

1. The work done in moving 10 lithium nuclei (Atomic number of Li = 3) through a potential difference of 10 V is :
 Charge on an electron is 1.6×10^{-19} C)
- (1) 4.8×10^{-16} J (2) 4.8×10^{-19} J
 (3) 4.8×10^{-18} J (4) 4.8×10^{-17} J

2. Choose the correct alternative which matches second and third column with first column :

Column I	Column II	Column III
(I) Magnetic field is produced near current carrying conductor	(A) Right hand thumb rule	(a) Michael Faraday
(II) Electric current is generated in a conductor moving in a magnetic field	(B) Fleming's right hand rule	(b) Hans Oersted

- (1) (I) – (B) – (a), (II) – (B) – (b) (2) (I) – (A) – (b), (II) – (B) – (b)
 (3) (I) – (B) – (b), (II) – (A) – (a) (4) (I) – (A) – (b), (II) – (B) – (a)

3. M.R.I. is based on

- (1) Magnetic effect of electric current (2) Heating effect of electric current
 (3) Chemical effect of electric current (4) Conduction of electric current

4. For refraction of light from air to rock salt, water and diamond if :

V – Velocity of light in air
 V_1 – Velocity of light in rock salt
 V_2 – Velocity of light in water
 V_3 – Velocity of light in diamond, then

Choose the correct alternative :

- (1) $V_3 > V_1 > V_2 > V$ (2) $V > V_2 > V_1 > V_3$
 (3) $V > V_1 > V_2 > V_3$ (4) $V_1 > V > V_3 > V_2$

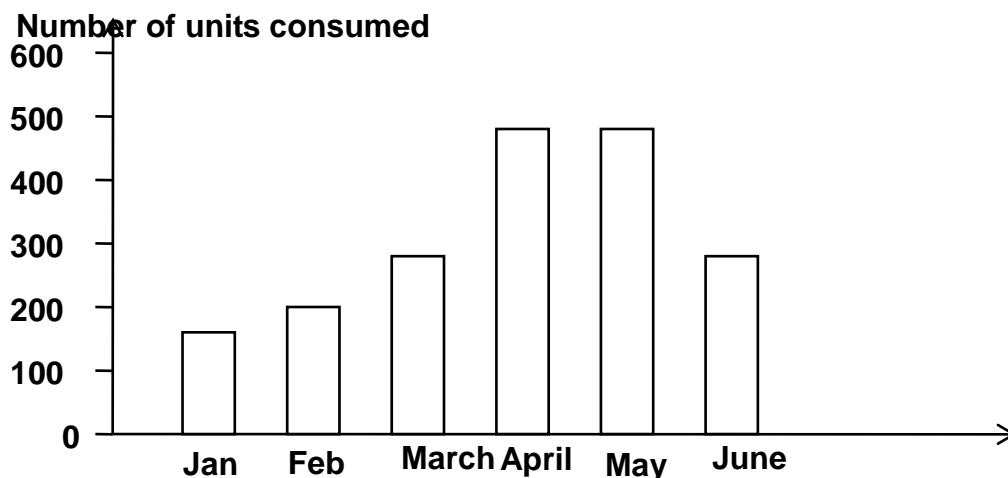
5. When white light is passed through an upside down (inverted) prism then

- (1) White light is obtained
 (2) Spectrum is obtained with violet colour undergoing maximum deviation and red colour undergoing minimum deviation
 (3) Spectrum is obtained with red colour undergoing maximum deviation and violet colour undergoing minimum deviation
 (4) light gets blocked

6. Select the correct sequence of light entering the different parts of human eye :

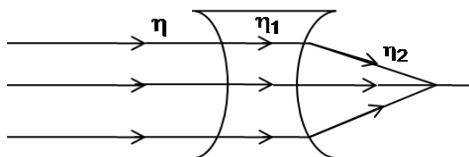
- (1) cornea, lens, iris, pupil, retina (2) pupil, cornea, iris, lens, retina
 (3) cornea, pupil, iris, lens, retina (4) cornea, iris, pupil, lens, retina

7. Graph shows the number of units consumed by a family for six months. Find the cost of energy for four months from March to June if M.S.E.B. increased its unit rate from ₹ 3.50 to ₹ 4.50 for April and May and again decreased by ₹ 2 for June :

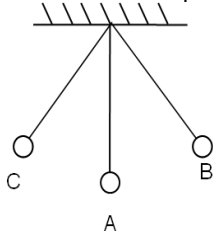


- (1) ₹ 6,000 (2) ₹ 6,030
 (3) ₹ 6,300 (4) ₹ 6,200

8. Object placed _____ of lens or mirror give infinite magnification.
 (1) at focus (2) at infinite distance
 (3) between F_1 and $2F_1$ (4) at $2F_1$
9. If a 3 cm tall object placed perpendicular to principal axis of a convex lens of focal length 156 cm produces a real inverted image of height 15 cm, then its object distance (u) is and image distance (v) is
 (1) $u = -18 \text{ m}$, $v = +90 \text{ m}$ (2) $u = +18 \text{ cm}$, $v = -90 \text{ cm}$
 (3) $u = -18 \text{ cm}$, $v = +90 \text{ cm}$ (4) $u = +18 \text{ cm}$, $v = +90 \text{ cm}$
10. If the path of parallel light through a concave lens is as shown in the figure, where η , η_1 and η_2 are refractive indices, then



- (1) $\eta > \eta_1 = \eta_2$ (2) $\eta = \eta_1 < \eta_2$
 (3) $\eta = \eta_1 > \eta_2$ (4) $\eta < \eta_1 = \eta_2$
11. Distance covered by an object thrown upwards in the last second
 (1) depends on initial velocity (2) depends on mass
 (3) depends on air velocity (4) is always same
12. In motion of a simple pendulum acceleration and kinetic energy are maximum at



- (1) C, B, A (2) A, B, C
 (3) A only (4) B, C only
13. A washing machine rated 300 W is operated one and half an hour/day. If the cost of unit ₹ 3.50, find the cost of energy to cooperate a washing machine for the month of September :
 (1) ₹ 27.90 (2) ₹ 35.25
 (3) ₹ 47.25 (4) ₹ 55.90
14. Elements A, B, C, D have atomic numbers as 35, 19, 17, 9 respectively. Choose the odd element.
 (1) A (2) B
 (3) C (4) D
15. The elements P, Q, R, S belong to group number 14, 15, 16, 17 respectively. Select the elements in increasing order of their electronegativity :
 (1) $P < Q < R < S$ (2) $P > Q > R > S$
 (3) $R < Q < P < S$ (4) $Q < P < S < R$
16. For the following reaction which statement is true?
 $2\text{H}_2\text{S}(\text{g}) + \text{SO}_2(\text{g}) \rightarrow 3\text{S}(\text{s}) + 2\text{H}_2\text{O}(\text{l})$
 (a) H_2S is reduced (b) SO_2 is oxidised
 (c) H_2S is reducing agent (d) SO_2 is oxidizing agent
 (1) (a) and (c) (2) (b) and (c)
 (3) (a) and (b) (4) (c) and (d)
17. A science teacher wrote 3 statements about rancidity :
 (i) When fats and oils are reduced, they become rancid
 (ii) In chips packet, rancidity is prevented by oxygen

(iii) Rancidity is prevented by adding antioxidants

Select the correct option :

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

18. The gas evolved during the reaction of CuCl_2 and conc. H_2SO_4 is

- (1) Natural (2) Basic
(3) Highly basic (4) Acidic

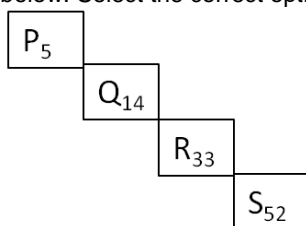
19. Which of the following substances has the lowest pH-value?

- (1) Tomato juice (2) Vinegar
(3) Washing soda (4) Human blood

20. Which of the following is most reactive metal?

- (1) Fe (2) Zn
(3) Ca (4) Al

21. In the given square P, Q, R, S with atomic number is written are metalloids. About this the 4 statements are given below. Select the correct option of the true statements :



- (a) Element after square P is a non-metal (b) Square R represents metalloid
(c) Element just before square R is a metalloid (d) Element just before square S is a non-metal
(1) (a), (b) and (c) (2) (a), (b) and (d)
(3) (b) and (c) (4) (a), (b), (c) and (d)

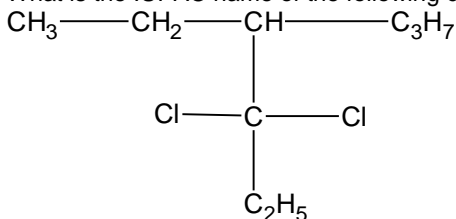
22. In the following structural formulae one IUPAC name is incorrect. Identify it :

- (1) $\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\underset{\text{||}}{\text{C}}}-\text{CH}_3$ - Butanone (2) $\text{CH}_3-\text{CH}_2-\overset{\text{H}}{\underset{\text{|}}{\text{C}}}=\text{O}$ - Propana
(3) $\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\underset{\text{||}}{\text{C}}}-\text{OH}$ - Ethanoic acid (4) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{OH}$ - Butanol

23. Select a compound which gives effervescence with NaHCO_3 solution :

- (1) $\text{C}_2\text{H}_6\text{O}$ (2) $\text{C}_2\text{H}_4\text{O}_2$
(3) $\text{C}_2\text{H}_4\text{O}$ (4) $\text{C}_3\text{H}_8\text{O}_2$

24. What is the IUPAC name of the following compounds?



- (1) 4-Ethyl-3, 3-dichloro heptanes (2) 4-Ethyl-3, 3-dichloro hexane
(3) 4-Ethyl-3-chlorohexane (4) 3, 3-dichloro-4-butyl heptanes

25. X and Y are the two atomic species

	X	Y
Number of Proton	8	8
Number of Neutron	8	10

Select the correct statement about X and Y :

- (1) X and Y are isobars (2) X and Y have different chemical properties
(3) X and Y have different physical properties (4) X and Y are the atoms of different elements

26. How many electrons are present in M-shell of an element with Atomic number 20?
 (1) 8 (2) 6
 (3) 18 (4) 2
27. Which of the following harmful products is not produced in the biochemical reactions of the cell of living organisms?
 (1) Urea (2) Uric acid
 (3) Ammonia (4) Lymph

28. Match the following components of Column 'A' with the components of Column 'B' :

Column-I

- (1) Venus flytrap
 (2) Balsam
 (3) Drosera
 (4) Lotus

Column-II

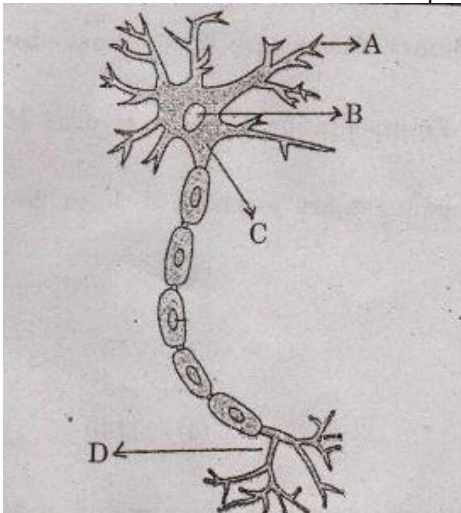
- (A) A trap which looks and smells like a flower to catch the insects
 (B) Flower opens in the morning
 (C) Fruit bursts open to scatter the seeds
 (D) Tentacles on the leaves to trap the insects

- (1) (1) – (A), (2) – (C), (3) – (D), (4) – (B)
 (3) (1) – (D), (2) – (C), (3) – (A), (4) – (B)

- (2) (1) – (A), (2) – (C), (3) – (B), (4) – (D)
 (4) (1) – (D), (2) – (B), (3) – (A), (4) – (C)

29. Select the correct sequence of the steps of human nutrition :
 (1) Ingestion → Digestion → Absorption → Assimilation → Egestion
 (2) Ingestion → Digestion → Assimilation → Absorption → Egestion
 (3) Ingestion → Assimilation → Digestion → Absorption → Egestion
 (4) Ingestion → Absorption → Digestion → Assimilation → Egestion

30. Where the environmental information is picked in the neuron?



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

31. Which plant hormone is found in greater concentration in fruits and seeds?
 (1) Auxins (2) Gibberellins
 (3) Cytokinins (4) Absciscic acid
32. Identify the wrong pair from the following :
 (1) Euglena – Binary fission (2) Yeast – Budding
 (3) Spirogyra – Fragmentation (4) Hydra – Multiple fission
33. How many male gametes are essential to form 25 seeds in Angiospermi plants?"
 (1) 25 (2) 50
 (3) 75 (4) 100
34. A basic process in reproduction is the creation of a Copy.

- (1) RNA
(3) Nucleus
- (2) DNA
(4) Mitochondria

35. Identify a fish who breathes air through its lungs :

- (1) Lungfish
(3) Dogfish
- (2) Rohu
(4) Sting Ray

36. A pea plant with yellow and round seeds (YYRR) is crossed with a pea plant having green and wrinkled (yyrr) seeds then in F₂ generation of this dihybrid cross 320 plants are produced. Out of which 180 plants have same phenotypic characters. Identify this phenotype.

- (1) Yellow and wrinkled seeds
(3) Green and round seeds
- (2) Yellow and round seeds
(4) Green and wrinkled seeds

37. Which gas emits on burning of rice straw?

- (1) SO₂
(3) O₃
- (2) NH₃
(4) H₂S

38. If biomedical waste not handled properly, then which disease is a potent source in human being?

- (1) Cancer
(3) AIDS
- (2) Heart diseases
(4) Leprosy

39. Which category lies in between the genus and order in the classification of plants?

- (1) Species
(3) Family
- (2) Class
(4) Kingdom

40. 'Earthworm, a friend of farmer belongs to phylum.

- (1) Arthropoda
(3) Mollusca
- (2) Echinodermata
(4) Annelida

41. Identify incorrect sentence related to Asian continent :

- (1) This continent is the biggest of all from the perspectives of area and population
(2) The continent got the name from the word 'Aasu'
(3) The renaissance era was started from this continent
(4) The emergence of old religion and culture from this continent

42. Which one of the following atomic reactors is not present in 'Atomic Reserch City' at Mumbai?

- (1) Apsara
(3) Zarlina
- (2) Narora
(4) Purnima

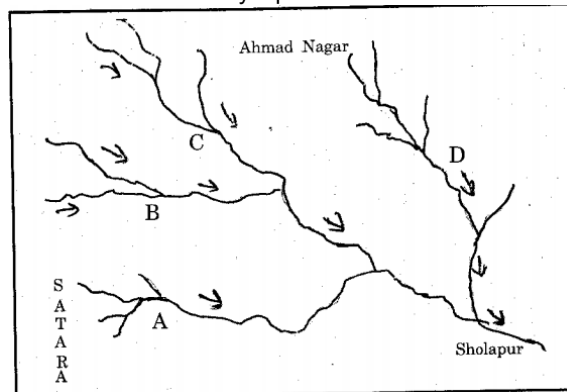
43. Who was the painter of this famous immortal picture?



- (1) Michelangelo
(3) Raphael
- (2) Leonardo-da-Vinci
(4) Donato

44. Who one of the following was not navigator?
 (1) John Cabot (2) John Key
 (3) Amerigo Vespucci (4) Christopher Columbus
45. Arrange the following events in chronological sequence :
 (I) Hitler adopted 4th year plan (II) Hitler adopted 4th year plan
 (III) Hitler brought out an agreement with Italy and Japan
 (IV) Hitler captured the Rhineland
 (1) (II), (I), (IV), (III) (2) (III), (IV), (II), (I)
 (3) (I), (III), (II), (IV) (4) (IV), (II), (I), (III)
46. Choose the inappropriate pair :
 (1) Business concessions took from king - Vasco-da-Gama
 (2) Request to the Japanese Government - Commodore Perry for business concession
 (3) The book written by him which was created among the European people a kind of attraction towards Africa – Bartholomew Dias
 (4) Motivated the navigators – King Henry
47. Which one of the following is not computer's input device?
 (1) Keyboard (2) Scanner
 (3) Mouse (4) Printer
48. is the first archaic scripture of the Aryans.
 (1) Yajurveda (2) Samveda
 (3) Atharvaveda (4) Rigveda
49. The communist thinker Karl Marx belong to _____ country.
 (A) Russia (B) France
 (C) Germany (D) Turkistan
50. 'UNO' was found in _____
 (A) New York (B) Washington
 (C) San Francisco (D) The Hague
51. Due to which action of Japan, the Asian Continent was engulfed into the international conflict?
 (1) The battle between China and Japan (2) Japan forced its army into the Indo- China Region
 (3) Japan attacked on Pearl Harbour (4) The rise of Militarism in Japan
52. Tipu Sultan was defeated due to collaboration with which rulers?
 (1) British – Maratha - Nizam (2) Nizam – Nawab of Karnataka - British
 (3) Maratha – British – Karnataka Nawab (4) King of Travancore – Maratha - British
53. Who has written the book 'Rights of Man'?
 (1) Thomas Jefferson (2) Thomas Penn
 (3) George Washington (4) Rousseau
54. Atomic energy plant has not been erected at ____
 (1) Talcher (2) Jadugad
 (3) Tuticorin (4) Nangal
55. Which nation is not included in the Committee an executive body of the League of Nations?
 (1) France (2) Italy
 (3) Soviet Russia (4) Germany
56. Hari -ke – Pattan National Wetland is situated in ____ state.
 (1) West Bengal (2) Assam
 (3) Punjab (4) Haryana
57. The correct order of Central Highlands of the peninsular Plateau Region from East to West is :
 (1) Chota Nagpur → Baghelkhand → Bundelkhand → Malwa Plateau
 (2) Baghelkhand → Bundelkhand → Malwa Plateau → Chota Nagpur
 (3) Bundelkhand → Malwa Plateau → Chota Nagpur → Baghelkhand
 (4) Malwa Plateau → Chota Nagpur → Baghelkhand → Bundelkhand

58. From the Physiography point of view which of the following region is situated to the east to Western Ghats known as "MuktaMaidan"?
- (1) Palkonda Hills (2) Biligiri Hills
(3) Nallamalla Hills (4) Velikonda Hills
59. Which of the following is not included in the Deccan Plateau?
- (1) Satpuda – MahadeoMaikal Range (2) Karnataka – Telangana Plateau
(3) Malwa Plateau (4) Maharashtra Plateau
60. Vegetal cover is thin in Rajasthan Plain region due to :
- (1) Winds blow with high velocity (2) Very high temperatures
(3) Dry Climate (4) Scanty rainfall
61. Along the shore of the Dal lake in Kashmir _____ is cultivated
- (1) Apple (2) Cherry
(3) Pears (4) Grapes
62. In the figure given below, which river is indicated by alphabet 'A'?



- (1) Man river (2) Bhima River
(3) Sina River (4) Nira River
63. Find the wrong pair having place and industry.
- (1) Durgapur – Iron and steel industry (2) Kanpur – Ship building industry
(3) Varanasi – Silk Sari (4) Barauni – Oil Refinery
64. If the countries sharing land border with India are arranged in ascending order of percentage, which country will be in the middle?
- Pakistan, China, Bhutan, Afghanistan, Nepal
- (1) Bhutan (2) Nepal
(3) Pakistan (4) Afghanistan
65. The eastern districts of Maharashtra _____ districts have more number of tanks and lakes.
- (1) Bhandara and Gondia (2) Wardha and Nagpur
(3) Chardrapur and Gadchiroli (4) Bhandara and Chandrapur
66. Which of the following regions is described as "Cold Desert"?
- (1) Sikkim Himalaya (2) Karakoram Ranges
(3) Ladakh Range (4) Kailas Range
67. Which of the following is known as "Canebrakes"?
- (1) Thick stands of tall grass (2) Forests with thick and tall trees
(3) Region affected by tropical cyclones (4) Region affected by floods
68. 'Shilong' belongs to which subdivision of the Himalaya?
- (1) The central Himalaya (2) The Kailas Range
(3) The Ladakh Range (4) The Eastern Himalaya
69. The region of older alluvium of the Ganga plain is known as _____
- (1) Khadar (2) Bhabar
(3) Bangar (4) Tarai

70. 'Bundelkhand' is situated in which direction in relation to Malwa Plateau?
 (1) South - East (2) South
 (3) West (4) North - East
71. Identify the correct pair of the following
 (i) Indian National Congress (A) Established in 1980
 (ii) Bharatiya Janata Party (B) Established in 1885
 (iii) Communist Party of India (C) Established in 1999
 (iv) Nationalist Congress party (D) Established in 1964
 (1) (i) – (D), (ii) – (C), (iii) – (B), (iv) – A (2) (i) – (C), (ii) – (B), (iii) – (A), (iv) – (D)
 (3) (i) – (D), (ii) – (A), (iii) – (C), (iv) – (B) (4) (i) – (B), (ii) – (A), (iii) – (D), (iv) – (C)
72. Which one of the following is not applicable for the parliamentary Democracy?
 (1) Two chief executives
 (2) Power vested in the parliament
 (3) Executive chiefs cannot be removed before the end of his tenure
 (4) In England and India, Parliamentary democracy is in existence
73. Who worked as the Chairperson of the Advisory Committee on fundamental rights of the Constituent Assembly?
 (1) Vallabhbaipatel (2) Pandit Jawaharlal Nehru
 (3) Dr.Rajendra Prasad (4) Dr.BabasahebAmbedkar
74. Who has written book called 'Stree – PurushTulana' Published in 1882?
 (1) Mahatma Phule (2) ShahuMaharaj
 (3) TarabaiShinde (4) SavitribaiPhule
75. People tend to migrate to more developed regions is an example of which inequality?
 (1) Political (2) Regional
 (3) Social (4) Linguistic
76. _____ refers to various activities related to the production, distribution and consumption of goods and services in a certain Geographical region.
 (1) Political Sovereignty (2) Sectoral distribution
 (3) An Economy (4) Natural Resources
77. Which day of the following is celebrated as World Consumer Day?
 (1) 15th March (2) 24th December
 (3) 10th December (4) 8th April
78. 'Economics is a science to study human well – being/welfare.' Who has defined it?
 (1) Prof. Adam Smith (2) Leonnel Robins
 (3) Prof. Kemmerer (4) Prof. Alfred Marshall
79. On Which factor of the following the decision regarding "How much to produce" does not depend upon?
 (1) Population growth (2) Level of Production
 (3) Size of Market (4) Availability of resources
80. Which is not a fiscal measure of the following to control inflation?
 (1) Increase in Taxation (2) Public Borrowings
 (3) Overvaluation (4) Increase in Bank Rate
81. In an A.P the sum of 'n' terms is $5n^2 - 5n$. Find the 10th term of the A.P
 (1) 80 (2) 90
 (3) 100 (4) 110
82. If $\frac{a}{x+y} = \frac{b}{y+z} = \frac{c}{z-x}$, then which of the following equations is true?
 (1) $a = b + c$ (2) $c = a + b$
 (3) $b = a \times c$ (4) $b = a + c$
83. The difference between the two roots of a quadratic equation is 2 and the difference between the cubes of the roots is 98, then which of the following is that quadratic equation?
 (1) $x^2 - 8x + 15 = 0$ (2) $x^2 + 8x - 15 = 0$

(3) $x^2 + 5x + 15 = 0$

(4) $x^2 - 5x - 15 = 0$

84. From a pack of 52 playing cards, face club cards are removed. The remaining cards are well shuffled and a card is drawn at random. Find the probability that the card drawn is a heart card.

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

(2) $\frac{13}{49}$

(3) $\frac{3}{52}$

(4) $\frac{49}{52}$

85. A boat takes 7 hours to travel 30 km upstream and 28 km downstream. It takes 5 hours to travel 21 km upstream and to return back. Find the speed of the boat in still water

(1) 10 km/hr

(2) 20 km/hr

(3) 14 km/hr

(4) 6 km/hr

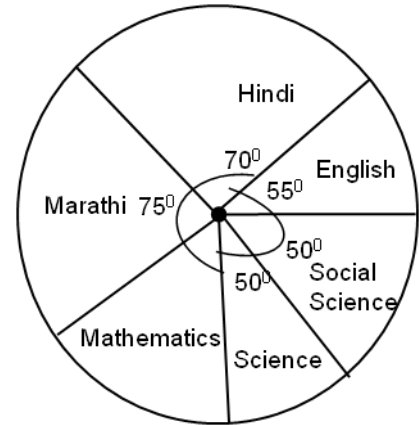
86. The marks scored by a student in an examination of 600 marks is shown in the following pie diagram. If he scored 60 marks in Mathematics, then find the percentage of marks that he secured in the examination.

(1) 60%

(2) 50%

(3) 75%

(4) 5%



87. $\sqrt{m^4 n^4} \times \sqrt[6]{m^2 n^2} \times \sqrt[3]{m^2 n^2} = (m, n)^k$, then find the value of k.

(1) 6

(2) 3

(3) 2

(4) 1

88. The cost of 20 guavas and 5 apples is same as that of 12 guavas and 7 apples then how many times the cost of an apple is to that of a guava?

(1) Two times

(2) half times

(3) four times

(4) five times

89. In a group of students, 10% students scored marks less than 20, 20% students scored marks between 20 to 40, 35% students scored marks between 40 to 60 and 20% students scored marks between 60 to 80. Remaining 30 students scored marks between 80 to 100. Find the mode of marks.

(1) 30

(2) 50

(3) 60

(4) 70

90. One of the root of a quadratic equation is $(3 - \sqrt{2})$, then which of the following is that equation

(1) $(x^2 - 6x - 7) = 0$

(2) $(x^2 + 6x - 7) = 0$

(3) $(x^2 + 6x + 7) = 0$.

(4) $(x^2 - 6x + 7) = 0$

91. In $\triangle ABC$, $m \angle B = 90^\circ$, $AB = 4\sqrt{5}$. $BD \perp AC$, $AD = 4$, then $A(\triangle ABC) = ?$

(1) 96 sq. units

(2) 80 sq.units

(3) 120 sq.units

(4) 160 sq.units

92. Side of a cube is increased by 50%, then what percent increase will be in the area of the vertical faces of the cube?

(1) 125%

(2) 150%

(3) 100%

(4) 50%

93. $\sin x = \frac{6 \sin 30^\circ - 8 \cos 60^\circ + 2 \tan 45^\circ}{2(\sin^2 30^\circ + \cos^2 60^\circ)}$, then x = how much?

(1) 30°

(2) 45°

(3) 60°

(4) 90°

94. $P \equiv (1, -9)$, $Q \equiv (2, 5)$ and $R \equiv (6, 7)$ are the co-ordinates of the vertices of $\triangle PQR$, then find the co-ordinates of the centroid from the following alternative given:

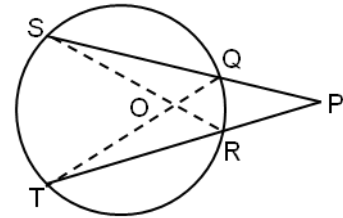
(1) $\left(\frac{10}{3}, \frac{-17}{3}\right)$

(2) (1,3)

(3) (3,1)

(4) (-3,1)

95. In the following figure secants QS and TR intersect each other at point P, which is outside the circle. O is the point of intersection of Chords SR and TQ. If OS = 5 cm, OT = 10 cm, TR = 12 cm, PR = 8 cm, then find I(PQ).



(1) 6 cm

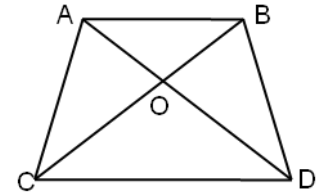
(2) 10 cm

(3) 12 cm

(4) 16 cm

96. In the following figure, seg AB || seg CD. Diagonals AC and BD intersect at point O.

If $AO : OC = 1 : 3$, then $\frac{A(\triangle AOB)}{A(\triangle ABD)} = ?$



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

(2) $\frac{1}{9}$

(3) 16

(4) 116

97. In $\triangle ABC$ points P and Q trisect side AB. Points T and U trisect side AC and points R and S trisect side BC. Then perimeter of hexagon PQRSTU is how many times of the perimeter of $\triangle ABC$?

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

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

(3) $\frac{1}{6}$ times

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

98. $\frac{\sin^4 \theta - \cos^4 \theta}{1 - \sin^2 \theta} = \text{how much}$

(1) $1 - \cot^2 \theta$

(2) $1 - \tan^2 \theta$

(3) $\tan^2 \theta - 1$

(4) $\cot^2 \theta - 1$

99. The radius of a cylindrical vessel is 7 cm and its height is 12 cm. $\frac{2}{3}$ of the vessel is filled with water. A sphere having radius 6 cm is dropped into the water. Find the volume of the water that will come out of the vessel.

(1) $196 \pi \text{ cm}^3$

(2) $92 \pi \text{ cm}^3$

(3) $288 \pi \text{ cm}^3$

(4) $588 \pi \text{ cm}^3$

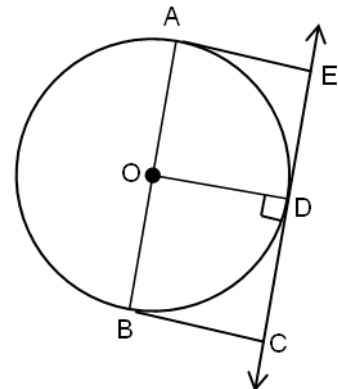
100. Radius of circle with centre 'O' is $4\sqrt{5}$ cm 'AB' is the diameter of the circle. $AE \parallel BC$, $BC = 8$ cm. Line EC is tangent at point D. Find the length of DE.

(1) $4\sqrt{5}$ cm

(2) $6\sqrt{5}$ cm

(3) 8 cm

(4) 10 cm



Sat Sol:

1. $q = 3 \times 1.6 \times 10^{-19} \text{C}$, $V = 10\text{V}$, $W = ?$

$$W = qV$$

$$W = 3 \times 1.6 \times 10^{-19} \times 10$$

$$W = 4.8 \times 10^{-18} \text{ J}$$

In moving one Lithium Nucleus, work done is 10 J

So in moving 10 nucleus

$$W' = 10W$$

$$= 4.8 \times 10^{-17} \text{ J}$$

2. Direction of Magnetic field produced near a current carrying wire is given by right hand thumb rule (direction only) and was discovered by Hans Oersted.

Direction of electric current is generated in a conductor moving in a magnetic field can be found out by using Fleming's Right hand rule and was discovered by Michael Faraday

3. M.R.I is Magnetic Resonance Imaging and is based on the magnetic effect of electric current.

4. As we know

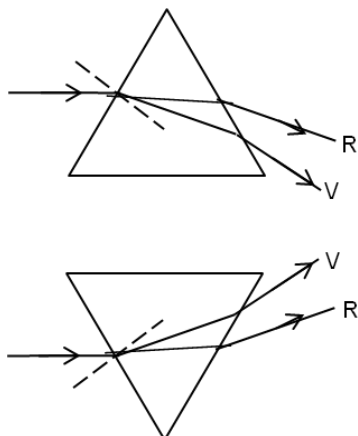
$$\mu_{\text{diamond}} > \mu_{\text{rock salt}} > \mu_{\text{water}} > \mu_{\text{air}}$$

So speed of light

$$V_{\text{diamond}} < V_{\text{rock salt}} < V_{\text{water}} < V_{\text{air}}$$

$$V_3 < V_1 < V_2 < V$$

- 5.



From figure we can see that deviation in violet is maximum in both cases, as violet remains near the normal in both cases.

6. The order of the parts of eyes are cornea, iris, pupil, lens, retina.

7. By analysing the graph

For March

$$300 \times 3.50 = 1050 \text{ Rs}$$

For April

$$500 \times 4.50 = 2250 \text{ Rs}$$

For May

$$500 \times 4.50 = 2250 \text{ Rs}$$

For June

$$300 \times 2.50 = 750 \text{ Rs}$$

$$\text{Total} = 1050 + 2250 + 2250 + 750 = 6300 \text{ Rs}$$

8. When object is placed at focus, it gives maximum magnification as the image is formed at infinity.

9. $h_1 = 3\text{cm}$, $f = +15\text{cm}$, $h_2 = -15\text{cm}$, $u = ?$, $v = ?$

We know that

$$m = \frac{h_2}{h_1} = \frac{v}{u}$$

$$\frac{-15}{3} = \frac{v}{u}$$

$$-5u = v$$

$$\therefore \frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{-5u} - \frac{1}{u} = \frac{1}{15}$$

$$\frac{-1-5}{5u} = \frac{1}{15} \Rightarrow u = -18 \text{ cm}$$

$$\therefore v = +90 \text{ cm}$$

10. From n to n_1 light passes without deviation. So it means $n = n_1$ and this concave lens behaves as converging lens (opposite behaviour) in this case so,
 $n_2 > n_1 = n$

11. $S_n^{\text{th}} = u + \frac{1}{2}a(2n - 1)$

So it depends on initial velocity (Most appropriate answer)

12. K.E is maximum at mean position means at A.
 Acceleration is maximum at extreme position means B and C

13. $P = 300 \text{ W}$, time per day = 1.5 hrs.
 Rupees per unit = 3.50, time in days = 30 days
 Cost for one day
 $= P \times t \times \text{Rupees}$
 $= 0.3 \times 1.5 \text{ KW / hr} \times 3.50$
 $= 4.5 \times 3.50 \text{ Rs}$
 Cost for 30 days
 $= 0.45 \times 3.50 \times 30$
 $= 47.25 \text{ Rs}$

14. A, C and D are halogens.

15. On moving left to right in periodic table, electro negativity increases.

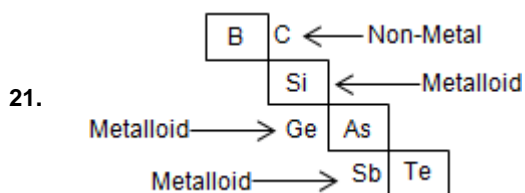
16. H_2S is reducing agent as it is undergoing in oxidation SO_2 is oxidising agent as it is undergoing in reduction.

17. Fact

18. $\text{CuCl}_2 + \text{H}_2\text{SO}_4 (\text{aq}) \rightarrow \text{CuSO}_4 (\text{aq}) + \text{HCl}_{(\text{g})} \uparrow$

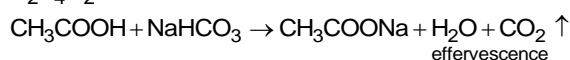
19. (a) tomato juice, $\text{pH} = 3$ to 4
 (b) Vinegar $\text{pH} = 2$ to 3
 (c) Washing soda pH above 7
 (d) human blood $\text{pH} > 7$

20. According to reactivity series



22. 3, Propanoic Acid

23. $\text{C}_2\text{H}_4\text{O}_2$ is ethanoic acid



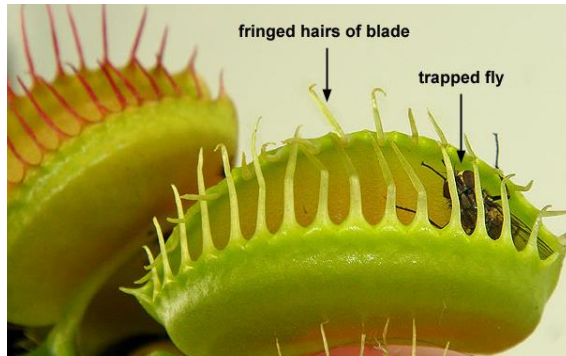
24. Fact

25. Fact

26. K L M N
2 8 8 2

27. urea, uric acid and ammonia are harmful products of biochemical reaction but lymph is not produced by biochemical reaction

28. (1) (D)



(2) (C)



(3) (A)



(4) (B) Lotus flower open in the morning and petals fall in the afternoon.

29. Humans show Holozoic mode of nutrition which follows option (1)

30. The label (A) is dendrite where the environmental information is picked in the neuron.

31. Cytokinins

32. Hydra reproduces by budding, fragmentation

33. 2 male gametes in angiosperms are required for the formation of seed (1 male gamete fuses with the egg to form the zygote and the second male gamete fuses with the two polar nucleus to form the triploid endosperm). Therefore 25 seeds 50 male gametes are involved
34. The basis process in reproduction is a creation of DNA copy, because DNA is the genetic material
35. Lungfish is a connecting link between Pisces and amphibian
36. The F_2 ratio is 9 : 3 : 3 : 1. The $9/16$ of 320 = 180, shows yellow and round phenotype
37. The burning of rice straw produces green house gases like CO_2 , CH_4 , SO_2 etc.,
38. The biomedical waste like syringes is not handle properly can transmit disease like AIDS
39. Family is the category the lies between genus and order
40. Earthworm belongs to Annelida Phylum.
81. $Sum = 5x^2 - 5n$
 $a_1 = S_1 = 5(1)^2 - 5(1) = 0$
 $a_2 = S_2 - S_1 = 10 - 0 = 10$
 $a_3 = S_3 - S_2 = 5(3)^2 - 5(3) - 10 = 20$
 $\Rightarrow d = a_2 - a_1 = 10$
 $\Rightarrow a_{10} = a + 9d = 90$
 Option (2) is correct
82. $\frac{a}{x+y} = \frac{b}{y+z} = \frac{c}{z-x} = k$
 $a = k(x+y)$
 $c = k(z-x)$
 $a+c = k(y+z) = b$
 So, option (4) is correct
83. $\alpha - \beta = 2$
 $\alpha^3 - \beta^3 = 98$
 $\Rightarrow (2+\beta)^3 - \beta^3 = 98$
 $\Rightarrow 8 + \beta^3 + 6\beta(\beta+2) - \beta^3 = 98$
 $\Rightarrow 6\beta(\beta+2) = 90$
 $\Rightarrow \beta^2 + 2\beta = 15$
 $\Rightarrow \beta = \frac{-2 \pm \sqrt{4 - (-60)}}{2}$
 $= \frac{-2 \pm \sqrt{64}}{2}$
 $\beta = \frac{-2 \pm 8}{2}$
 $\beta = \frac{-2+8}{2}$ or $\beta = \frac{-2-8}{2} = -5$
 $\beta = 3$ or -5
 $\Rightarrow \beta = 3, \alpha = 3+2 = 5$
 $\Rightarrow \beta = -5, \alpha = -5+2 = -3$
 $\Rightarrow x^2 - (\alpha + \beta)x + \alpha\beta$
 $(3,5) \Rightarrow x^2 - 8x + 15$
 $(-3,-5) \Rightarrow x^2 - (\alpha + \beta)x + \alpha\beta = 0$
 $\Rightarrow x^2 - (-8)x + 15 = 0$
 $\Rightarrow x^2 + 8x + 15 = 0$
 So, option (1) is correct

84. No. of heart cards = 13
 Total cards = 52
 But face club are removed
 So, total cards remained = $52 - 3 = 49$.
 Probability that the card drawn is a Heart card = $\frac{13}{49}$
 So, option (2) is correct

85. Let speed of boat in still water = x km/hr
 Let speed of stream = y km/h
 Net speed of Boat for upstream = $(x - y)$ km/hr
 Net speed of Boat for downstream = $(x + y)$ km/hr

$$\frac{30}{x - y} + \frac{28}{x + y} = 7 \quad \dots(1)$$

$$\frac{21}{x - y} + \frac{21}{x + y} = 5 \quad \dots(2)$$

Equation :

$$\frac{2}{x - y} + 28 \left[\frac{1}{x - y} + \frac{1}{x + y} \right] = 7$$

$$\frac{2}{x - y} + 28 \times \frac{5}{21} = 7$$

$$\Rightarrow \frac{2}{x - y} = 7 - \frac{140}{21}$$

$$\Rightarrow x - y = 6 \quad \dots(3)$$

Put $x - y = 6$ in (1) equation

$$\Rightarrow x + y = 14 \quad \dots(4)$$

From (3) & (4)

$$\Rightarrow 2x = 20$$

$$x = 10 \text{ km/hr}$$

So, option (1) is correct

86. Total Marks = 600
 Marks in Maths = 60
 Let marks scored by a students in the exam = x

$$x \times \frac{60^\circ}{360^\circ} = 60$$

$$\Rightarrow \frac{x}{6} = 60$$

$$\Rightarrow x = 360$$

$$\% \text{ of marks} = \frac{360}{600} \times 100 = 60\%$$

So, option (1) is correct

87. $\sqrt{m^4 n^4} \times \sqrt[6]{m^2 n^2} \times \sqrt[3]{m^2 n^2} = (mn)^k$

$$\Rightarrow (mn)^2 \times (mn)^{1/3} \times (mn)^{2/3} = (mn)^k$$

$$\Rightarrow (mn)^3 = (mn)^k$$

$$\Rightarrow k = 3$$

 So, option (2) is correct

88. Let's cost of guavas = Rs x .
 Let's cost of apples = Rs y .
 $20x + 5y = 12x + 7y$
 $\Rightarrow 8x = 2y$
 $\Rightarrow y = 4x$
 So, option (3) is correct

89. Let's total students = x .
 $< 20 = 10\%$ of total students
 $20 - 40 = 20\%$ of total students
 $40 - 60 = 35\%$ of total students
 $60 - 80 = 20\%$ of total students

$$80 - 100 = 30 \text{ students} = [100 - 110 + 20 + 35 + 20]\% \text{ of } x.$$

$$\Rightarrow 30^2 = \frac{15}{100} \times x$$

$$\Rightarrow x = 200 \text{ students}$$

So, slab (40 – 60) will have higher no. of students option (2) is correct.

90. One of the Root of Quadratic equation = $3 - \sqrt{2}$

Another conjugate will be = $3 + \sqrt{2}$

Sum of the roots = 6

Product of the roots =

$$(3 - \sqrt{2})(3 + \sqrt{2}) = 9 - 2$$

$$= 7$$

$$\Rightarrow x^2 - (\text{sum of the roots})x + \text{product of the roots} = 0$$

$$\Rightarrow x^2 - 6x + 7 = 0$$

So, option (4) is correct.

91. $\frac{4\sqrt{5}}{AC} = \frac{4}{4\sqrt{5}}$

$$AC = 20$$

$$BC = 8\sqrt{5}$$

$$\text{Area (ABC)} = 80 \text{ sq. unit}$$

92. $\frac{4\left(\frac{9}{4}a\right)^2 - 4a^2}{4a^2} \times 100\%$

$$= 125\%$$

93. $\sin x = 1$
So, $x = 90^\circ$

94. Centroid = $\left(\frac{1+2+6}{3}, \frac{-9+5+7}{3}\right)$

$$= (3, 1)$$

95. $\frac{5}{10} = \frac{SQ}{12}$
SQ = 6
PQ = x
 $x(x+6) = 8 \times 20$
x = 10

96. $\frac{\text{ar (AOB)}}{\text{ar (ABD)}} = \frac{\frac{1}{2} \times h \times OB}{\frac{1}{2} \times h \times BD} = \frac{y}{4y} = \frac{1}{4}$

97. Perimeter of hexagon = $\frac{2}{3} \text{ per (ABC)}$

98. $\frac{\sin^2 \theta - \cos^2 \theta}{\cos^2 \theta} = \tan^2 \theta - 1$

99. Volume of water comes out
= $288\pi - (588\pi - 392\pi)$
= 92π

100. $\frac{4\sqrt{5}}{8} = \frac{x}{4\sqrt{5}}$

$$x = 10$$

