

SET - B

ODM SAPPHIRE GLOBAL SCHOOL

OSAT- 2021(2nd)

For Admission in Std.-XI Science (CBSE)

Index No./Roll No. : _____

Time : 2 Hours

Date of Exam : _____

Total Mark : 200

Name of the Candidate

(Write in Capital letters)

Father's Name

Mother's Name

Name of the School last attended

Address :

C/o

Plot No.

At

P.O.

Dist.

PIN

Phone No.

Parent's Mobile No.

Full Signature of the Applicant

Full Signature of the Invigilator

Instructions

- This booklet is your Question Paper contains 100 questions. You need to attempt Physics, Chemistry and Mathematics / Biology.
- The Question Paper Code is printed on the top right corner of this sheet.
- Blank papers, clipboards, log tables, slide rule, calculators, mobile or any other electronic gadgets in any form are not allowed to be used.
- There is a negative marking for wrong answers. Each correct answer will fetch +2 marks, the wrong answer will fetch -1 mark, and unattempted questions will fetch Zero mark].
- Before answering the paper, fill up the required details in the blank space provided in the Objective Response Sheet (ORS).
- Do not forget to mention your set code and index number/roll number neatly and clearly in the blank space provided in the Objective Response Sheet (ORS) / Answer Sheet.
- The invigilators will provide no rough sheets. All the rough work is to be done in the blank space provided in the question paper.
- No query related to question paper of any type is to be put to the invigilator.

OSAT -2021(SCIENCE)

CHEMISTRY

- 01.** The value of p^{OH} of rain water is :
- (a) 7 (b) 6
(c) 8 (d) 9.5
- 02.** The organic compound contains 4 carbon atoms, the root word according to IUPAC is :
- (a) Meth- (b) Eth-
(c) Prop- (d) But-
- 03.** Which one of the following element is not a Metalloid ?
- (a) Arsenic (b) Silicon
(c) Boron (d) Copper
- 04.** Which of the following does not release H^+ ion when added in water ?
- (a) HCl^- (b) $HCOOH$
(c) CH_3OH^- (d) CH_3COOH^+
- 05.** Find the odd one out.
- (a) mesons (b) positrons
(c) neutrinos (d) protons
- 06.** An element 'X' has 8 electrons in the M shell when it gains one electron. Which statements given below are not correct about the element 'X' ?
- (1) It belongs to 3rd period in the modern periodic table
(2) It has a valency of 7
(3) It belongs to 18th group in the modern periodic table
(4) its valency is 1
- (a) 1 and 2 (b) 2 and 3
(c) 2 and 4 (d) 1 and 4
- 07.** Identify the double displacement reactions.
- (1) $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$
(2) $HCl + NaOH \rightarrow NaCl + H_2O$
(3) $CuO + 2HCl \rightarrow CuCl_2 + H_2O$
(4) $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$
- (a) 1 and 2 (b) 2 and 3
(c) 1, 2 and 4 (d) 1, 2 and 3
- 08.** Assertion (A) : The position of hydrogen in the modern periodic table is still under debate.
Reason (R) : In the periodic table hydrogen is placed at the bottom of the alkali metals while hydrogen is a gas.
- (a) Both A and R are correct
(b) Both A and R are incorrect
(c) A is correct but R does not explain A
(d) A is correct and R explains A
- 09.** The Rule of Eight was proposed by :
- (a) Kossel and Lewis (b) Henry Moseley
(c) Dimitri Mendeleev (d) John Newland
- 10.** (A) $CH_3 - CH_2 - OH$
(B) $CH_3 - O - CH_3$
- If compounds (A) and (B) have same molecular formula but different kind of arrangements, then compound (B) is an :
- (a) alcohol (b) ether
(c) aldehyde (d) acid
- 11.** Identify the incorrect pair.
- (a) Group 11 - Halogen family
(b) Group 2 - Alkaline earth metals
(c) Group 13 - Boron family
(d) Group 16 - Chalcogen family
- 12.** If the difference in electronegativity between two elements is 1.7, then the bond is _____.
- (a) 60% covalent 40% ionic
(b) 50% covalent 50% ionic
(c) 40% covalent 60% ionic
(d) 70% covalent 30% ionic
- 13.** The acid which makes iron passive is _____.
- (a) Conc. HCl (b) Conc. H_2SO_4
(c) Conc. HNO_3 (d) Conc. HF

14. Correct order of compressibility is :
 (a) Solid > Liquid > Gas
 (b) Solid > Gas > Liquid
 (c) Gas > Liquid > Solid
 (d) Gas > Solid > Liquid
15. Number of molecules present in 0.25 moles of water are -
 (a) 3.011×10^{23} (b) 30.11×10^{23}
 (c) 1.5055×10^{23} (d) 15.055×10^{23}
16. Substance having equivalent number of molecules as in 9g of water is -
 (a) 12 g of Magnesium
 (b) 12 g of Carbon
 (c) 17 g of Ammonia
 (d) 11 g of Carbondioxide
17. Atomic number of element having symbol As is -
 (a) 31 (b) 32
 (c) 33 (d) 34
18. Atomic radius of chlorine is 99 pm. Distance between nuclei of its two atoms in molecule will be -
 (a) 1.98 pm (b) 49.5 pm
 (c) 99 pm (d) 198 pm
19. Molecular formula of chloride of a metal 'M' is MCl_2 . Molecular formula of oxide of 'M' will be :
 (a) MO (b) M_2O
 (c) MO_2 (d) M_2O_3
20. Suitable method for separation of pure naphthalene from sandy naphthalene is -
 (a) Filtration (b) Crystallisation
 (c) Sublimation (d) Distillation
21. pH of the solution having hydrogen ion concentration $[H^+] = 1 \times 10^{-4} \text{ mol/L}$ will be -
 (a) 3 (b) 4
 (c) 7 (d) 10
22. Conjugate acid-base pair is :
 (a) HCO_3^- , CO_3^{2-} (b) NH_4^+ , NH_2^-
 (c) OH^- , H_2O_2 (d) NO_2 , NO_3
23. Gas used for precipitation of pure common salt (NaCl) from saturated solution of common salt is -
 (a) H_2 (b) Cl_2
 (c) HCl (d) CO_2
24. $CuSO_4 + Zn \rightarrow ZnSO_4 + Cu$
 Correct statement related to the above reaction is -
 (a) Zn is less reactive as compared to Cu
 (b) Zn is more reactive as compared to Cu
 (c) Reactivity of Cu and Zn is equal
 (d) Zn is displaced by Cu
25. Useful substance in preparation of freezing mixture is-
 (a) NaOH (b) NaCl
 (c) $NaHCO_3$ (d) $CaSO_4 \cdot 2H_2O$
26. Correct increasing order of reactivity of elements is :
 (a) Au, Cu, K, H (b) Au, Cu, H, K
 (c) Cu, Au, K, H (d) Cu, Au, H, K
27. $CH_3CH_2OH \xrightarrow[443K]{\text{Conc. } H_2SO_4} \text{Products}$
 The products formed in the above reaction is/are
 (a) Ethene and H_2O
 (b) Ethyne and H_2O
 (c) Ethane and H_2O
 (d) Methane and H_2O
28. Denatured alcohol is a mixture of
 (a) CH_3OH and HCHO
 (b) CH_3OH and CH_3COOH
 (c) C_2H_5OH and CH_3OH
 (d) C_2H_5OH and CH_3COOH
29. For welding, a mixture of oxygen and _____ is burnt,
 (a) Benzene (b) Butane
 (c) Methane (d) Ethyne

30. The following elements are arranged in the increasing order of their metallic character. Choose the correct option.

- (a) $\text{Be} < \text{Si} < \text{K} < \text{Al}$ (b) $\text{Si} < \text{Be} < \text{Al} < \text{K}$
 (c) $\text{K} < \text{Al} < \text{Si} < \text{Be}$ (d) $\text{Be} < \text{Si} < \text{Al} < \text{K}$

31. Which one of the following oxide is insoluble in water ?

- (a) Na_2O (b) CuO
 (c) K_2O (d) CaO

32. Which of the following oxide turns moist red litmus into blue ?

- (a) SO_2 (b) CO_2
 (c) NO_2 (d) KO_2

33. Which one of the following is not a green house gas ?

- (a) CH_4 (b) O_3
 (c) CO_2 (d) SO_2

34. Which of the following element does not show allotropy ?

- (a) Phosphorus (b) Sulphur
 (c) Oxygen (d) Aluminium

35. Which one of the following will have the largest number of atoms ?

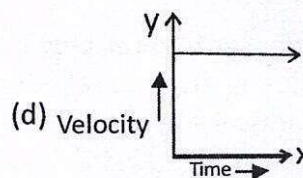
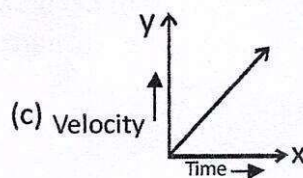
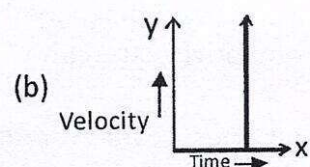
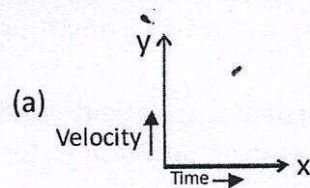
- (a) 100 g of He (b) 100 g of Na
 (c) 100 g of li (d) 100 g of Al

PHYSICS

36. Group of vector quantities are :

- (a) displacement, velocity, time
 (b) area, density, mass
 (c) speed, length, impulse
 (d) velocity, acceleration, force

37. The velocity-time graph of an object moving with uniform velocity is :



38. If force, momentum and displacement are represented by A, B and C respectively then

the term $\left(\frac{AC}{B}\right)$ will represent:

- (a) momentum (b) acceleration
 (c) velocity (d) displacement

39. The mass of a person on earth surface is 60 kg then his mass on moon will be

- (a) 60 kg (b) 360 kg
 (c) 20 kg (d) 10 kg

40. When distance between two masses is halved, the gravitational force between them will be

- (a) half (b) one-fourth
 (c) four times (d) double

41. If the speed of wave is 250 m/s and its wavelength is 50 cm then the frequency will be

- (a) 5 Hz (b) 500 Hz
 (c) 50 Hz (d) 12500 Hz

42. An object of mass 10 gm is moving with an acceleration of 10 m/s^2 . Force acting on the object will be :

- (a) 1 N (b) 0.1 N
 (c) 1000 N (d) 100 N

43. Lens formula is

- (a) $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ (b) $\frac{1}{v} + \frac{1}{2u} = \frac{1}{f}$
 (c) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ (d) $\frac{1}{v} - \frac{1}{2u} = \frac{1}{f}$

44. Focal length of a lens is 50 cm. In dioptre, power of lens will be

- (a) 0.02 (b) 2
 (c) 0.2 (d) 50

45. Correct relation between radius of curvature (R) and Focal length (F) of spherical mirror is :

- (a) $R = \frac{F}{2}$ (b) $R = F$
 (c) $R = 2F$ (d) $R = (F)^2$

46. Refraction from denser to rarer medium for a light ray, the value of angle of refraction at the condition of critical angle is

- (a) 0° (b) 180°
 (c) 45° (d) 90°

47. The resistance of a bulb marked (220V - 10W) is :

- (a) 242Ω (b) 4840Ω
 (c) 121Ω (d) Zero

48. A person of mass 100 kg reaches a height of 5 meters in 10 seconds. Find the power used by the person ($g = 10 \text{ m/s}^2$).

- (a) 500 watt (b) 250 watt
 (c) 5000 watt (d) 50 watt

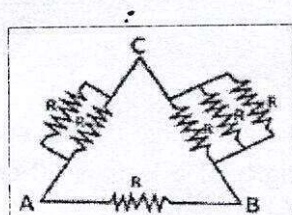
49. The sound of same pitch and loudness are "distinguished from one another by their

- (a) Wavelengths (b) Velocity
 (c) Quality (d) Tones

50. A water pumps lifts water from a level 10 m below the ground. The water is pumped at the rate of 30 kg/ min with negligible velocity. Calculate the minimum power the pump should have to do this work.

- (a) 49 J/s (b) 490 J/s
 (c) 500 J/s (d) 48 J/s

51. Six identical resistors connected between points A, B and C as shown in diagram. The equivalent resistance would be maximum between.

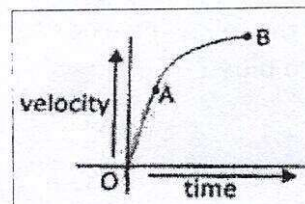


- (a) A and B (b) B and C
 (c) A and C
 (d) Option (a), (b) and (c) are correct

52. A particle of mass 0.3 kg is subjected to a force $F = Kx$ with $K = 15 \text{ N/m}$, what will be its acceleration if it is released from a point $x = 20 \text{ cm}$.

- (a) 1 m/s^2 (b) 10 m/s^2
 (c) 100 m/s^2 (d) 0.1 m/s^2

53. An object is moving in a straight line. The velocity time graph is as shown below. Then



- (a) In part OA acceleration is increasing
 (b) In part AB acceleration is increasing
 (c) In part OA acceleration is decreasing
 (d) In part AB acceleration is decreasing

54. A force of 100 N acts on a body so that the body acquire a velocity of 10 m/s after some time. Now the force of 100 N is replaced by another force F which decelerates the body and body come to the rest then.

- (a) $F > 100 \text{ N}$ (b) $F < 100 \text{ N}$
 (c) $F = 100 \text{ N}$
 (d) All options are possible

55. 2 points A and B are at electric potentials 10 V and 100 V respectively. A charge q is taken from A to B and 18 Joule of work is done. The value of q is

- (a) 2 coulomb (b) 0.2 coulomb
 (c) 20 coulomb (d) 0.02 coulomb

56. Which of the following is NOT correct for magnetic filed lines ?

- (a) The direction of magnetic field lines outside the magnet is from north pole of south pole.
 (b) The direction of magnetic field lines inside the magnet is from south pole to north pole.
 (c) The degree of closeness of magnetic field lines tells the relatives strength of magnetic field
 (d) Magnetic field lines never form closed loop.

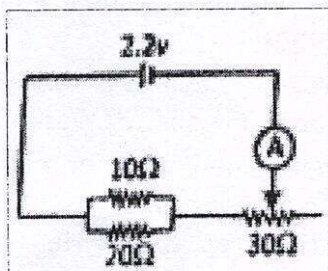
57. A car moving along straight line covers $\frac{1}{5}$ th of total distance with speed v_1 and remaining part of distance with speed v_2 . The average speed of car over entire distance is

- (a) $\frac{5v_1v_2}{v_2+4v_1}$ (b) $\frac{4v_1v_2}{5v_1+v_2}$
 (c) $\frac{5v_1v_2}{4v_2+v_1}$ (d) $\frac{4v_1v_2}{4v_1+v_2}$

58. Light travels through a glass slab of thickness t and having refractive index n . If c is the velocity of light in vacuum then the time taken by light to travel this thickness of glass is

- (a) $\frac{t}{nc}$ (b) $\frac{nt}{c}$
 (c) $\frac{n^2t}{c}$ (d) $\frac{t}{n^2c}$

59. The resistance of rheostat shown in the figure is $0 - 30 \Omega$. Neglecting the resistance of ammeter and connecting wire the minimum and maximum currents through the ammeter will be



- (a) (0.08A, 0.33A) (b) (0.06A, 0.08A)
 (c) (0.06A, 0.33A) (d) (0.33A, 0.09A)

60. Three particles A, B and C are thrown from top of a building with same speed. A is thrown upwards, B is thrown downwards and C is thrown horizontally, they hit the ground with speed V_A, V_B and V_C respectively then

- (a) $V_A = V_B = V_C$ (b) $V_B > V_C > V_A$
 (c) $V_A = V_B > V_C$ (d) $V_A > V_B = V_C$

61. An object of height 2.0 cm is placed on the principal axis of a concave mirror at a distance of 12 cm from the pole. If the image is inverted, real and 5 cm in height then location of the image and focal length of the mirror respectively are

- (a) (-30 cm, +8.6 cm)
 (b) (-30 cm, -8.6 cm)
 (c) (+30 cm, +8.6 cm)
 (d) (+30 cm, -8.6 cm)

62. Pick out the correct statements regarding the properties of Magnetic Lines of force.

- (A) Magnetic Lines of force never intersect
 (B) They will be maximum at the equator than at the poles
 (C) Magnetic Lines of force start from South pole and end at the North pole.
 (D) Magnetic Lines of force are closed continuous curves extending to the body of the magnet.

- (a) A, B and C only (b) A, B and D only
 (c) A and D only (d) B and C only

63. A person wears glasses of power -2.0 D. The defect of the eye and of the far point of the person without the glasses will be :

- (a) Near sightedness, 50 cm
 (b) Far sightedness, 50 cm
 (c) Near sightedness, 250 cm
 (d) Astigmatism, 50 cm

64. The monthly bill (30 days), if the following appliances are used as indicated below at the rate of rupees 5 per unit.

- (A) A heater of 1000 Watt for 2 hours daily
 (B) Ten 60 watt bulbs for 5 hours daily.

- (a) 550 (b) 700
 (c) 750 (d) 500

65. The expression for the magnification of a spherical mirror in terms of focal length f and distance of the object from mirror (u) is :

- (a) $\frac{-f}{u-f}$ (b) $\frac{f}{u+f}$
 (c) $\frac{-f}{u+f}$ (d) $\frac{f}{u-f}$

66. $\alpha = \frac{R_T - R_0}{R_0(T - T_0)}$ where R_T, R_0 Resistance,

T, T_0 - Temperature, then the unit of α is :

- (a) $\Omega / ^\circ\text{C}$ (b) $\Omega ^\circ\text{C}$
 (c) $^\circ\text{C}^{-1}$ (d) $^\circ\text{C} / \Omega$

67. A girl of mass 40 kg stands on her feet of surface area 80 cm^2 ($g = 10 \text{ m/s}^2$). The pressure exerted by her feet is :

- (a) $5 \times 10^3 \text{ Pa}$ (b) $5 \times 10^4 \text{ Pa}$
 (c) 0.5 Pa (d) 2 Pa

68. If the EMF of a cell is 1.5 V, then the energy provided by the cell to drive 0.5 C of charge around the circuit :

- (a) 1 J (b) 0.75 J
 (c) 0.5 J (d) 0.25 J

69. Pick out the right answer to correct the given statement. "The distance travelled by sound in one second is called time period of the sound."

- (a) Loudness (b) Pitch
 (c) Velocity (d) Frequency

70. A DC generator works on the principle of _____.

- (a) Lenz's Law (b) Ohm's law
 (c) Faraday's law of Electromagnetic Induction
 (d) Fleming's Rule

BIOLOGY

71. Rearrange the following sentences and choose the correct option.

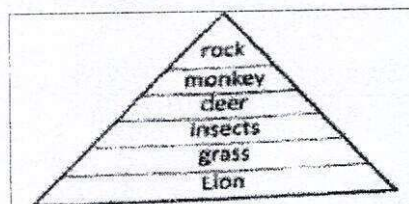
A. Breakdown of H_2O into Hydrogen and Oxygen and Conversion of light energy into chemical energy.

B. Reduction of carbon dioxide to carbohydrates.

C. Absorption of light energy by chlorophyll.

- (a) $A \rightarrow B \rightarrow C$ (b) $C \rightarrow B \rightarrow A$
 (c) $C \rightarrow A \rightarrow B$ (d) $A \rightarrow C \rightarrow B$

72. Deepak is trying to study flow of energy in an area and he made the following diagram for the same. How will you interpret his observations ?



- (a) His observations and number of trophic levels are wrong.
 (b) His observations are correct but the number of trophic levels can be more.
 (c) His observations are wrong but number of trophic levels are correct.
 (d) His observations as well as number of trophic levels are correct.

73. UV rays cause cancer but in stratosphere the same UV rays are helping us, how ?

- (a) They divert harmful UV rays back to sun
 (b) They convert oxygen in stratosphere into ozone.
 (c) UV rays are not present in stratosphere.
 (d) UV rays reach the earth surface then bounce back carrying ozone to stratosphere.

74. The opening and closing of the stomata depends upon :

- (a) Oxygen (b) Temperature
 (c) Carbon dioxide (d) Water in guard cells

75. Sonu performed an experiment to study di-hybrid cross for round/wrinkled and yellow/green coloured seeds. He obtained 2432 seeds in total. What will be the number of seeds which are round and yellow ?

- (a) 1367 (b) 1356
 (c) 1368 (d) 1438

76. The stakeholders of various forest products are :

- (i) People living near forests
 (ii) Government only
 (iii) Nature lovers (iv) Wild life
 (a) All options are correct
 (b) Only (i), (ii) and (iii) is correct
 (c) Only (ii) is incorrect
 (d) None of the option is correct

77. Choose the correct sequence.
- (a) Pulmonary vein → Pulmonary artery
→ Left auricle → Right ventricle
- (b) Pulmonary artery → Right auricle
→ Left ventricle → Pulmonary vein
- (c) Right auricle → Pulmonary artery
→ Pulmonary vein → Left ventricle
- (d) Left ventricle → Pulmonary vein
→ Pulmonary artery → Right auricle
78. Assertion (A) : No carbon dioxide is released during the day in plants.
Reason (R) : Only photosynthesis occurs during the day.
- (a) 'A' is true and 'R' is false
(b) 'A' is false and 'R' is true
(c) Both 'A' and 'R' are false
(d) Both 'A' and 'R' are true but 'R' does not explain 'A'.
79. Choose the non-biodegradable substance from the following :
- Carrot
 - Glass bottle
 - Perfume spray bottle
 - Rice bran
 - Papaya
 - Thermocol
 - Wooden stick
 - Ball pen refill
- (a) (ii), (iii), (vii), (viii)
(b) (ii), (iii), (vi), (viii)
(c) (iii), (i), (v), (vii)
(d) (viii), (v), (i), (iii)

80. Match the column I and column II and select correct option.

	Column-I		Column-II
(A)	Ribosome	1.	ATP formation
(B)	Mitochondria	2.	Photosynthesis
(C)	Centriole	3.	Protein synthesis
(D)	Chloroplast	4.	Cell division

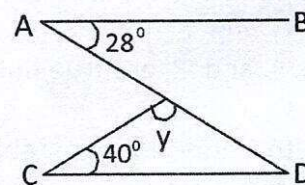
- (a) A → 1; B → 2; C → 4; D → 3
(b) A → 3; B → 1; C → 4; D → 2
(c) A → 4; B → 3; C → 2; D → 1
(d) A → 2; B → 1; C → 3; D → 4

81. Which of the following is a barrier method of contraception ?
- (a) Diaphragm (b) Contraceptive pills
(c) Tubectomy (d) All of the above
82. Sperms are produced in the :
- (a) Seminiferous tubules
(b) Interstitial cell
(c) Vas deferens
(d) Prostate gland
83. Blood pressure is measured by an instrument called:
- (a) Barometer
(b) Sphygmomanometer
(c) Photometer
(d) Manometer
84. In which of the plant group chitineous cell wall is found.
- (a) Algae (b) Fungi
(c) Thallophyta (d) Bryophyta
85. The light reaction occurs in which part of the chloroplast.
- (a) Stroma (b) Outer wall
(c) Grana (d) None of above
86. Lack of which element occurs when Algal Bloom is formed in a waterbody.
- (a) Oxygen (b) Nitrogen
(c) Hydrogen (d) Calcium
87. The plant group called "pollution indicator" is :
- (a) Bryophyta (b) Lichen
(c) Gymnosperm (d) Pteridophyta
88. Genotypic ratio of F₂ generation in monohybrid cross is :
- (a) 3 : 1 (b) 9 : 3 : 3 : 1
(c) 1 : 2 : 1 (d) 1 : 3
89. Rabi Crop is :
- (a) *Oryza sativa* (b) *Triticum aestivum*
(c) *Pennisetum typhoides*
(d) *Zea mays*
90. Kevla Devi National Park is situated at -
- (a) Karnataka (b) Madhya Pradesh
(c) Rajasthan (d) Gujarat

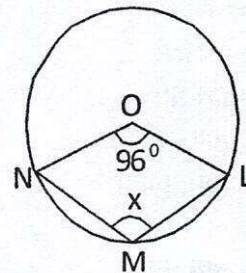
91. Disease caused by Virus, is
 (a) Malaria (b) Diptheria
 (c) Chicken pox (d) Leprosy
92. Which of the following is not a member of phylum Arthropoda
 (a) House-fly (b) Earthworm
 (c) Shrimp (d) Cockroach
93. DNA synthesis occurs, in which stage of cell cycle.
 (a) G-I phase (b) G-II phase
 (c) M-phase (d) S-phase
94. Example of Fat digesting enzyme is
 (a) Amylase (b) Pepsin
 (c) Lipase (d) Nucleases
95. Indian scientist known for research on cosmic rays and nuclear energy
 (a) Dr. Prafullachandra Roy
 (b) Chandra Shekhara Venkat Raman
 (c) Dr. Panchanan Maheshwari
 (d) Dr. Homi Jahangir Bhabha
96. Tal chhapar wild life sanctuary is located at
 (a) Alwar (b) Jaipur
 (c) Churu (d) Kota
97. Disease caused by deficiency of vitamin - C is :
 (a) Scurvy (b) Night blindness
 (c) Beri-beri (d) Rickets
98. Hydroponics was demonstrated by a German Botanist _____ in 1980.
 (a) Julius Von Sachs (b) Nehemiah Grew
 (c) Robin Hill (d) Robert Brown
99. Assertion (A) : Rhizobium is a soil bacterium that colonize the roots of leguminous plants to form root nodules.
 Reason (R) : They increase the intake of Phosphorous.
 (a) A is correct and R is incorrect
 (b) A is incorrect and R is correct
 (c) A is correct but (R) does not explain A.
 (d) A is correct and R explains A
100. Which is not component of stele ?
 (a) Pith (b) Pericycle
 (c) Cambium (d) Vascular tissue

MATHEMATICS

71. In a party of 100 people, 60 had Vanilla ice-cream and 40 had chocolate ice-cream. 10 People did not have any ice-cream. How many had only chocolate ice-cream ?
 (a) 10 (b) 0
 (c) 20 (d) 30
72. If $x^2 + y^2 + z^2 = 29$ and $xy + yz + zx = 26$, then the value of $x + y + z$ is :
 (a) 9 (b) 81
 (c) ± 9 (d) ± 3
73. In the given figure. AB is parallel to CD. The angle y is :



- (a) 68° (b) 34°
 (c) 112° (d) 56°
74. From the given figure, the angle x is : (where O is the centre of the circle).



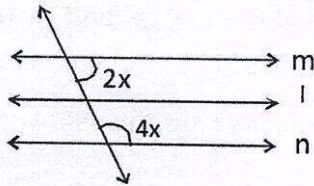
- (a) 48° (b) 132°
 (c) 96° (d) 264°
75. $\frac{\sin 35^\circ}{\cos 55^\circ} - \frac{\tan 12^\circ}{\cot 78^\circ} - \frac{\sin 18^\circ}{\cos 72^\circ} = ?$
 (a) 1 (b) 0
 (c) 3 (d) -1
76. Mean of 10 observations is 58 and 5 is subtracted from each observation, then the mean of new observations is :
 (a) 53 (b) 514
 (c) 63 (d) 151

77. Which of the following is a true statement ?
 (a) any real number is either rational or irrational.
 (b) 0 is not real number
 (c) Any real number is either prime or composite.
 (d) $\sqrt{9}$ is an irrational number.

78. The area of a rectangle is $6x^2 + 5x - 6$. If its length is $3x - 2$, then its breadth is :
 (a) $2x + 3$ (b) $2x + 1$
 (c) $x + 3$ (d) $3x + 2$

79. $\frac{x}{y} + \frac{y}{x} = 1$, ($x, y \neq 0$), then the value of $x^3 - y^3$ is :
 (a) 1 (b) -1
 (c) 0 (d) $\frac{1}{2}$

80. In the given figure, the line l is parallel to the lines m and n . Then the value of x is :



- (a) 90° (b) 30°
 (c) 45° (d) 60°
81. If the total surface area of a cube is 96 cm^2 , then its volume is :
 (a) 64 cm^3 (b) 512 cm^3
 (c) 8 cm^3 (d) 27 cm^3
82. The probability of choosing a vowel in the word EDUCATION is :
 (a) $\frac{3}{9}$ (b) $\frac{4}{5}$
 (c) $\frac{5}{9}$ (d) $\frac{7}{9}$
83. The L.C.M of $6x^2y^2$ and $8x^4y^4$ is :
 (a) $24x^4y^4$ (b) $48x^6y^6$
 (c) $24x^6y^6$ (d) $48x^4y^6$

84. Two parallel lines touch the circle at the points A and B respectively. If area of the circle is $25\pi \text{ cm}^2$, then AB is equal to :

- (a) 10 cm (b) 8 cm
 (c) 5 cm (d) 25 cm

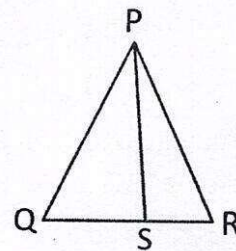
85. A girl of height 100 cm is walking away from the base of a lamp post at a speed of 1.9 m/sec. If the lamp is 5m above the ground, the length of the shadow after 4 sec, is :

- (a) 160 cm (b) 180 cm
 (c) 200 cm (d) 190 cm

86. If 'a' and 'b' are any two positive integers and $a^b \times b^a = 72$, then the values of a and b are :

- (a) 2,3 (b) 3,2
 (c) 2,3 or 3,2 (d) 3,3

87. If PS is the bisector of angle P and $QS = 6 \text{ cm}$, $SR = 5 \text{ cm}$, $PQ = 12 \text{ cm}$, then PR is :



- (a) 12 cm (b) 10 cm
 (c) 8 cm (d) 30 cm

88. The distance between two points $(4,3)$ and $(-2,1)$ is :

- (a) $2\sqrt{10}$ units (b) 4 units
 (c) $2\sqrt{2}$ units (d) $5\sqrt{2}$ units

89. The simplified value of

$$\cos\theta \sec\theta + \sin\theta \operatorname{cosec}\theta \text{ is :}$$

- (a) 2 (b) 3
 (c) 0 (d) 1

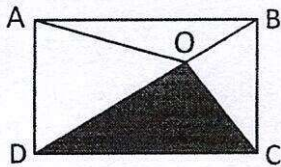
90. If the base circumference of a right circular cone and its height are 220 cm and 21 cm respectively, then the volume of the cone is :

- (a) $24,630 \text{ cm}^3$ (b) $21,750 \text{ cm}^3$
 (c) $26,950 \text{ cm}^3$ (d) $25,400 \text{ cm}^3$

91. A 'p' m long wire is cut into two pieces one of which is bent into a circle and the other into a square enclosing the circle. What is the radius (in meter) of the circle ?

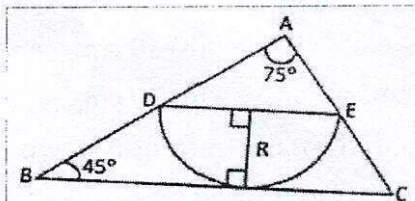
- (a) $\frac{p}{\pi+4}$ (b) $\frac{2p}{\pi+4}$
 (c) $\frac{p}{2\pi+8}$ (d) $\frac{2p\pi}{\pi+4}$

92. In the figure, ABCD is a rectangle such that Area of $\triangle AOB = am^2$, Area of $\triangle AOD = bm^2$, Area of $\triangle COD = cm^2$. Then the area of $\triangle BOC$ (in m^2) =



- (a) $a+b+c$ (b) $a+b-c$
 (c) $b+c-a$ (d) $a+c-b$

93. In $\triangle ABC$, A semi-circle with DE as diameter is drawn such that $BC=26$ m, the radius R (in meter) =



- (a) $3+\sqrt{3}$ (b) $9-\sqrt{3}$
 (c) $9+\sqrt{3}$ (d) $3-\sqrt{3}$

94. If the values of x in the roots of the equation $p(\sin^2 x) + q(\sin x) + r = 0$ are complementary, then

- (a) $p^2 = q(q+2r)$ (b) $q^2 = p(p+2r)$
 (c) $r^2 = q(q+2p)$ (d) $r^2 = p(p+2q)$

95. The average age of all the 100 employees in an office is 29 years, where $\frac{2}{5}$ employees are ladies. The ratio of average age of men to women is 5 : 7. The average age of female employees is :

- (a) 18 years (b) 35 years
 (c) 25 years (d) None of these

96. If $\triangle ABC$ is an equilateral triangle such that $A(2,2)$ and centroid of the triangle is $(-2,2)$ then find the length of its side.

- (a) 4 units (b) 6 units
 (c) $4\sqrt{3}$ units (d) 9 units

97. The sum of the n consecutive odd natural numbers starting from 5 is 60. Find the value of $(n^2 - n)$.

- (a) 20 (b) 30
 (c) 42 (d) 56

98. The sum of the first 'p' odd natural numbers is 100 & the sum of the first 'q' even natural numbers is 90. Find the value of $(p+q)$.

- (a) 18 (b) 19
 (c) 20 (d) 21

99. If $x + \frac{1}{y} = 1$ and $y + \frac{1}{z} = 1$, then what is the

value of $\left(z + \frac{1}{x} + 1\right)$.

- (a) 0 (b) 1
 (c) 2 (d) 3

100. If $\sqrt[3]{p} + \sqrt[3]{q} + \sqrt[3]{r} = 0$ then the value of $(p+q+r)^3$ is

- (a) 3pqr (b) 9pqr
 (c) 27pqr (d) 0
