride is :

- (1) fractional distillation (2) sublimation
(3) chromatography (4) crystallization

Ans. (2)

Sol. Common salt and Ammonium chloride is separated by sublimation.

NH_4Cl is sublimable and NaCl is not.

21. Number of molecules present in 14 gm of N_2 molecule is :

- (1) 6.022×10^{23} (2) 3.011×10^{23} (3) 1.51×10^{23} (4) 6.022×10^{22}

Ans. (2)

Sol. $\text{Mole} = \frac{\text{given mass}}{\text{GMM}}$

$$= \frac{14}{28} = 0.5 \text{ mol}$$

$$\text{Mole} = \frac{N}{N_A}$$

$$\begin{aligned} N &= 0.5 \times N_A & N_A &= 6.022 \times 10^{23} \\ &= 0.5 \times 6.022 \times 10^{23} \\ &= 3.011 \times 10^{23} \end{aligned}$$

22. Which of the following elements has an electronic configuration 2, 8, 6 ?

- (1) Sulphur (2) Oxygen (3) Phosphorus (4) Chlorine

Ans. (1)

Sol. Sulphur has

Atomic number = 16

Total electron = 16

	K	L	M
Electronic configuration of Sulphur	2	8	6

23. Which of the following elements shows variable valency ?

- (1) Na (2) Mg (3) Fe (4) Zn

Ans. (3)

Sol. Fe

Iron shows two valency

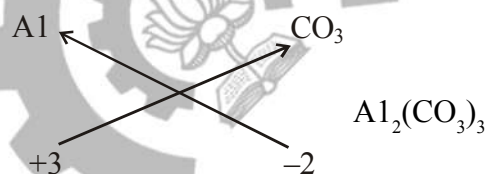
$\text{Fe}^{+2} \rightarrow$ ferrous

$\text{Fe}^{+3} \rightarrow$ ferric

24. Formula of aluminium carbonate is :

- (1) $\text{Al}_2(\text{CO}_3)_3$ (2) Al_2CO_3 (3) Al_2HCO_3 (4) AlCO_3

Ans. (1)



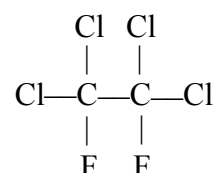
Sol.

25. Formula of Freon - 112 is :

- (1) $\text{C}_2\text{F}_2\text{Cl}_4$ (2) CF_2Cl_2 (3) CFCl_3 (4) CCl_3F

Ans. (1)

Sol. $\text{C}_2\text{F}_2\text{Cl}_4$



1, 2-Difluorotetrachloroethane [Freon-112]

26. The element X reacting with chlorine forms a water soluble compound having high melting point. Element X is
 (1) Magnesium (2) argon (3) carbon (4) neon
 Ans. (1) Magnesium
 Sol. Magnesium reacting with chlorine forms a water soluble compound having high melting point
 $\text{Mg} + \text{Cl}_2 \rightarrow \text{MgCl}_2$
 Argon and neon are noble gases. They do not react with chlorine.
 Carbon forms carbon tetrachloride CCl_4 . It is non-polar. It does not dissolve in water.
27. Which tissue is found in fibrous covering of coconut ?
 (1) Parenchyma (2) Collenchyma (3) Sclerenchyma (4) Meristematic tissue
 Ans. (3)
 Sol. Sclerenchyma is found in fibrous covering of coconut.
28. Nucleus of the cell was discovered by
 (1) Robert Hooke (2) Leeuwenhoek (3) Robert Brown (4) Virchow
 Ans. (3)
 Sol. Nucleus of cell was discovered by Rober Brown in the year 1831.
29. Which of the following is a plant hormone ?
 (1) Insulin (2) Thyroxine (3) Cytokinin (4) Oestrogen
 Ans. (3)
 Sol. Cytokinin is a plant hormone which promotes cell division in plants.
30. Plant group more sensitive to the levels of sulphur dioxide in air is
 (1) Thallophyta (2) Lichen (3) Pteridophyta (4) Gymnosperm
 Ans. (2)
 Sol. Lichen is sensitive to sulphur dioxide present in the environment. So, act as useful bioindicators for the same.
31. Examples of perennial, evergreen and woody plants are
 (1) Funaria, Marchantia (2) Marsilea, Horse-tail
 (3) Cycas, Pinus (4) Ulothrix, Spirogyra.
 Ans. (3)
 Sol. Cycas and Pinus belong to gymnosperms and are perennial, evergreen, woody plants.
32. Turgidity of cell is maintained by
 (1) Vacuole (2) Lysosome (3) Plastid (4) Golgi body
 Ans. (1)
 Sol. Turgity of a cell is maintained by vacuoles. As a plant cell receives water, the central vacuoles swell up and creates a turgor pressure and maintains turgity of cell.
33. The substance not essential for photosynthesis is
 (1) Sunlight (2) Chlorophyll (3) Nitrogen (4) Carbon dioxide.
 Ans. (3)
 Sol. Nitrogen is not directly required for photosynthesis.
34. The nature of nerve impulse is
 (1) Chemical (2) Magnetic (3) Electrochemical (4) Electromagnetic
 Ans. (3)
 Sol. The nerve impulse is a electrical impulse and its transmission also involves chemicals such as neurotransmitters. So it is an electrochemical impulse.
35. The example of uricotelic animal is
 (1) Fishes (2) Reptiles (3) Amphibians (4) Mammals.
 Ans. (2)
 Sol. Reptiles are uricotelic animals. They excrete nitrogenous waste in the form of uric acid.

42. For which positive values of k and p , equations $2x^2 + px + 8 = 0$ and $p(x^2 + x) + k = 0$ have equal roots?

- (1) $k = 1, p = 4$ (2) $k = 2, p = 8$ (3) $k = 4, p = 8$ (4) $k = 2, p = 4$

Ans. (2) $2x^2 + px + 8 = 0$

Sol. For equal roots $D = 0$

$$b^2 - 4ac = 0 \Rightarrow p^2 - 4 \times 2 \times 8 = 0$$

$$\Rightarrow p^2 = 64$$

$$p = 8$$

$$\Rightarrow 8(x^2 + x) + k = 0 \Rightarrow 8x^2 + 8x + k = 0$$

For equal roots $D = 0$

$$b^2 - 4ac = 0 \Rightarrow 64 - 4 \times 8 \times k = 0$$

$$k = 2$$

43. If α, β are zeros of polynomial $x^2 - p(x + 1) - k$ such that $(\alpha + 1)(\beta + 1) = 6$, the value of k is

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

Ans. (4)

Sol. $x^2 - p(x + 1) - k = 0$

$$x^2 - px - p - k = 0$$

$$\alpha + \beta = p, \quad \alpha\beta = -(p + k)$$

$$\text{ATQ } (\alpha + 1)(\beta + 1) = 6$$

$$\alpha\beta + \alpha + \beta + 1 = 6$$

$$-p - k + p + 1 = 6$$

$$k = 1 - 6 \Rightarrow k = -5$$

44. Which is unit digit of $6^{18} - 5^{10}$?

- (1) 5 (2) 8 (3) 1 (4) 9

Ans. (3)

Sol. Unit digit of $6^{18} - 5^{10}$

$$\text{cyclicity of } 6 = 1$$

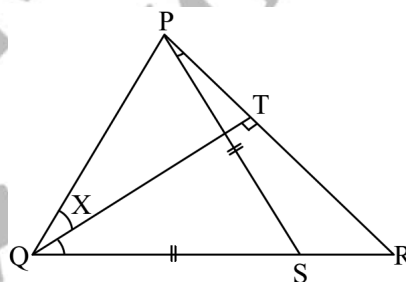
$$\text{Unit digit of } 6^{18} \rightarrow 6$$

$$\text{cyclicity of } 5 = 1$$

$$\text{Unit digit of } 5^{10} = 5$$

$$\therefore \text{Unit digit of } 6^{18} - 5^{10} = 1$$

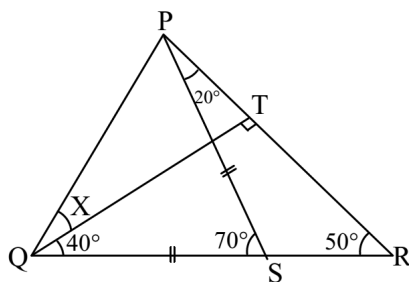
45. In the following figure $QT \perp PR$ and $QS = PS$. If $\angle TQR = 40^\circ$ and $\angle RPS = 20^\circ$ the value of x is



- (1) 80° (2) 25° (3) 15° (4) 35°

Ans. (3)

Sol. $QS = PS$



In ΔQTR

$$\angle TRQ = 180^\circ - 40^\circ - 90^\circ = 50^\circ$$

$\angle PSQ$ is exterior angle

$$\Rightarrow \angle PSQ = 20^\circ + 50^\circ = 70^\circ$$

In ΔPQS

$$PS = QS$$

$$\angle SPQ = \angle PQS = \frac{110}{2} = 55^\circ$$

$$\Rightarrow \angle PQS = 55^\circ = x + 40^\circ$$

$$x = 15^\circ$$

46. Which term of A.P. $20, 19\frac{1}{4}, 18\frac{1}{2}, \dots$ is first negative term ?

(1) 18th

(2) 15th

(3) 28th

(4) 27th

Ans. (3)

Sol. $20, 19\frac{1}{4}, 18\frac{1}{2}, \dots$

$$a = 20, \quad d = -\frac{3}{4}$$

For first - ve term

$$T_n < 0$$

$$a + (n-1)d < 0$$

$$20 + (n-1)\left(-\frac{3}{4}\right) < 0$$

$$20 - \frac{3}{4}n + \frac{3}{4} < 0$$

$$\Rightarrow \frac{3}{4}n > \frac{83}{4}$$

$$\text{or } 3n > 83$$

$$n > 27\frac{2}{3}$$

\Rightarrow First Negative term is $n = 28$

47. The angles of elevation of the top of a 12 m high tower from two points in opposite directions with it are complementary. If distance of one point from its base is 16 m, then distance of second point from tower's base is
- (1) 24 m (2) 9 m (3) 12 m (4) 18 m

Ans. (2)

Sol. Let the two angles are

θ and $(90 - \theta)$

Since $BC = 16$ m

& $BD = x$ m

In $\triangle ABC$

$$\tan \theta = \frac{AB}{BC} = \frac{12}{16}$$

$$\tan \theta = \frac{3}{4} \quad \dots\dots\dots (i)$$

In $\triangle ABD$

$$\tan (90 - \theta) = \frac{AB}{BD}$$

$$\cot = \frac{12}{x}$$

$$\frac{4}{3} = \frac{12}{x} \Rightarrow x = 9m$$

48. If $m = \frac{\cos A}{\cos B}$ and $n = \frac{\cos A}{\sin B}$, then $(m^2 + n^2) \cos^2 B$ is equal to.

- (1) m^2 (2) n^2 (3) $m^2 + n^2$ (4) $m + n$.

Ans. (2)

Sol. $(m^2 + n^2) \cos^2 B = \left(\frac{\cos^2 A}{\cos^2 B} + \frac{\cos^2 A}{\sin^2 B} \right) \cos^2 B$

$$\Rightarrow \left(\frac{\cos^2 A \sin^2 B + \cos^2 A \cos^2 B}{\cos^2 B \sin^2 B} \right) \cos^2 B$$

$$\Rightarrow \cos^2 A \frac{[\sin^2 B + \cos^2 B]}{\sin^2 B} [\because \sin^2 B + \cos^2 B = 1]$$

$$\Rightarrow \frac{\cos^2 A}{\sin^2 B} = n^2$$

49. If ratio of heights of two similar triangles is 4 : 9, then ratio between their areas is

- (1) 2 : 3 (2) 3 : 2 (3) 81 : 16 (4) 16 : 81

Ans. (4)

Sol. Let the area of two triangles are A_1 and A_2 and heights are h_1 and h_2

$$\frac{A_1}{A_2} = \left(\frac{h_1}{h_2} \right)^2$$

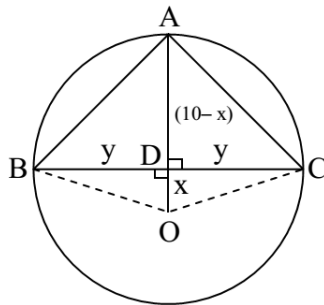
$$A_1 : A_2 = \left(\frac{4}{9} \right)^2 = 16 : 81$$

50. In a circle of 10 cm radius, two chords $AB = AC = 12$ cm, then the length of the chord BC is
 (1) 12 cm (2) 9.6 cm (3) 19.2 cm (4) 7.2 cm

Ans. (3)

Sol. $AB = AC = 12$ cm

$OA = OB = OC = \text{radius} = 10$ cm



Let $OD = x$

$$\Rightarrow AD = 10 - x$$

Also let $BD = DC = y$

In $\triangle OBD$, $\angle D = 90^\circ$

$$OB^2 = x^2 + y^2$$

$$100 = x^2 + y^2 \quad \dots(1)$$

In $\triangle ABD$, $\angle D = 90^\circ$

$$AB^2 = (10 - x)^2 + y^2$$

$$144 = 100 + x^2 - 20x + y^2$$

from (1)

$$144 = 100 + 100 - 20x$$

$$\Rightarrow 20x = 56$$

$$\Rightarrow x = \frac{56}{20} = 2.8$$

$$= 100 - (2.8)^2$$

$$= 92.16$$

$$y = 9.6 \text{ cm}$$

$$2y = 9.6 \times 2 = 19.2 \text{ cm}$$

51. If mean of ten consecutive odd numbers is 120, then the mean of first five odd numbers among them is

- (1) 113 (2) 115 (3) 114 (4) 116

Ans. (2)

Sol. Let the consecutive odd number are $x, x + 2, x + 4, \dots, x + 18$

$$\text{Mean} = \frac{x + x + 2 + \dots + x + 18}{10}$$

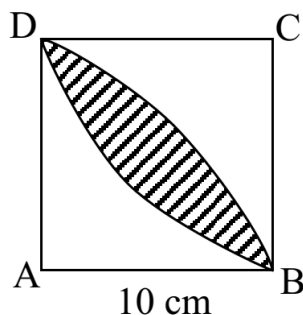
$$\Rightarrow 120 = \frac{10x + 90}{10}$$

$$\Rightarrow x = 111$$

Then first five odd numbers are 111, 113, 115, 117, 119

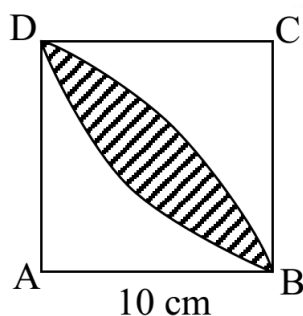
$$\text{Mean} = \frac{111 + 113 + 115 + 117 + 119}{5} = 115$$

52. Find the area of shaded region, where side of square ABCD is 10 cm and two arcs drawn from two opposite vertices of the square.



- (1) $\frac{200}{7}$ sq. unit (2) $\frac{400}{7}$ sq. unit (3) $\frac{600}{7}$ sq. unit (4) $\frac{100}{7}$ sq. unit

Ans. (2)
Sol.



area of shaded region = area of 2 quadrant – area of square

$$= 2 \times \frac{\pi}{4} \times (10)^2 - 100$$

$$= 100 \left(\frac{\pi}{2} - 1 \right)$$

$$= 100 \left(\frac{11}{7} - 1 \right)$$

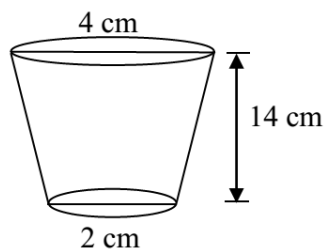
$$= \frac{400}{7} \text{ cm}^2$$

53. Find the capacity of a glass which is in the shape of frustum of height 14 cm and diameters of both circular ends are 4 cm and 2 cm.

- (1) $\frac{308}{3} \text{ cm}^3$ (2) $\frac{298}{21} \text{ cm}^3$ (3) 112 cm^2 (4) $\frac{298}{21} \text{ cm}^2$

Ans. (1)

Sol. $h = 14 \text{ cm}$
 $r_1 = 2 \text{ cm}$
 $r_2 = 1 \text{ cm}$

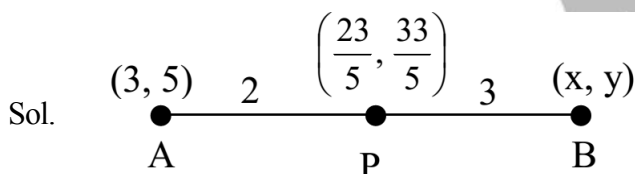


$$\begin{aligned}\therefore \text{Volume} &= \frac{1}{3} \pi (r_1^2 + r_2^2 + r_1 r_2) h \\ &= \frac{1}{3} \times \frac{22}{7} (4^2 + 2^2 + 4 \times 2) \times 14 \\ &= \frac{308}{3} \text{ cm}^3\end{aligned}$$

54. If a point $P\left(\frac{23}{5}, \frac{33}{5}\right)$, divides line AB joining two points $A(3, 5)$ and $B(x, y)$ internally in ratio of 2 : 3, then the values of x and y will be

(1) $x = 4, y = 7$ (2) $x = 5, y = 9$ (3) $x = 7, y = 9$ (4) $x = 7, y = 8$

Ans. (3)



$$\text{Now, } \left(\frac{23}{5}, \frac{33}{5}\right) = \left(\frac{2x+9}{5}, \frac{2y+15}{5}\right)$$

On comparing we get,

$$\frac{2x+9}{5} = \frac{23}{5}$$

$$2x = 14$$

$$x = 7$$

$$\frac{2y+15}{5} = \frac{33}{5}$$

$$2y = 18$$

$$y = 9$$

55. If a leap year is selected randomly, then what is the probability of having 53 Mondays in this year?

(1) $\frac{1}{7}$ (2) $\frac{2}{7}$ (3) $\frac{53}{366}$ (4) $\frac{52}{365}$

Ans. (2)

Sol. In a leap year, there are 366 days i.e. 52 weeks & 2 days.

Now, 2 days = Sun + Mon, Mon + Tue, Tue + Wed, Wed + Thur, Thur + Fri, Fri + Sat, Sat + Sun

$$\therefore P(53 \text{ Mondays}) = \frac{2}{7}$$

56. If the length of circumference of a circle is 60 cm more than its diameter, then length of its circumference is
 (1) 14π cm (2) 28π cm (3) 35π cm (4) 42π cm

Ans. (2)

Sol. Let the radius of a circle be r cm.

Now, according to question,

$$\text{Circumference} - \text{Diameter} = 60$$

$$2\pi r - 2r = 60$$

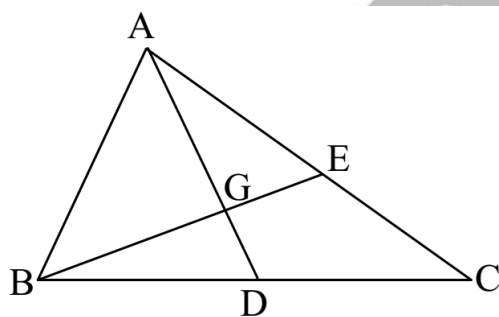
$$2r(\pi - 1) = 60$$

$$r\left(\frac{22}{7} - 1\right) = 30$$

$$r = 14 \text{ cm}$$

$$\therefore \text{Circumference} = 2\pi r = 2 \times \frac{22}{7} \times 14 = 28\pi \text{ cm}$$

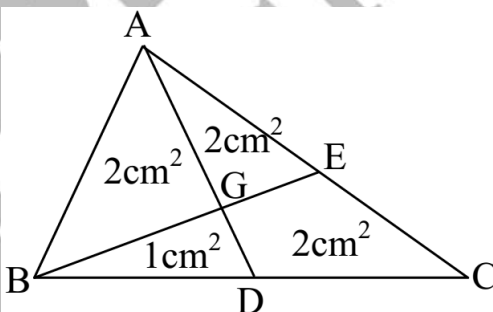
57. In given $\triangle ABC$, AD and BE are medians of triangle which intersect each other at point G. If area of $\triangle BDG$ is 1 cm^2 , then what is the area of DCEG?



- (1) 2 cm^2 (2) 3 cm^2 (3) 4 cm^2 (4) 1 cm^2

Ans. (1)

Sol.



Given

$$\text{Area } \triangle BGD = 1 \text{ cm}^2$$

$$\text{Since } AG : GD = 2 : 1$$

$$\text{therefore Area } \triangle AGB : \text{Area } \triangle BGD = 2 : 1$$

$$\text{Area } \triangle AGB = 2 \text{ cm}^2$$

$$\text{Area } \triangle ABD = 3 \text{ cm}^2$$

$$\text{Since AD is median, therefore Area } \triangle ABD = \text{Area } \triangle ADC$$

$$\text{Area } \triangle ADC = 3 \text{ cm}^2$$

$$\text{Therefore area } \triangle BEC = 3 \text{ cm}^2$$

$$\text{area of quadrilateral DCEG} = 2 \text{ cm}^2$$

58. What is the radian value of angle $60^\circ 30'$?

- (1) $\frac{\pi^c}{3}$ (2) $\frac{121}{360}\pi^c$ (3) $\frac{121\pi^c}{180}$ (4) $\frac{121}{540}\pi^c$

Ans. (2)

Sol. $60^\circ 30' = 60^\circ + \left(\frac{1}{60}\right)^\circ \times 30 = \frac{121^\circ}{2}$

$$\therefore \frac{121^\circ}{2} = \frac{121}{2} \times \frac{\pi}{180} = \frac{121}{360}\pi^c$$

59. The diameter of a sphere is decreased by 25%. By what percent does its curved surface area decrease?

- (1) 25% (2) 56.25% (3) 43.75% (4) 62.5%

Ans. (3)

Sol. Let diameter of a sphere be $2r$.

\Rightarrow radius = r

Now, new radius (r') = $r - \frac{25r}{100} = \frac{3r}{4}$

\therefore % decrease in curved surface area

$$= \left[\frac{4\pi(r')^2 - 4\pi r^2}{4\pi r^2} \right] \times 100\%$$

$$= \frac{(r')^2 - r^2}{r^2} \times 100\%$$

$$= \frac{\left(\frac{3r}{4}\right)^2 - r^2}{r^2} \times 100\%$$

$$= \frac{9 - 16}{16} \times 100\%$$

$$= \frac{-7}{16} \times 100\% = 43.75\% \text{ decrease}$$

60. Value of $(x-y)^3 + (y-z)^3 + (z-x)^3$ is

- (1) $(x-y)^3 (y-z)^3 (z-x)^3$ (2) $3(x-y)(y-z)(z-x)$
(3) $x^3 + y^3 + z^3 - 3xyz$ (4) $x^3 + y^3 + z^3 - 2x^3y - 2y^3z - 2z^3x$

Ans. (2)

Sol. $(x-y)^3 + (y-z)^3 + (z-x)^3 = 3(x-y)(y-z)(z-x)$

$[\because a^3 + b^3 + c^3 = 3ab, \therefore a + b + c = 0]$

61. Match List-I with List-II correctly and choose the correct code from the following :

List-I

- (1) Meeting of the Estates General
(2) Bastille was destroyed on
(3) Abolishment of feudal system in France
(4) Swore of Tennis Court

List-II

- (i) 20th June, 1789
(ii) 4th August, 1789
(iii) 14th July, 1789
(iv) 5th May, 17489

Code :

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

Ans. (2)

62. The state of India where the Jallianwalla Bagh is situated, is
 (1) Haryana (2) Uttar Pradesh (3) Punjab (4) Rajasthan
 Ans. (3)
63. The German King in 1871 was
 (1) William I (2) Napoleon III (3) Frederik William IV (4) Emmanuel II
 Ans. (1)
64. Who discovered the spinning jenny ?
 (1) John Ke (2) T.E. Nicholsom (3) Raphadel Samuel (4) James Hargreaves
 Ans. (4)
65. The year of the Partition of Bengal was
 (1) 1903 (2) 1905 (3) 1907 (4) 1909
 Ans. (2)
66. Which one of the following countries was not among the Allied Powers ?
 (1) England (2) France (3) Russia (4) Germany
 Ans. (4)
67. When was the publication of Bengal Gazette initiated ?
 (1) 1750 (2) 1780 (3) 1850 (4) 1880
 Ans. (2)
68. Consider the following points :
 (1) Mahatma Gandhi started Salt March with his 78 confidential volunteers.
 (2) Mahatma Gandhi violated the Salt law at Dandi on April 20th, 1930.
 Choose the correct answer from the codes given below :
 (1) only (1) (2) only (2) (3) both (1) and (2) (4) None of these
 Ans. (1)
69. After which war the British rule was founded in India ?
 (1) Battle of Sabrao (2) Battle of Panipat
 (3) Battle of Plassey (4) Second Anglo Mysore war
 Ans. (3)
70. When was the Great Economics Depression between the two World Wars held ?
 (1) 1921 (2) 1929 (3) 1935 (4) 1939
 Ans. (2)
71. Who composed Ananda Math ?
 (1) Rabindranath Tagore (2) Munsii Premchand
 (3) Mahatma Gandhi (4) Bankim Chandra Chattopadhyay
 Ans. (4)
72. 'Khadar' is found in
 (1) The northern mountain region (2) Thar desert
 (3) The vast northern plain (4) The peninsular plateau
 Ans. (3)
73. The rising place of the largest river of peninsular plateau is
 (1) Betul (2) Nasik (3) Jabalpur (4) Cuddalore
 Ans. (2)
74. The quantity of rainfall received on the Western Ghats by south-west monsoon is
 (1) 100 - 150 cm (2) 150 - 200 cm (3) 200 - 250 cm (4) above 250 cm
 Ans. (4)
75. In which Indian forest are silver, fir and pine trees found ?
 (1) Tropical deciduous forest (2) Montane forest
 (3) Mangrove forest (4) Tropical evergreen rain forest
 Ans. (2)

76. Match List-I and List-II and choose the correct code from the following :

List-I

- (1) Northern end
- (2) Southern end
- (3) Eastern end
- (4) Western end

Code :

A

- (1) ii
- (2) i
- (3) ii
- (4) iii

B

- iii
- ii
- i
- ii

List-II

- (i) 8° 4' N
- (ii) 37° 6' N
- (iii) 68° 7' E
- (iv) 97° 25' E

C

- iv
- iv
- iv
- i

D

- i
- iii
- iii
- iv

Ans. (3)

77. Which of the following is the major sugarcane producing state ?

- (1) Uttar Pradesh
- (2) Rajasthan
- (3) West Bengal
- (4) Madhya Pradesh

Ans. (1)

78. Important deposits of which mineral are found in Koraput in Odisha ?

- (1) Iron ore
- (2) Coal
- (3) Copper
- (4) Bauxite

Ans. (4)

79. In which year was the first successful cotton textile mill established in India ?

- (1) 1853
- (2) 1854
- (3) 1855
- (4) 1856

Ans. (2)

80. Indian population policy 2000 not includes

- (1) free education
- (2) free from diseases
- (3) Reducing infant mortality rate below 30
- (4) increase the employment opportunities

Ans. (4)

81. Gas transportation pipeline which passes through Kota in Rajasthan is

- (1) Guwahati – Barauni – Allahabad – Kanpur
- (2) Barauni – Rajbandh – Haldia
- (3) Hazira – Vijaipur – Jagdishpur
- (4) Salaya – Viramgam – Mathura – Delhi

Ans. (3)

82. In which state of India is red and yellow soil found ?

- (1) Chhattisgarh
- (2) Rajasthan
- (3) Jammu & Kashmir
- (4) None of these

Ans. (1)

83. In which House is the finance bill presented first ?

- (1) Rajya Sabha
- (2) Lok Sabha
- (3) Both Lok Sabha and Rajya Sabha anywhere
- (4) Reserve Bank of India

Ans. (2)

84. Who among the following is a part of the political executive ?

- (1) District Collector
- (2) Secretary of the Ministry of Home Affairs
- (3) Home Minister
- (4) Director General of Police

Ans. (3)

85. Which of the following institutions can make changes to an existing law of our country ?

- (1) Supreme Court of India
- (2) International Court of Justice
- (3) Prime Minister
- (4) Parliament

Ans. (4)

86. Which one of the following is considered as a fundamental right according to the Constitution of India ?

- (1) Right to work
- (2) Right to adequate livelihood
- (3) Right to protect one's culture
- (4) Right to get higher education

Ans. (3)

87. Match the following in reference to constitution making process :
- | | |
|--|--|
| (P) B.N. Rao | (i) President of the Constituent Assembly |
| (Q) B.R. Ambedkar | (ii) Member of the Drafting Committee |
| (R) Rajendra Prasad | (iii) Chairman of the Drafting Committee |
| (S) T.T. Krishnamachari | (iv) Legal Advisor |
| (1) (P) - iv, (Q) - iii, (R) - i, (S) - ii | (2) (P) - iv, (Q) - ii, (R) - i, (S) - iii |
| (3) (P) - i, (Q) - iii, (R) - iv, (S) - ii | (4) (P) - iii, (Q) - iv, (R) - i, (S) - ii |
- Ans. (1)
88. Choose the correct statement describing the word 'code of conduct' :
- (1) A set of norms and guidelines to be followed by Political Parties
 (2) A set of norms and guidelines to be followed by candidates in Election
 (3) Guidelines for Election Commission
 (4) Compulsory voting for voters
- (1) A, B, C (2) A, B (3) B, C (4) C, D
- Ans. (2)
89. According to the Constitution of India, how many maximum number of judges can be appointed in Supreme Court ?
- (1) 29 + 1 (2) 30 + 1 (3) 28 + 1 (4) 31 + 1
- Ans. (2)
90. How many members will be nominated in Legislative Council ?
- (1) $\frac{1}{3}$ (2) $\frac{1}{2}$ (3) $\frac{1}{6}$ (4) $\frac{1}{4}$
- Ans. (3)
91. By which Article of the Constitution of India is the Prime Minister appointed ?
- (1) 74th (2) 75th (3) 52nd (4) 61st
- Ans. (2)
92. The Vice-President of India is elected by
- (1) elected members of Lok Sabha
 (2) all members of Rajya Sabha
 (3) elected members of Lok Sabha & Rajya Sabha
 (4) all members of Lok Sabha, Rajya Sabha and all state legislative assemblies
- Ans. (3)
93. Match List – I and List – II and choose the correct code from the given codes :
- | | |
|----------------------|-----------------------|
| List-I | List-II |
| (P) Union list | (i) Computer Software |
| (Q) State list | (ii) Communications |
| (R) Concurrent list | (iii) Police |
| (S) Residuary powers | (iv) Forests |
- Code :
- | | | | |
|---------|-----|----|-----|
| P | Q | R | S |
| (1) iii | ii | i | iv |
| (2) ii | iii | iv | i |
| (3) ii | iv | i | iii |
| (4) iv | iii | ii | i |
- Ans. (2)
94. The example of capital is
- (1) Water (2) Forest (3) Climate (4) Machine
- Ans. (4)
95. The rabi crop is
- (1) Jowar (2) Bajra (Millet) (3) Maize (4) Wheat
- Ans. (4)

96. In India the currency note is issued by
(1) Reserve Bank of India (2) State Bank of India
(3) NABARD (4) Bank of India
Ans. (1)
97. The source of institutional credit is
(1) Moneylender (2) Landlord (3) Bank (4) Relatives
Ans. (3)
98. The example of tertiary sector is
(1) Agriculture (2) Fisheries
(3) Making sugar from sugarcane (4) Banking services
Ans. (4)
99. The government of India enacted the law of "Right to Information" Act in
(1) October, 2005 (2) November, 2006 (3) December, 2007 (4) January, 2008
Ans. (1)
100. The Multinational Company of India is
(1) Infosys (2) Asian Paints (3) Tata Motors (4) All of these
Ans. (4)

