Q.1 Twinkling stars are seen due to _____
(A) irregular emission of light from stars
(B) weather changes
(C) stars are far away
(D) refractive index of air in the given region goes on changing and randomly

Q.2 Government of India celebrates 28 February as 'National Science Day' in the memory of _____
(A) Dr. Hargovind Khurana
(B) Dr. C. V. Raman
(C) Dr. Vikram Sarabhai
(D) Dr. A.P.J. Abdul Kalam

Q.3 $F = G\frac{m_1 \times m_2}{R_2}$ is the formula to prove _____
(A) Newton's First law of motion
(B) Newton's Second law of motion
(C) Newton's Third law of motion
(D) Newton's Law of Gravitation

Q.4 Calculate pressure exerted by a screw on the wooden plank if area of contact of the screw is 0.5 mm^2 and its weight is 50 N.
(A) 100 X 10^6 N/m^2
(B) 50 X 10^6 N/m^2
(C) 100 X 10^6 N
(D) 50 X 10^6 N

Q.5 The distance of distinct vision is _____ cm.
(A) 20
(B) 25
(C) 30
(D) 35

Q.6 Observe the Columns I, II and III, match them and select the correct answer from given options.

I		II		III	
A.	Resistors in series	(a)	Required to move a unit positive charge from one point to another point.	(i)	$Q = \frac{Rl}{A}$
B.	Potential difference	(b)	Used to increase effective resistance in a circuit.	(ii)	$I = \frac{Q}{t}$
C.	Electric current	(c)	Net charge flowing through any cross section of a conductor in the given time.	(iii)	$R(s) = R_1+R_2+R_3....R_{(n)}$
D.	Resistivity	(d)	Depends on the material of the conductor	(iv)	$V = \frac{W}{Q}$

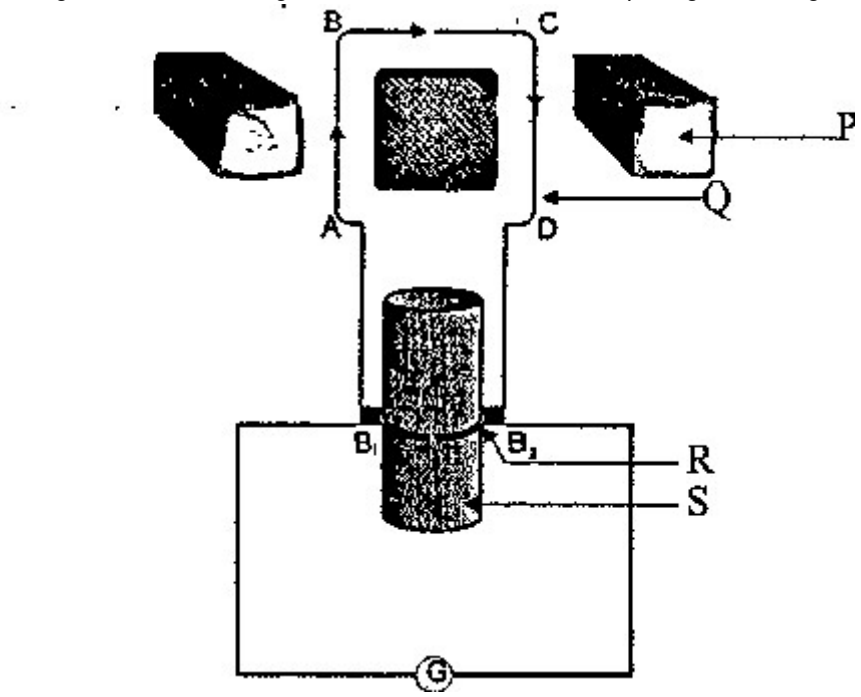
(A) A – b – iii, B – a – iv, C- c – ii, D- d – i.
(B) A – c – iv, B – b – iii, C- d – i, D- a – ii.
(C) A – d – ii, B – b – i, C- a – iii, D- c – iv.
(D) A – a – i, B – b – iii, C- d – iv, D- c – ii.

Q.7 MRI stands for _____.
(A) Managing Response Index
(B) Magnetic Resonance Index
(C) Magnetic Resonance Imaging
(D) Managing Response Imaging

Q.8 Which of the followings is not property of magnetic lines of force.
(A) The tangent at any point on the magnetic lines of pole gives the direction of the magnetic field at that point.
(B) No two magnetic lines of pole can intersect each other
(C) Magnetic lines of force are crowded where the magnetic field is strong and far from each other where field is weak.
(D) They are closed continuous curves. They start from south pole and end on north pole.

Q.9 Select the incorrect statement stated below related to concave mirror
(A) Outer surface is coated with opaque substance.
(B) Inner surface is polished and thus reflective.
(C) It is called as converging mirror.
(D) It is used to observe the phenomenon of refraction.

Q.10 Observe the diagram of 'Electric DC generator, and select the correct pairing of labelling.

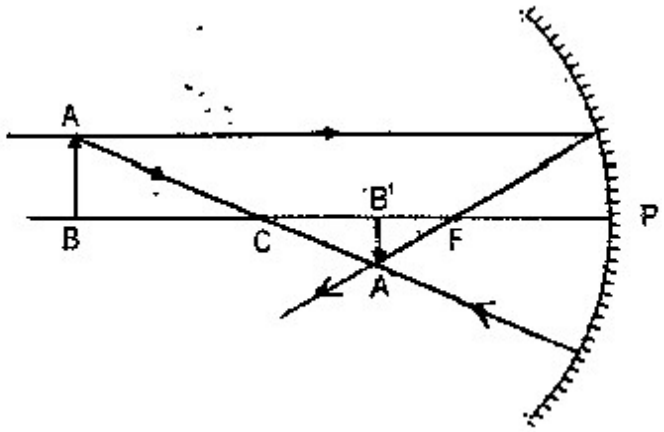


(A) P-Strong magnet, Q-Armeature, R-Splitring, S-Axle
(B) P-Iron core, Q-Armeature, R-Splitring, S-Axle
(C) P-Strong magnet, Q-Iron core,, R-Axle, S-wire
(D) P-Iron core, Q-Axle, R-Splitring, S-Strong magnet

Q.11 A current of 0.4A is flowing through a bulb for 3 minutes. Find the charge that is flowing through the circuit.

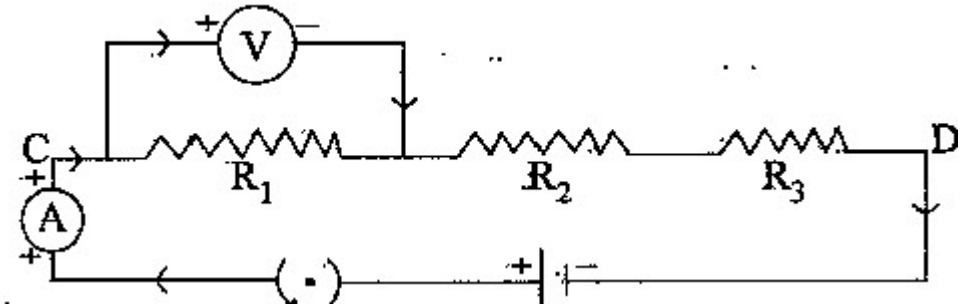
(A) 12 C
(B) 36 C
(C) 72 C
(D) 450 C

Q.12 Observe the adjacent ray diagram and select the correct option of position, nature and size of image.



(A) Beyond C, Real and inverted, Enlarged
(B) Between C and F, Real and inverted, Diminished
(C) Beyond C, Real and inverted, Enlarged
(D) Between C and F, Virtual and Erect, Diminished

Q.13 Observe the adjacent ray diagram and select the correct option of position, nature and size of image



(A) Electric circuit is open
(B) Resistors R_1, R_2 and R_3 are connected in series
(C) Ammeter 'A' is connected in series
(D) Voltmeter 'V' is connected .in parallel

Q.14 Which of the following Element loses and electron most easily.
(A) Na (B) Mg
(C) K (D) Ca

Q.15 Which of the following species does not have electrons equal to 18.
(A) K^{++} (B) Cl^-
(C) Ca^{2+} (D) K

Q.16 Which of the following is a double displacement reaction
(A) $NH_3 + HCl \longrightarrow NH_4Cl$
(B) $CuSO_{4(aq)} + Fe_{(s)} \longrightarrow FeSO_4 + Cu$
(C) $Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + 2\ NaCl$
(D) $CaCO_{3(s)} \longrightarrow CaO_{(s)} + CO_{2(g)}$

Q.17 The colour of anhydrous copper sulphate is _____ .
(A) Blue (B) White
(C) Pink (D) Green

Q.18 Ajay has a stung by red ant, it causes itching & irritation. The sting consists of which of the following acid
(A) Acetic acid (B) Butyric acid
(C) Carbonic acid (D) Formic acid

Q.19 Which of following compound is alkaline in aqueous medium.
(A) Na_2CO_3 (B) NaCl
(C) H_2CO_3 (D) $CuSO_4$

Q.20 Which of the following compound conduct electricity in aqueous solution which is a covalent compound.
(A) Calcium Chloride (B) Hydrogen Chloride
(C) Magnesium Oxide (D) Lithium Fluoride

Q.21 of the following metal does not react with dilute HCl
(A) Copper (B) Aluminium
(C) Iron (D) Zinc

Q.22 Select a pair of homologous from the following.
(A) C_3H_6 and C_4H_{10} (B) CH_3COOH and C_2H_5COOH
(C) C_4H_8 and C_3H_4 (D) $(CH_3)_2CO$ and C_3H_7CHO

Q.23 According to IUPAC rule, which of the following compound is prop — I — ene.
(A) CH_3- CH_2- CH_3 (B) CH_3- CH = CH_2
(C) CH_3- CH = CH - CH_3 (D) CH_3- C = CH

Q.24 Stainless steel alloy is a mixture of
(A) Fe + C + Cr + Ni (B) Ni + C + Cr + Al
(C) Fe + Cu + Al + c (D) Fe + Zn + C +Ni

Q.25 Which of the following elements will form an acidic oxide
(A) An element with atomic number 7
(B) An element with atomic number 3
(C) An element with atomic number 12
(D) An element with atomic number 19

Q.26 Which of the general formulae represents the alkyl group
(A) C_nH_{2n} (B) C_nH_{2n+1}
(C) C_nH_{2n+2} (D) C_nH_{2n-1}

Q.27 Raw material required for photosynthesis is _____ and water.
(A) Chloroplast (B) Sunlight
(C) Nitrogen (D) Carbon-dioxide

Q.28 Find the odd man
(A) Uterus (B) Ovary
(C) Vagina (D) Testis

Q.29 The Prescribed limit of sound in decibels in silent zone during daytime is.
(A) 50 (B) 60
(C) 70 (D) 40

Q.30 A green house gas N_20 remains for how many years in the atmosphere?
(A) 100 (B) 114
(C) 104 (D) 109

Q.31 In human being blood goes through the heart ..... times during each cycle.
(A) one (B) three
(C) two (D) four

Q.32 Response to stimulus of touch is called _____
(A) Tropic movement (B) Photo-tropic movement
(C) Hydro-tropic movement (D) Seismonastic movement

Q.33 Find the odd man
(A) Fragmentation (B) Regeneration
(C) Budding in Yeast (D) Budding in Hydra

Q.34 The total no. of pairs of chromosomes in human beings are .....
(A) 22 (B) 23
(C) 46 (D) 44

Q.35

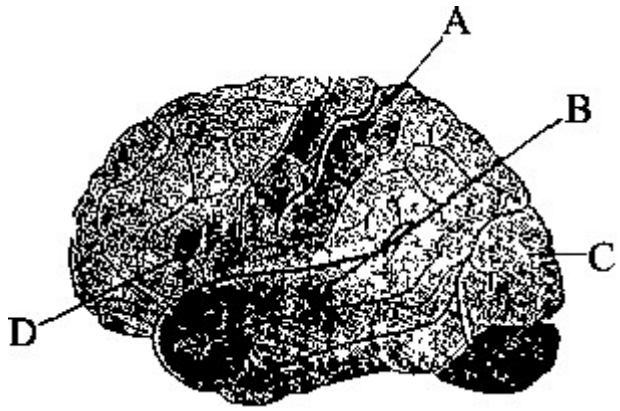
Column A		**Column B**	
(i)	Darwin	(a)	heritability of acquired characteristics
(ii)	Lamarck	(b)	inheritance
(iii)	Mendel	(c)	natural selection

(A) (i) – (c), (ii) – (a), (iii) – (b) (B) (i) – (b), (ii) – (c), (iii) – (a)
(C) (i) – (b), (ii) – (a), (iii) – (c) (D) (i) – (a), (ii) – (c), (iii) – (b)

Q.36 Which plant does not belong to group Thallophyta
(A) Ulothrix (B) Spirogyra
(C) Chara (D) Funaria

Q.37 The excretory product in crystalline form of the plants .....causes itching
(A) Phyroid (B) Raphyids
(C) Graphyid (D) Cyanide

Q.38 From different areas of the brain which is vision area?



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

Q.39 In female reproductive system ovaries secrete ..... hormone.
(A) testosterone (B) estrogen
(C) auxin (D) thyroxine

Q.40 Find the odd man
(A) Adiantum (B) Equisetum
(C) Selaginella (D) Riccia

Q.41 Select the correct chronological order from the given
(i) America declared war against Germany
(ii) Austria declared war against Serbia
(iii) Assassination of Austrian Prince Francis Ferdinand
(iv) Italy entered into war from England and Frances side

(1) (ii), (iii), (i), (iv) (2) (iii), (ii), (iv), (i)
(3) (iv), (i), (iii), (ii) (4) (i), (iv), (iii), (ii)

Q.42 Who took lead and sacrificed the cold war?
(A) Nikita Kruchev (B) Eisenhower
(C) Truman (D) Gorbochev

Q.43 First colony established by England in America is _____
(A) Mary land (B) Virginia
(C) New York (D) New Jersey

Q.44 In which continent did the first international trade revolution take place?
(A) America (B) Africa
(C) Europe (D) Asia

Q.45 Which one of the following options is applicable to the Nanking Treaty'?
(A) Won the Hong Kong Island
(B) The business of opium was granted
(C) Christion missionaries got permission to spread their religion in China.
(D) A group of six ports was opened for the foreign traders.

Q.46 Identify the incorrect pair of the following
(A) Assembly — To observe the administration of UNO
(B) Security Council — Permission to new membership
(C) Economic and social committee — To protect human rights and fundamental rights
(D) Secretariat — To interpret international law

Q.47 Find the correct option of the constructive effect of imperalism.
(A) Destruction of village autonomy
(B) Decline of values
(C) Rise of new leadership
(D) Suppression of under depended nations

Q.48 Which policy of Linen was opposed by the extremist communist leaders?
(A) Give land to landless farmers
(B) Allow private industry business to a limited extend
(C) To provide workers with basic needs instead of wages
(D) Domination of the working class in the government.

Q.49 In which of following place parallel government was not established?
(A) Meerut (B) Pornia
(C) Baliya (D) Midnapur

Q.50 Out of following which issue was solved peacefully by the United Nations?
(A) The attack of Italy on Ethiopia
(B) Hitler's attack on Austria
(C) Japan's attack on Manchuria
(D) Italy's attack on Kaifu Island

51. 'People Party' was established by _____
(1) Sultan Majid (2) Kamal Pasha
(3) General Tojo (4) Emperor Genro

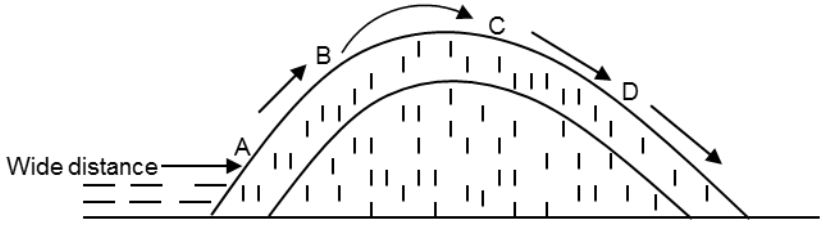
52. Which one of the following is not an 'Input Devices' of a computer?
(1) Key Board (2) Mouse
(3) Monitor (4) Scanner

53. The discovery of the fact that 'the universe is not a divine creation' was made to the world by _____
(1) Newton (2) Holdmant
(3) Copernicus (4) Galileo

54. Which king motivated the navigators in Europe?
(1) Nicholas (2) Pancham George
(3) William (4) Henry

55. Which Asian country was involved in Africa's imperialistic policy?
(1) Thailand (2) Iraq
(3) Arab (4) Iran

56. In the given diagram which alphabet indicates the rain shadow area.



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

57. _____ is a weight loosing raw material
(1) Sugar Cane (2) Cotton
(3) Wool (4) Silk

58. Which physical division is shown?

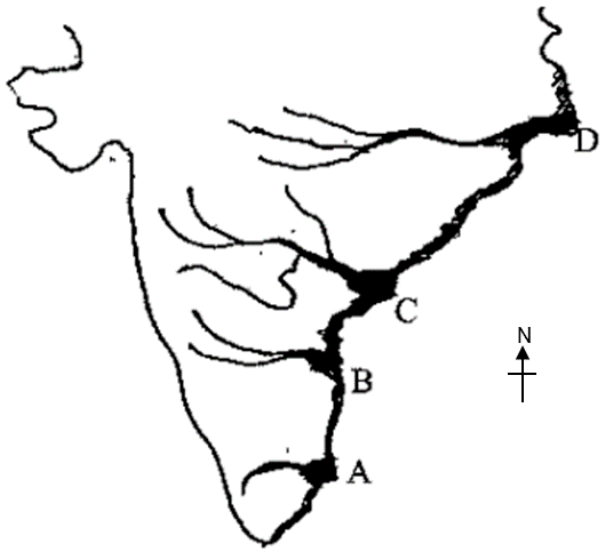
(1) Southern plateau region
(2) Western plain region
(3) Northern mountainous region
(4) Eastern coastal plain

59. How many state capitals are connected by the Golden Quadrilateral other than Delhi?
(1) Five
(2) Seven
(3) Six
(4) Eight

60. Area wise which is the largest division of India?
(1) North Indian plain region
(2) The Indian plateau region
(3) Northern mountainous region
(4) Ghat coastal plain region and island

61. Asia's biggest Agricultural University is at _____
(1) Hissar
(2) Ambala
(3) Ludhiana
(4) Amritsar

62. In the given map which alphabet represents the Godavari delta?



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

63. Which of the following feature is not formed by the rivers of Ganga Plain?
(1) Meanders
(2) Ox-bow lakes
(3) Natural levees
(4) 'V' Shaped valley

64. Which of the following is not the sub division of Deccan Plateau
(1) Satpura-Mahadeo-Maikal ranges
(2) Maharashtra plateau
(3) Malwa plateau
(4) Karnataka plateau

65. Which of the following has wrong correlation.

Type of Vehicle		Degree	Percentage
A	Public Transport	58	17.1
B	Professional vehicle	14	3.8
C	Three wheelers	14	3.8
D	Two wheelers	274	76.1

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

66. Which of the following is not the subdivision of Central Highlands?
(1) Malwa plateau (2) Chota Nagpur plateau
(3) The Vindhya ranges (4) Dandakaranya

67. Find the correct pair
(1) North Mountainous region Chinar
(2) Rajasthan Plain Dhak
(3) Deccan plateau Khipbush
(4) Punjab Haryana plain Sandlwood

68. Find the incorrect pair.

State	**Coastal area**
(1) Karnataka	Kalangut
(2) Kerala	Kovalam
(3) Maharashtra	Guhagar
(4) Goa	Kolwa

69. Proper sequence of peaks in the eastern ghats from South to North.
(1) Nimgiri, Mahendragiri, Nallamala, Palkonda (2) Palkonda, Nallamala, Mahendragiri, Nimgiri
(3) Nallamala, Palkonda, Mahendragiri, Nimgiri (4) Nimgiri, Mahendragiri, Pulkonda, Nallamala

70. In the middle Ganga plain silk are manufactured at _____
(1) Gorakhpur (2) Samastipur
(3) Mirzapur (4) Bhagalpur

71. Who creates government and decides the powers of the regional level governments?
(1) Legislature (2) Judiciary
(3) Executive (4) Constitution

72. Kashi Ram is 1984 founder _____ party.
(1) Samajwadi Party (2) Bahujan Vikas Party
(3) Bahujan Samaj Party (4) Bharip Bahujan Maha Sangh

73. In which county's electoral system does the vote of an indigenous person have more value than that of an Indian person?
(1) Fiji (2) Estonia
(3) Mexico (4) Finland

74. Due to the efforts of Eminent Social activists Anna Hazare, which right has been passed by the Indian Government?
(1) Right to Relaxation (2) Labour Rights
(3) Right to information (4) Human Rights

75. Which one of the following is the first political work of the citizen?
(1) to bring about people together (2) to caste a vote
(3) to be present at meeting conducted (4) to comment on the government

76. Which of the following is not part of the consumer's Redressal Agencies?
(1) The taluka Forum (2) The district Forum
(3) The state commission (4) The national Commission

77. Who will be the benefited during inflation?
(1) Debtors
(2) A person with steady Income
(3) A person infesting in equities
(4) Creditors

78. Monetary measures to control inflation is _____
(1) Reduction in Public expenditure
(2) Increase in cash reserve ratio
(3) Increase in taxes
(4) Surplus budget

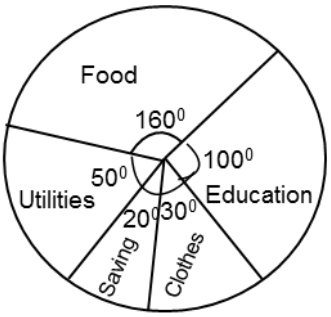
79. Which of the following is extremely necessary for men?
(1) Car
(2) Health
(3) Fan
(4) Furniture

80. Identify the statement which relates to 'Optimum population'?
(1) Available resources are not used enough
(2) Creates stress on available resources
(3) Population is not enough to consume resources completely
(4) Indicates ideal size of population of a country

81. How many numbers between 10 to 300. When divided by 4, leave remainder 3?
(1) 71
(2) 72
(3) 73
(4) 74

82. Which of the following are the roots of the quadratic equation $x^2 + 2\sqrt{2x} - 6 = 0$?
(1) $-3\sqrt{2}, \sqrt{2}$
(2) $3\sqrt{2}, -2\sqrt{2}$
(3) $3, 2$
(4) $3, 2\sqrt{2}$

83. The expenditure incurred on different items in a family is shown in the adjacent pie diagram. If the amount of house rent is ₹ 10, 000 then find the amount incurred on education.
(1) ₹ 20, 000
(2) ₹ 32, 000
(3) ₹ 72, 000
(4) ₹ 30, 000



84. A train travels some distance at a constant speed. If the speed of the train would have increased by 15 km/hr, then it would have required 2 hours less. But if the speed of the train would have decreased by 5 km then to cover the same distance it would have required 1 hour more. Find the distance covered by the train.
(1) 120 km
(2) 240 km
(3) 360 km
(4) 400 km

85. $\left(\sqrt[3]{3} + \sqrt[3]{2}\right)\left(\sqrt[3]{9} + \sqrt[3]{4} - \sqrt[3]{6}\right) = ?$
(1) 5
(2) $\sqrt[2]{5}$
(3) $\sqrt[6]{5}$
(4) $\sqrt[3]{5}$

86. The number obtained by adding 12 to a natural number is 160 times of the multiplicative inverse of that natural number. Find the number.
(1) 20
(2) 16
(3) 12
(4) 8

87. There are 50 cards marked with the numbers 1 to 50. One card is drawn at random. What is the probability that number on the Card is a prime number?
(1) $\frac{3}{10}$
(2) $\frac{1}{5}$
(3) $\frac{1}{4}$
(4) $\frac{2}{15}$

88. If the polynomial $x^3+2x^2-ax-12$ is divided by $(x-4)$ the remainder is 52. Find the value of $'\alpha'$.

(1) $\frac{11}{2}$ (2) -5

(3) 8 (4) -8

89. When two simultaneous equations are solved by Cramer's Rule.

We get $x=9$ and $D=4$; If $Dx=\begin{vmatrix}7 & m\\ 5 & 8\end{vmatrix}$ then find the value of m

(1) -4 (2) 4

(3) -9 (4) 9

90. Following tables given the number of trees planted by the students in a school on Environment Day, Observe the table and find mode of the trees planted by the students.

Number of plants	0-10	10-20	20-30	30-40	40-50	50-60
Number of Students	30	42	50	80	50	40

(1) 80 (2) 50

(3) 45 (4) 35

91. $\frac{\cos^2 30^0+\cos 30^0\sin 30^0+\sin^2 30^0}{\text{Cos}^3 30^0-\sin^3 30^0}=?$

(1) 1 (2) $\sqrt{3}+1$

(3) $\sqrt{3}-1$ (4) $\frac{1}{\sqrt{3}-1}$

92. If $\tan\theta=-1$ then find the value of $\frac{\text{Sec}\,\theta+\text{Cos ec}\theta}{\text{Cos}\,\theta+\text{Sin}\,\theta}$

(1) 0 (2) 1

(3) $-\sqrt{2}$ (4) $\sqrt{2}$

93. Line $PQ \parallel$ line AB. The slope of line AB is $\frac{1}{2}$ y-intercept of line PQ is 3. Find x-intercept

(1) 3 (2) -2

(3) -6 (4) 6

94. Find the ratio of the volume to total surface area of a sphere of radius $\sqrt{7}$ cm.

(1) $\frac{\sqrt{7}}{3}$ (2) $\frac{7}{3}$

(3) $\frac{7\sqrt{7}}{3}$ (4) $\frac{\sqrt{7}}{\sqrt{3}}$

95. The diameter of the base of a cylindrical metal block is 6.6 cm and its height is 0.4m. How many disc of diameter 2.2 cm and height 0.2 cm can be cut from this metal block?

(1) 180 (2) 600

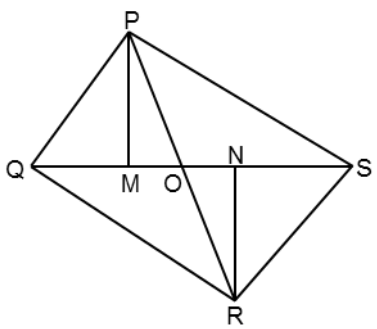
(3) 1200 (4) 1800

96. In the adjacent figure $PM \perp QS$, $R N \perp QS$. Diagonals QS and PR intersect at $'O'$ $A(\Delta PMO):A(\Delta RNO)=1:4$ then find.

$A(\Delta \mathbf{P}QS):A(\Delta RQS)$

(1) $\frac{1}{16}$ (2) $\frac{1}{8}$

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

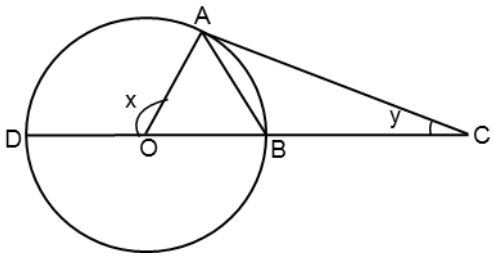


97. The longest side of a triangle is 20 cm. and other side is 10 cm. The area of the triangle is 80 cm^2. Find the length of the remaining side of the triangle.

(1) $2\sqrt{65}$ (2) $5\sqrt{10}$

(3) $10\sqrt{3}$ (4) 15

98. In the adjoining figure 'O" is the centre of the circle $AB = BC$ m $\angle AOD = x$ and m $\angle ACB = y$ then find $\frac{x}{y}$.



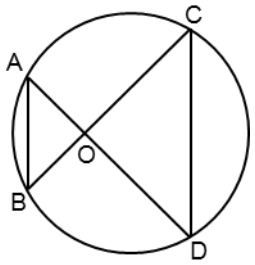
(1) $\frac{1}{2}$

(2) 2

(3) 4

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

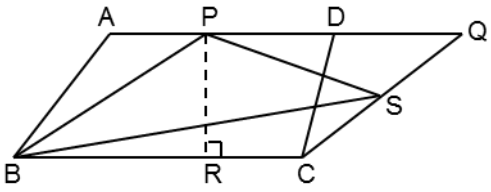
99. In the adjoining figure if $AB = 16$ and $CD = 40$ then find the ratio of A $(\Delta OCD) : A(\Delta OAB)$



(1) $\frac{5}{2}$ (2) $\frac{2}{9}$

(3) $\frac{25}{4}$ (4) $\frac{4}{25}$

100. In the adjoining figure $\square ABCD$ and $\square PBCQ$ are parallelogram BC = 12 cm $PR = 8\,cm.$ Find $A(\Delta PSB)$.



(1) 96 cm^2

(2) 72 cm^2

(3) 48 cm^2

(4) 36 cm^2

NATIONAL TALENT SEARCH EXAMINATION, 2017-18

SAT ANSWER KEY

QUE.	1	2	3	4	5	6	7	8	9	10
ANS.	4	2	3	1	2	1	3	4	4	1

QUE.	11	12	13	14	15	16	17	18	19	20
ANS.	3	2	1	3	4	3	2	4	1	2

QUE.	21	22	23	24	25	26	27	28	29	30
ANS.	1	2	2	1	1	2	4	4	1	2

QUE.	31	32	33	34	35	36	37	38	39	40
ANS.	3	4	2	2	1	4	2	3	2	4

QUE.	41	42	43	44	45	46	47	48	49	50
ANS.	2	4	2	3	1	4	3	2	1	4

QUE.	51	52	53	54	55	56	57	58	59	60
ANS.	2	3	4	4	3	4	1	3	2	2

QUE.	61	62	63	64	65	66	67	68	69	70
ANS.	1	3	3	3	1	4	1	2	2	4

QUE.	71	72	73	74	75	76	77	78	79	80
ANS.	1	3	1	3	2	1	3	2	2	4

QUE.	81	82	83	84	85	86	87	88	89	90
ANS.	3	1	1	3	1	1	1	3	2	4

QUE.	91	92	93	94	95	96	97	98	99	100
ANS.	2	1	3	1	4	4	1	3	3	3

SAT SOLUTIONS

1. (4)
Theory :- Light bonds due to difference in R.I. of air layers.

2. (2)
General Knowledge

3. (3)
Theory:- Universal law of gravitation

4. (1)

$$P = \frac{F}{A} = \frac{50}{0.5 \times 10^{-6}}\ N/m^2 = 100 \times 10^6\ N/m^2$$

5. (2)
Theory:- Property of human eye

6. (1)
Theory

7. (3)
Theory

8. (4)
Theory:- Filed lines originate from north pole and end on south pole outside magnet

9. **(**4)
Theory:- Phenomenon is reflection

10. (1)
Theory:- Electromagnetic Induction

11. (3)
$Q = it = 0.4 \times 3 \times 60 = 72C$

12. (2)
Theory:- Image formation by concave mirror

13. (1)
Theory:- Circuit diagram for Ohm's Law

14. (3)
Ionisation energy decreases down the group and increases across the period. Hence K

15. (4)

$K^+ = 19 - 1 = 18$

$Cl^- = 17 + 1 = 18$

$Ca^{2+} = 20 - 2 = 18$

Hence Only K

16. (3)

$Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

17. (2)

$$\underset{\text{Blue}}{CuSO_4 \cdot 5H_2O} \rightarrow \underset{\text{white anhydrous } CuSO_4}{CuSO_4}$$

18. (4)
Ant sting contains methanoic acid also called formic acid.

19. (1)
Na_2CO_3 is formed from NaOH and H_2CO_3 i.e. strong base and weak acid.
Hence Na_2CO_3.

20. (2)
HCl . Rest all are ionic

21. (1)
Copper lies below H in reactivity series.

22. (2)
CH_3COOH and C_2H_5COOH
a difference of $-CH_2$

23. (2)

$CH_3 - CH = CH_2$

24. (1)
Stainless steel is a mixture of Iron, Nickel, Chromium and Carbon.

25. (1)
Nonmetals form acidic oxides.
Hence aromic No. 7

26. (2)
C_nH_{2n+1} is alkyl

27. (4)
CO_2 and water (CO_2 is reduced to $C_6H_{12}O_6$ and H_2O is oxidized to oxygen)

28. (4)
Testis (Is male reproductive organ while others are female)

29. (1)
50 decibel (in day time, 40 decibel at night in silent zone)

30. (2)
114 (N_2O remains in the atmosphere for 114 years)

31. (3)
Two (Deoxydenated blood enters the heart and then lungs, oxygenated blood enters the heart and pumped to other parts of the body (Pulmonary circulation and then systemic circulation))

32. (4)
Seisononastic movement (Nastic movement, nondirectional movement towards direction of touch)

33. (2)
Regeneration is not truly a reproductive process, rather it's a process of renewal, restoration and growth in organisms.

34. (2)
23 pairs of chromosomes (22 pairs of autosome and one pair of allosome)

35. (1)
Darwin explained natural selection, Lamarck explained inheritance of acquired characters and Mendel is known for pioneering work in inheritance.

36. (4)
1, 2 and 3 belongs to Thallophyta and 4 belongs to Bryophyta

37. (2)
Raphide crystals are sharp needle like crystals of calcium oxalate that dart and cause discomfort to throat, activates inflammatory reaction by production of histamines.

38. (3)
Area A is for perception of touch, pain etc.
Area B is for perception of sound
Area C is occipital lobe of for brain for visual perception
Area D is for thinking, Intelligence etc.

39. (2)
Estrogen is secreted by ovary

40. (4)
1, 2 and 3 are pteridophytes and 4 is bryophyte

41. (2)

42. (4)

43. (2)

44. (3)

45. (1)

46. (4)

47. (3)

48. (2)

49. (1)

***50.** **(4)** (Correction in question - League of nation)

51. (2)

52. (3)

53. (4)

54. (4)

55. (3)

56. (4)

57. (1)

58. (3)

59. (2)

60. (2)

61. (1)

62. (3)

63. (3)

64. (3)

65. (1)

66. (4)

67. (1)

68. (2)

69. (2)

70. (4)

71. (1)

72. (3)

73. (1)

74. (3)

75. (2)

76. (1)

77. (3)

78. (2)

79. (2)

80. (4)

81. (3)

11, 15, 19, . . . 299
299 = 11 + (n – 1)4
$\therefore$ n = 73

82. (1)

$x^2 + 2\sqrt{x} - 6 = 0$

$\Rightarrow x^2 + 3\sqrt{2}x - \sqrt{2}x - 6 = 0$

$\Rightarrow (x - \sqrt{2})(x + 3\sqrt{2}) = 0$

$x = \sqrt{2}, -3\sqrt{2}$

83. (1)

$50 \rightarrow$ 10,000/-

$100 \rightarrow$ 20,000/-

84. (3)

Speed x km/hr distance = y km

Speed = (x + 15)

$\frac{y}{x+15} = \frac{y}{x} - 2$

$\Rightarrow xy = (x + 15)(y - 2x)$

$\Rightarrow xy = xy + 15y - 2x^2 - 30x$

$\Rightarrow 15y = 2x^2 + 30x$

Speed = (x – 15) km/hr

$\frac{y}{x-5} = \frac{y}{x} + 1$

$xy = (x - 5)(y + x)$

$\Rightarrow xy = xy + x^2 - 5y - 5x$

$\Rightarrow 5y = x^2 - 5x$

$\Rightarrow 15y = 3x^2 - 15x$

$\therefore 3x^2 - 15x = 2x^2 + 30x$

$\Rightarrow x^2 - 45x = 0$

x = 0, x = 45

$\therefore$ y = $\frac{(45)^2}{5} - 45$ = 405 – 45 = 360 km

85. (1)

$(\sqrt[3]{3} + \sqrt[3]{2})(\sqrt[3]{9} + \sqrt[3]{4} - \sqrt[3]{6})$

$= \sqrt[3]{27} + \sqrt[3]{12} - \sqrt[3]{18} + \sqrt[3]{18} + \sqrt[3]{8} - \sqrt[3]{12}$

= 3 + 2 = 5

86. (1)

$x + 12 = 160 \times \frac{1}{x}$

$\Rightarrow x^2 + 12x = 160$

$\Rightarrow x^2 + 12x - 160 = 0$

$\Rightarrow x^2 + 20x - 8x - 160 = 0$

$\Rightarrow x(x + 20) - 8(x + 20) = 0$

X = 8, x = -20

X = 8

$\therefore$ Number = 8 + 12 = 20

87. (1)

n(S) = 50

E = {2, 3, 5, 7, 11, 13, 17, 19, 23, 2, 31, 37, 41, 43, 47}

n(E) = 15

$\therefore$ P(E) = $\frac{15}{50} = \frac{3}{10}$

88. (3)

$52 = (4)3 + 2(4)2 - 4\alpha - 12$

$\Rightarrow 52 = 64 + 32 - 4\alpha - 12$

$\Rightarrow 4\alpha = 84 - 52$

$\Rightarrow \alpha = \frac{32}{4} = 8$

89. (2)

$D_x = \begin{vmatrix} 7 & m \\ 5 & 8 \end{vmatrix} = 56 - 5m$

$x = \frac{D_x}{D}$

$\Rightarrow 9 = \frac{56 - 5m}{4}$

$\Rightarrow 36 = 56 - 5m$

$\therefore = \frac{20}{5} = 4$

90. (4)

0 – 10	30
10 – 20	42
20 – 30	50
30 – 40	80 → Modal class
40 – 50	50
50 – 60	40

$l = 30$

$n = 10$

$f_1 = 80$

$f_0 = 50$

$f_2 = 50$

$\therefore$ Mode $= \ell + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

$= 30 + \left(\frac{80 - 50}{160 - 50 - 50}\right) \times 10$

$= 30 + \frac{30}{60} \times 10 = 35$

91. (2)

$\frac{\cos^2 30^\circ + \cos 30^\circ \cdot \sin 30^\circ + \sin^2 30^\circ}{\cos^3 30^\circ - \sin^3 30^\circ}$

$= \frac{(1 + \sin 30^\circ \cdot \cos 30^\circ)}{(1 + \sin 30^\circ \cos 30^\circ)}$

$= \frac{1}{\frac{\sqrt{3}}{2} - \frac{1}{2}} = \frac{2}{\sqrt{3} - 1} \times \frac{\sqrt{3} + 1}{\sqrt{3} + 1}$

$= \sqrt{3} + 1$

92. (1)

$\tan\theta = -1$

$\frac{\sec\theta + \operatorname{cosec}\theta}{\cos\theta - \sec\theta} = \frac{\operatorname{cosec}\theta(\tan\theta + 1)}{\cos\theta(1 - \tan\theta)} = 0$

93. (3)

Equation of PQ

$y = \frac{1}{2}x + 3$

$y - \frac{x}{2} = 3$

$\frac{y}{3} + \frac{x}{(-6)} = 1$

Intercept on x is -6.

94. (1)

$$\frac{\frac{4}{3}\pi r^3}{4\pi r^2} = \frac{\sqrt{7}}{3}$$

95. (4)

$$N \times \pi \times 1.1 \times 1.1 \times 0.2 = \pi \times 3.3 \times 3.3 \times 40$$

$$N = 1800$$

96. (4)

$$\frac{[PMD]}{[RND]} = \frac{1}{4} = \left(\frac{1}{2}\right)^2$$

$$\frac{PM}{RN} = \frac{1}{2}, \frac{[PQS]}{[RQS]} = \frac{\frac{1}{2} \times QS \times PM}{\frac{1}{2} \times QS \times RN} = \frac{1}{2}$$

97. (1)

$$S = 15 + \frac{x}{2}$$

$$80 = \sqrt{\left(15 + \frac{x}{2}\right)\left(\frac{x}{2} + 5\right)\left(15 - \frac{x}{2}\right)\left(\frac{x}{2} - 5\right)}$$

$$x = 2\sqrt{65}$$

98. (3)

Let $\angle BAC = \angle BCA = y$

Then $\angle OAB = \angle ABO = 2y$

$4y = x$

$x/y = 4$

99. (3)

$\Delta OCD \sim \Delta OAB$

$$\frac{[OCD]}{[OAB]} = \frac{40^2}{16^2} = \frac{25}{4}$$

100. (3)

$$\frac{1}{2}[PQCB] = [PSB]$$

$$\frac{1}{2} \times 8 \times 12 = [PSB]$$

$$[PSB] = 48$$