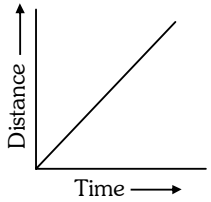
NATIONAL TALENT SEARCH EXAMINATION (NTSE-2018) STAGE -1 [PAPER CODE : 612-C]

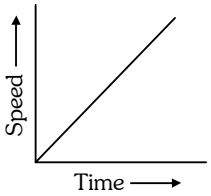
STATE : RAJASTHAN PAPER : SAT

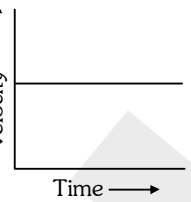
Date: 05/11/2017

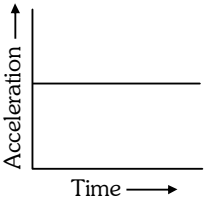
Max. Marks: 100 **SOLUTIONS** **Time allowed: 90 minutes**

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

(A) 

(B) 

(C) 

(D) 

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

Ans. ***(4)***

Sol. For constant speed slope of distance-time graph gives speed.

In option (1) slope is constant so speed is constant and in option (4) velocity is constant so speed is 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. By momentum conservation

$$m_B V_B + m_G v_G = 0$$

$$\text{recoil velocity } v_G = -\frac{m_B v_B}{m_G}$$

$$v_G = -\frac{\left(\frac{50}{1000}\right) \times 100}{10}$$

$$v_G = 0.5 \text{ m/s}$$

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. Let initial velocity of ball = u

By IIIrd equation $H = \frac{u^2}{2g} = 100m$

If initial velocity is doubled

$$H' = \frac{(2u)^2}{2g} = \frac{4 \cdot u^2}{2g} = 4 \times 100$$

$H' = 400$ 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. Gravity at the surface of earth $g = \frac{GM}{R^2}$

$$\frac{g}{G} = \frac{M}{R^2}$$

5. The unit 'hertz' is same as

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

Ans. ***(2)***

Sol. Hertz is SI unit of frequency (f)

$$f = \frac{1}{\text{Time period}} = \frac{1}{\text{Second}} = Sec^{-1}$$

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. $V = f \times \lambda$

$= 10 \times 10^3 \times 3 \times 10^{-3} = 30$

$$t = \frac{d}{v} = \frac{3}{30} = 0.1 \text{sec}.$$

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. If position of object at centre of curvature then size of image will be same as object.

8. A convex lens has focal length 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. $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{v} - \frac{1}{-15} = \frac{1}{30}$

$\Rightarrow v = -30$

$$m = \frac{v}{u} = -\frac{30}{15}$$

$m = -2 \Rightarrow |m| = 2$

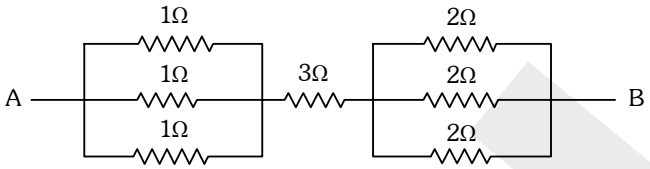
9. The electrical resistivity of a conducting wire is K. If its length and area of cross-section are doubled then the new resistivity of the wire will be :

(1) K (2) 2K (3) K/2 (4) K/4

Ans. ***(1)***

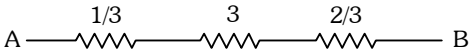
Sol. Resistivity remain constant it does not depends on length and area.

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



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

Ans. ***(2)***

Sol. 

$R_{eq} = 1\Omega$

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

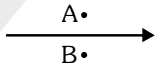
Ans. ***(1)***

Sol. $E = \frac{4 \times 100 \times 6}{1000}\text{kWh} = 2.4\ \text{kWh}$

Consumed in 30 days $= 30 \times 2.4 = 72$

Total cost $= 72 \times 5 = 360$ Rs.

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



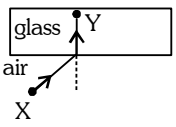
(1) their needles will not deflect (2) only one of the needles will deflect

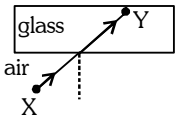
(3) both the needles will deflect in the same direction (4) the needles will deflect in the opposite direction

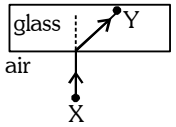
Ans. ***(4)***

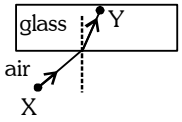
Sol. Using right hand thumb rule direction of magnetic field will be in oppsite direction at A and B.

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 ?

(1) 

(2) 

(3) 

(4) 

Ans. ***(4)***

Sol. When ray travels from rarer (air) to [Denser (glass)] medium it bends towards normal.

14. Conjugate base of HCl in the following reaction is

$$HCl(aq) + H_2O \longrightarrow Cl^-(aq) + H_3O^+$$

(1) H_3O^+ (2) H_2O (3) Cl^- (4) HCl

Ans. ***(3)***

Sol. According to Bronsted theory acids are proton donar, acid form conjugate base, after donating of proton.

15. The chemical formula of Plaster of Paris is

(1) $CaSO_4$ (2) $CaSO_4.2H_2O$ (3) $CaSO_4.\frac{1}{2}H_2O$ (4) $CaSO_4.H_2O$

Ans. ***(3)***

Sol. $CaSO_4.\frac{1}{2}H_2O$

16. Which type of catalyst is ethanol in the following reaction ?

$$CHCl_3 + O_2 \xrightarrow{C_2H_5OH} 2COCl_2 + 2HCl$$

(1) Positive catalyst (2) Negative catalyst (3) Bio–catalyst (4) Autocatalyst

Ans. ***(2)***

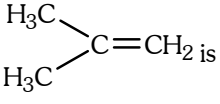
Sol. Ethanol is an example of negative catalyst in the given reaction.

17. Metalloid among the following is

(1) lithium (2) sulphur (3) sodium (4) silicon

Ans. ***(4)***

Sol. "Silicon is metalloid".

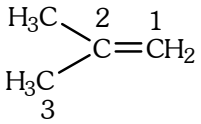
18. The IUPAC name of  is

(1) 1,1–dimethyl–2–ethene (2) 2–methyl–1–propene

(3) 2,2–dimethyl ethene (4) 2–methyl prop–2–ene

Ans. ***(2)***

Sol.



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)***

Sol. The polymer formed by condensation of adipic acid and hexamethylene diamine is nylon–6,6.

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. The method for separation of mixture of common salt and ammonium chloride is sublimation as ammonium chloride is a sublimable substance while NaCl (common salt) is a non–sublimable substance.

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. $N_2 = \frac{14}{28} = 0.5$

Number of Nitrogen molecules $= 0.5 \times 6.023 \times 10^{23}$

So answer is 3.01×10^{23}.

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 atomic no. = 16.

Electronic configuration = 2, 8, 6.

K, L,M

23. Which of the following elements shows variable valency ?

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

Ans. ***(3)***

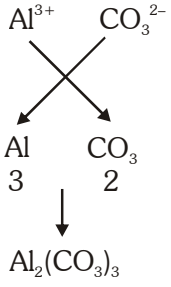
Sol. Iron shows variable valency Fe^{2+} & Fe^{3+}.

24. Formula of aluminium carbonate is

(1) $Al_2(CO_3)_3$ (2) Al_2CO_3 (3) Al_2HCO_3 (4) $AlCO_3$

Ans. ***(1)***

Sol.



25. Formula of Freon–112 is

(1) $C_2F_2Cl_4$ (2) CF_2Cl_2 (3) $CFCl_3$ (4) CCl_3F

Ans. ***(1)***

Sol. Formula of Freon–112 is $C_2F_2Cl_4$.

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)***

Sol. $Mg + Cl_2 \longrightarrow MgCl_2$

X Ionic compound have high melting point as strong attraction between positive & negative ions.

27. Which tissue is found in fibrous covering of coconut ?

(1) Parenchyma (2) Collenchyma (3) Sclerenchyma (4) Meristematic tissue

Ans. ***(3)***

Sol. Fibrous covering of coconut is made up of Sclerenchymatous fibres.

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 Robert Brown.

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.

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. Lichens are more sensitive to the levels of sulphur dioxide in air.

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. Perennial, evergreen and woody plants are Cycas, Pinus (gymnosperms).

32. Turgidity of cell is maintained by

(1) Vacuole (2) Lysosome (3) Plastid (4) Golgi body

Ans. ***(1)***

Sol. Turgidity of cell is maintained by Vacuole which contain cell sap.

33. The substance not essential for photosynthesis is

(1) sunlight (2) chlorophyll (3) nitrogen (4) carbon dioxide

Ans. ***(3)***

Sol. The substance not essential for photosynthesis is nitrogen among given options.

34. The nature of nerve impulse is

(1) chemical (2) magnetic (3) electrochemical (4) electromagnetic

Ans. ***(3)***

Sol. The nature of nerve impulse is electrochemical (with in neuron it is electrical and between neuron it is chemical).

35. The example of uricotelic animals is

(1) fishes (2) reptiles (3) amphibians (4) mammals

Ans. ***(2)***

Sol. Reptiles are uricotelic.

36. According to Mendel in monohybrid cross the genotypic ratio of F_2 generation is

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

Ans. ***(4)***

Sol. In monohybrid cross the genotypic ratio of F_2 generation is 1 : 2 : 1.

37. Example of connective tissue is

(1) cartilage (2) skeletal muscles (3) skin of animals (4) nerve cells

Ans. ***(1)***

Sol. Cartilage is connective tissue.

38. The example of egg laying mammal is

(1) Bat (2) Kangaroo (3) Pigeon (4) Echidna

Ans. ***(4)***

Sol. Egg laying mammal is Echidna.

39. Non-communicable disease is

(1) Cancer (2) AIDS (3) Amoebiasis (4) Jaundice

Ans. ***(1)***

Sol. Cancer is non-communicable disease.

40. Animals of which phylum are pseudocoelomate?

(1) Porifera (2) Platyhelminthes (3) Aschelminthes (4) Mollusca

Ans. ***(3)***

Sol. Members of phylum aschelminthes are pseudocoelomate.

41. If $\frac{3+2\sqrt{3}}{3-\sqrt{3}} = a+\sqrt{3}b$, then the value of $\sqrt{a+b}$ where a and b are rational numbers is

(1) 5 (2) 8 (3) 2 (4) 16

Ans. ***(3)***

Sol. $\frac{3+2\sqrt{3}}{3-\sqrt{3}} \times \frac{3+\sqrt{3}}{3+\sqrt{3}}$

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

$= \frac{15+9\sqrt{3}}{6} = \frac{5}{2}+\frac{3}{2}\sqrt{3}$

Comparing $\frac{5}{2}+\frac{3}{2}\sqrt{3}$ with $a+\sqrt{3}b$, we have : $a=\frac{5}{2}$ and $b=\frac{3}{2}$

Hence, $\sqrt{a+b} = \sqrt{\frac{5}{2}+\frac{3}{2}} = \sqrt{4} = 2$

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)***

Sol. $2x^2 + px + 8 = 0$

has equal roots

so $p^2 - 4 \times 2 \times 8 = 0 \quad \Rightarrow p^2 = 64$

$\Rightarrow p = 8$ as $p > 0$

$p(x^2 + x) + k = 0 \Rightarrow px^2 + px + k = 0$ also has equal roots

so $p^2 - 4 \times p \times k = 0$

$\Rightarrow (8)^2 - 4 \times 8 \times k = 0 \Rightarrow k = \dfrac{64}{32} = 2$

Hence, k = 2, p = 8 which is option (2)

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

(1) 5 (2) – 1 (3) – 3 (4) – 5

Ans. ***(4)***

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

$\Rightarrow \quad p(x) = x^2 - px - p - k$

α and β are zeroes of p(x)

so $\alpha + \beta = \dfrac{-(-p)}{1} = p$

and $\alpha\beta = \dfrac{-p - k}{1} = -p - k$

Given : $(\alpha + 1)(\beta + 1) = 6$

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

$\Rightarrow \quad p - p - k + 1 = 6$

$\Rightarrow \quad k = -5$ which is option (4)

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

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

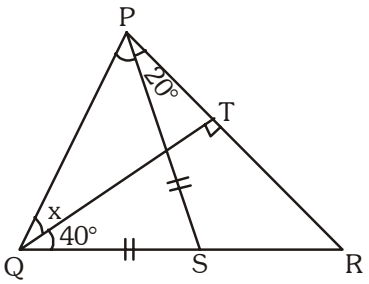
Ans. ***(3)***

Sol. $6^{18} - 5^{10}$ will end with 6 – 5 = 1 as

6^n and 5^n end with 6 and 5 respectively.

Hence, option (3) is correct.

45. In the followign figure QT $\perp$ PR and QS = PS. If $\angle TQR = 40°$ and $\angle RPS = 20°$ then value of x is :



(1) 80° (2) 25° (3) 15° (4) 35°

Ans. ***(3)***

Sol. In ΔPQS,

$QS = PS$

$\Rightarrow \angle Q = \angle P = 40° + x$

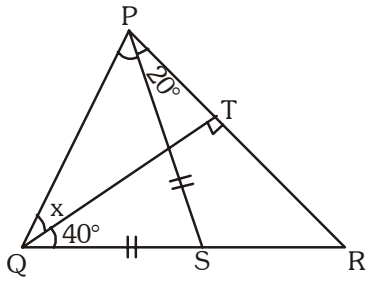
In ΔRQT,

$\angle R = 180° - (90° + 40°)$

$\Rightarrow \angle R = 50°$

In ΔPQR,

$40° + x + 40° + x + 20° + 50° = 180°$



$\Rightarrow x = \frac{30°}{2} = 15°$

Option (3)

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

(1) 18th (2) 15th (3) 28th (4) 27th

Ans. ***(4)***

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

or $20, \frac{77}{4}, \frac{37}{2}, ...$

$a = 20$

$d = \frac{77}{4} - 20 = \frac{-3}{4}$

Let n^{th} term of A. P. be first negative term

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

$\Rightarrow 80 - 3n + 3 < 0$

$\Rightarrow 3n > 83 \Rightarrow n > 27\frac{2}{3}$

Hence, 28^{th} term is first negative term.

(Option 3)

47. The angles of elevation of the top of 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.

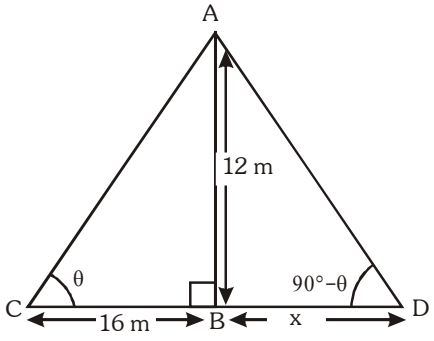
$\frac{AB}{BC} = \tan\theta \Rightarrow \tan\theta = \frac{12}{16}$ ....(1)

$\frac{AB}{BB} = \tan(90-\theta) \Rightarrow \cot\theta = \frac{12}{x}$ ....(2)

eq. (1) × eq. (2) we get

$\frac{12}{16} \times \frac{12}{x} = \tan\theta \times \cot\theta = 1$

$\Rightarrow 16x = 144 \Rightarrow x = \frac{144}{16} = 9m$



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. $m=\frac{\cos A}{\cos B}$ and $n=\frac{\cos A}{\sin B}$

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

$= \cos^2 A\left(\frac{\sin^2 B+\cos^2 B}{\cos^2 B \sin^2 B}\right)\cos^2 B = \cos^2 A \times \frac{1}{\sin^2 B}=\left(\frac{\cos A}{\sin B}\right)^2 = n^2$

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. Altitudes of similar triangles are in ratio 4 : 9

Hence, area of these triangles

= square of th ratio of their heights or altitudes

$= (4 : 9)^2 = 16 : 81$

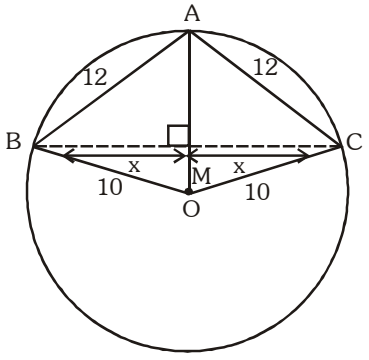
Option (4)

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.



In ΔOBM $10^2 = (MO)^2 + x^2$ ....(1)

In ΔABM $12^2 = x^2 + (10 - 0m)^2$ ....(2)

Eq(2) – (Eq.(1)

$144 - 100 = x^2 + 100 + OM^2 - 20 \times OM - x^2$

$44 = 144 - 20 \times OM \Rightarrow OM = 2.8$

Put OM = 2.8 in Eq. (1)

we get x = 9.6, So $BC = 2 \times 9.6 = 19.2$

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 ten consecutive odd number be

$2x + 1, 2x + 3, ..., 2x + 19$

Hence, $(2x + 1) + (2x + 3) + ... + (2x + 19)$

$= 10 \times 120$ (sum of observations = Mean × No. of observation)

$\Rightarrow 20x + 100 = 1200$

$\Rightarrow x = \frac{1100}{20} = 55$

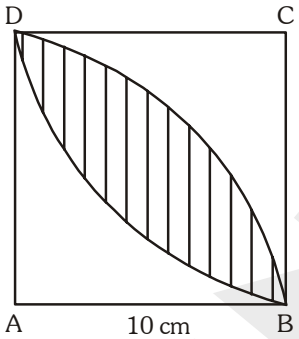
Mean of first five odd numbers

$$= \frac{(2x + 1) + (2x + 3) + \ldots\ldots\ldots\ldots + (2x + 9)}{5}$$

$$= \frac{10 \times 55 + 25}{5} = \frac{575}{5} = 115$$

Option (2)

52. Find the area of shaded region, where side of square ABCD is 10 cm and two arcs are 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)***

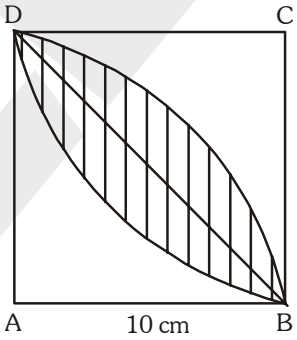
Sol. Area of shaded region

= 2 [Area of quadrant – Area of triangle]

$$= 2\left[\frac{\pi(10)^2}{4} - \frac{1}{2} \times 10 \times 10\right]$$

$$= 2 \times 100\left[\frac{22}{7 \times 4} - \frac{1}{2}\right]$$

$$= 200 \times \frac{2}{7} = \frac{400}{7} \text{ Sq.cm}$$



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

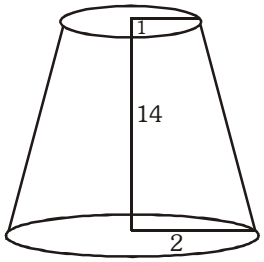
(1) $\frac{308}{3}$ cm^3 (2) $\frac{298}{21}$ cm^3 (3) 112 cm^2 (4) $\frac{298}{21}$ cm^2

Ans. ***(1)***

Sol. $v = \frac{\pi h}{3}(r_1^2 + r_2^2 + r_1 r_2)$

$$v = \frac{22}{7} \times \frac{14}{3}(1^2 + 2^2 + 1 \times 2)$$

$$= \frac{44}{3}(7) = \frac{308}{3} \text{ cm}^3$$



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)***

Sol.

$$P\left(\frac{23}{5}, \frac{33}{5}\right)$$

A (3,5) — 2 : 3 — B (x,y)

$$\frac{23}{5} = \frac{2 \times x + 3 \times 3}{2+3} \text{ and } \frac{33}{5} = \frac{2 \times y + 3 \times 5}{2+3}$$

$$\frac{23}{5} = \frac{2x+9}{5} \quad \text{and} \quad \frac{33}{5} = \frac{2y+15}{5}$$

$$x = 7 \quad \text{and} \quad y = 9$$

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. Leep year has = 52 weeks + 2 days

Sample spore = {MT, TW, WT, TF, FS, SS, SM}

P (Monday) = $\frac{2}{7}$

Option (2)

56. If the length of circumference of a circle is 60 cm more than its diameter, then length of its circumference is :

(1) 14 π cm (2) 28 π cm (3) 35 π cm (4) 42 π cm

Ans. ***(2)***

Sol. $2\pi r = 60 + 2r$

$$2 \times \frac{22}{7} \times r = 60 + 2r$$

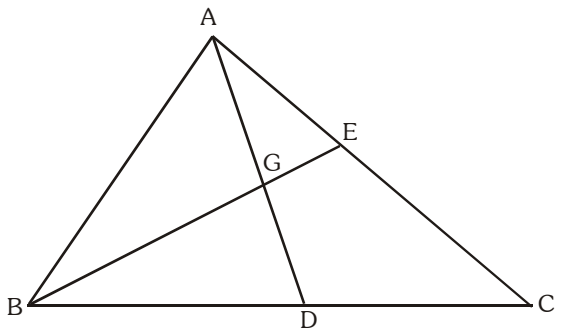
$$\frac{22}{7} \times r = 30 + r$$

$$30 = \frac{22}{7} r - r$$

$$30 = \frac{15r}{7} \Rightarrow r = 14$$

Circumference = $2\pi r = 2 \times \pi \times 14 = 28\pi$

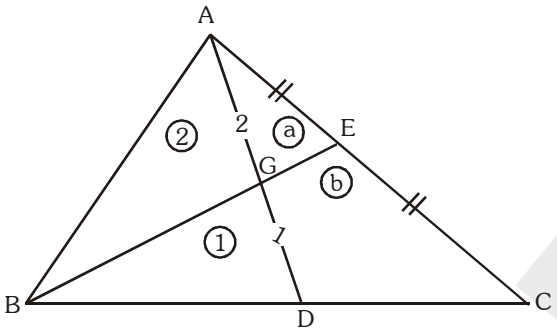
57. In given ΔABC, AD and BE are medians of triangle which intersect each other at point G. If area of ΔBDG is 1 cm^2, then what is the area of DCEG?



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

Ans. ***(1)***

Sol.



Let ar(AGE) = a cm^2 and ar(GECD) = b cm^2

ar (ABD) = ar(ADC)

$3 = a + b$ ....(1)

Also, ar(ABE) = ar(BEC)

$2+a = 1 + b$

$a = 1, b = 2$

58. What is the radian value of angle 60°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. $\pi^C = 180°$

$$\Rightarrow 60°\,30' = 60° + \frac{1°}{2} = \frac{121°}{2} = \left(\frac{121}{2} \times \frac{\pi}{180}\right)^C$$

$$= \frac{121}{360}\pi^C$$

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. C.S.A $= 4\pi r^2 = \pi(2r)^2 = \pi d^2$

new diameter $(d') = \frac{3}{4}d$

new C.S.A $= \pi(d')^2 = \frac{9\pi}{16}d^2$

Change in C.S.A. $= \frac{\frac{9}{16}\pi d^2 - \pi d^2}{\pi d^2} \times 100 = -43.75\%$

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) $x^3 + y^3 + z^3 - 2x^2y - 2y^2z - 2z^2x$

Ans. ***(2)***

Sol. Let $(x-y) = a$, $(y-z) = b$, $(z-x) = c$
$a + b + c = 0$
So, $a^3 + b^3 + c^3 = 3abc$
$(x-y)^3 + (y-z)^3 + (z-x)^3 = 3(x-y)(y-z)(z-x)$
Option (2)

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

	List-I	***List-II***
(A)	Meeting of the Estates General	(i) 20^{th} June, 1789
(B)	Bastille was destroyed on	(ii) 4^{th} August, 1789
(C)	Abolishment of feudal system in France	(iii) 14^{th} July, 1789
(D)	Swore of Tennis Court	(iv) 4^{th} May, 1789

Code :

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

Ans. ***(2)***

62. The state of India where the Jallianwalla Bagh is situated, in

(1) Haryana (2) Uttar Pradesh (3) Punjab (4) Rajasthan

Ans. ***(3)***

Sol. Jallianwalla Bagh is situated in Punjab.

63. The German King in 1871 was

(1) William I (2) Nepoleon III (3) Frederik William IV (4) Emmanuel II

Ans. ***(1)***

Sol. The German King in 1871 was William I.

64. Who discovered the spinning jenny ?

(1) John Ke (2) T.E. Nicholson (3) Raphael Samuel (4) James Hargreaves.

Ans. ***(4)***

Sol. James Hargreaves discovered the spinning jenny.

65. The year of the partition of Bengal was
(1) 1903 (2) 1905 (3) 1907 (4) 1909

Ans. ***(2)***

Sol. The year of the partition of Bengal was 1905.

66. Which one of the following countries was not among the Allied Powers?
(1) England (2) France (3) Russia (4) Germany

Ans. ***(4)***

Sol. Germany was not among the Allied Powers.

67. When was the publication of Bengal Gazette initiated?
(1) 1750 (2) 1780 (3) 1850 (4) 1880

Ans. ***(2)***

Sol. Bengal Gazette was published in 1780.

68. Consider the following Points :
(A) Mahatma Gandhi started Salt March with his 78 confidential volunteers
(B) Mahatma Gandhi violated the Salt law at Dandi on April 20th, 1930
Choose the correct answer from the codes given below:
(1) only (A) (2) only (B) (3) both (A) and (B) (4) none of these

Ans. ***(1)***

Sol. Mahatma Gandhi violated the Salt law at Dandi on April 6^{th}, 1930

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)***

Sol. British rule was founded in India after battle of Plassey in 1757.

70. When was the Great Economic Depression between the two World Wars held?
(1) 1921 (2) 1929 (3) 1935 (4) 1939

Ans. ***(2)***

Sol. The Great Economic Depression occurred in 1929.

71. Who composed Ananda Math ?
(1) Rabindranath Tagore (2) Munsi Premchand
(3) Mahatma Gandhi (4) Bankim Chandra Chattopadhyay

Ans. ***(4)***

Sol. Bankim Chandra Chattopadhyay composed Ananda Math.

72. 'Khadar' is found in
(1) the northern mountain region (2) Thar desert
(3) the vast northern plain (4) the peninsular plateau

Ans. ***(3)***

Sol. Khadar' is found in the vast northern plain.

73. The rising place of the largest river of peninsular plateau is
(1) Betul (2) Nasik (3) Jabalpur (4) Cuddalore

Ans. ***(2)***

Sol. The rising place of the largest river (Godavari) of peninsular plateau is Nasik.

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)***

Sol. The orographic rainfall occurs in Western Ghar causes higher rainfall in this region.

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)***

Sol. Silver, fir and pine trees found in montane forest.

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

List - I	***List - II***
(A) Northern end	(i) 8° 4′ N
(B) Southern end	(ii) 37° 6′ N
(C) Eastern end	(iii) 68° 7′ E
(D) Western end 1	(iv) 97° 25′ E

Code :

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

Ans. ***(3)***

Sol. These are longitudinal and latitudinal extent of India.

77. Which of the following is the major sugarcane producing state?
(1) Uttar Pradesh (2) Rajasthan (3) West Bengal (4) Madhya Pradesh

Ans. ***(1)***

Sol. The major sugarcane producing state is Uttar Pradesh

78. Important deposits of which mineral are found in Koraput in Odisha?
(1) Iron one (2) Coal (3) Copper (4) Bauxite

Ans. ***(4)***

Sol. Bauxite deposits are found in Koraput in Odisha.

79. In which year was the first successful cotton textile mill established in India?
(1) 1853 (2) 1854 (3) 1855 (4) 1856

Ans. ***(2)***

Sol. The first successful cotton textile mill established in India in 1854.

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 opporiunities

Ans. ***(4)***

Sol. Indian population policy 2000 includes
(1) free education
(2) free from diseases
(3) reducing infant mortality rate below 30

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)***

Sol. Kota is part of HVJ pipeline.

82. In which state of India is red and yellow soil found?
(1) Chhattisgarh (2) Rajasthan (3) Jammu and Kashmir (4) None of these

Ans. ***(1)***

Sol. Red and yellow soil is found in Chhattisgarh .

83. In which House is the finance bill (Money Bill) presented first?
(1) Rajya Sabha (2) Lok Sabha
(3) Both Lok Sabha and Rajya Sabha anywhere (4) Reserve Bank of India

Ans. ***(2)***

Sol. Money Bill only can be introduced in Lok Sabha.

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)***

Sol. Ministers are party of polirtical executive.

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)***

Sol. Parliament make laws and changes in existing law of our country.

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)***

Sol. Cultural and educational rights empowers people to protect their culture.

87. Match the following in reference to constitution making process :

(A) B.N. Rao	(i) President of the Constituent Assembly
(B) B.R. Ambedkar	(ii) Member of the Drafting Committee
(C) Rajendra Prasad	(iii) Chairman of the Drafting Committee
(D) T.T. Krishnamachari	(iv) Legal Advisor

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

Ans. ***(1)***

88. Choose the correct statement describing the word 'code of conduct':
(A) A set of norms and guidelines to be followed by Political Parties
(B) A set of norms and guidelines to be followed by candidates in Election
(C) Guidelines for Election Commission
(D) Compulsory voting for voters
(1) A, B, C (2) A, B (3) B, C (4) C, D

Ans. ***(2)***

Sol. Code of conduct is set of norms and guidelines to be followed by Political Parties and candidates in Election.

89. According to the Constitution of India, how many maximum no. of judges can be appointed in Supreme Court?
(1) 29 + 1 (2) 30 + 1 (3) 28 + 1 (4) 31 + 1

Ans. ***(2)***

Sol. 30 Judges and One CJI.

90. How many members will be nominated in Legistative Council?
(1) 1/3 (2) 1/2 (3) 1/6 (4) 1/4

Ans. ***(3)***

Sol. 1/6 members nominated in Legistative Council by Governor.

91. By which Article of the Constitution of India is the Prime Minister appointed?
(1) 74th (2) 75th (3) 52nd (4) 61st

Ans. ***(2)***

Sol. Article 75 states that the Prime Minister is appointed by President.

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 and Rajya Sabha
(4) all members of Lok Sabha, Rajya Sabha and all state legislative assemblies

Ans. ***(Bonus)***

Sol. All members of Rajya Sabha and Lok Sabha.

93. Match List-I and List-II and choose the correct code from the given codes:

List-I		***List-II***
(A) Union list	(i)	Computer Software
(B) State list	(ii)	Communications
(C) Concurrent list	(iii)	Police
(D) Residuary power	(iv)	Forests

Code:

	A	***B***	***C***	***D***
(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)***

Sol. Machine is the example of fixed capital.

95. The rabi crop is
(1) Jowar (2) Bajra (Millet) (3) Maize (4) Wheat.

Ans. ***(4)***

Sol. The rabi crop is wheat.

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)***

Sol. Reserve Bank of India issues the currency note.

97. The source of institutional credit is
(1) Money lender (2) Landlord (3) Bank (4) Relatives

Ans. ***(3)***

Sol. The source of institutional credit is Bank

98. The example of tertiary sector is
(1) Agriculture (2) Fisheries
(3) making sugar from sugarcane (4) Banking services.

Ans. ***(4)***

Sol. The Banking services is example of tertiary sector.

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)***

Sol. The Government of India enacted the law of "Right to Information" Act in October, 2005.

100. The Multinational Company of India is
(1) Inforys (2) Asian Paints (3) Tata Motors (4) All of these

Ans. ***(4)***

Sol. All are Multinational Companies of India.

* * * * *