REMEMBER
"NO ONE IS YOU AND THAT IS YOUR POWER"

Important Instructions:

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully with blue/black ballpoint pen only. Each subject contains two sections Section A contains 35 question which are all mandatory and Section B contains 15 question in which only 10 questions are to be attempted.

2. The test is of 3 hours and 20 minutes duration and Test Booklet contains 200 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total score. The maximum marks are 720.

3. Use Blue/Black Ballpoint Pen Only for writing particulars on this page/marking responses.

4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

5. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Hall. The candidates are allowed to take away Test Booklet only with them.

6. The CODE for this Booklet is A for English Medium and B for Hindi Medium. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet & Answer Sheet.

7. The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll no. anywhere else except in the specified space in the Test Booklet/Answer Sheet.

8. Use of white fluid for correction is not permissible on the Answer Sheet.

9. Each candidate must show on demand his/her Admit Card to the Invigilator.

10. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.

11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty And sign the Attendance Sheet. Cases where a candidate has not signed the Attendance Sheet will be deemed not to have Handed over the Answer Sheet & dealt with as an unfair means case.

12. Use of Electronic/Manual Calculator is prohibited.

13. The candidates are governed by Rules & Regulations of the Institute with regard to their conduct in the Examination Hall, All cases of unfair means will be dealt with as per Rules and Regulations of the Institute.

14. No part of the Test Booklet & Answer Sheet shall be detached under any circumstances.

15. The Candidates will write the correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

Name of the Candidate (in Capitals) :_____

Roll Number (in Figures) : _____

(in Words) :_____

Centre of Examination (in Capitals) :_____

Candidate's Signature :_____Invigilator's Signature:_____

SUBJECT	TOPIC
PHYSICS	NLM & 2D Motion
CHEMISTRY	Redox reaction, mole concept
BIOLOGY	Digestion and absorption Breathing and exchange of gases

PHYSICS

SECTION - A

1. At the top of the trajectory of a projectile the direction of its velocity and acceleration are-

(1) Parallel to each other

(2) inclined at an angle of $45°$ to the horizontal

(3) Perpendicular to each other

(4) None of the above statement is correct

2. Three particles, A , B and C are projected from the same point with same initial speeds making angles $30°$, $45°$ and $60°$ respectively with the horizontal. Which of the following statement is correct ?

(1) A, B and C have equal ranges

(2) ranges of A and C are equal and less than that of B

(3) ranges of A and C are equal and greater than that of B

(4) A, B and C have equal ranges

3. The horizontal range covered by projectile is proportional to

(1) its velocity

(2) square of its velocity

(3) sine of the angle of projection

(4) square of the sine of the angle of projection

4. The horizontal range for projectile is given by

(1) $\dfrac{u^2 \sin^2 \theta}{g}$

(2) $\dfrac{u^2 \sin 2\theta}{g}$

(3) $\dfrac{u^2 \sin 2\theta}{2g}$

(4) $\dfrac{u^2 \cos 2\theta}{g}$

5. The maximum vertical height attained by a projectile is

(1) $\dfrac{U^2 \sin \theta}{g}$

(2) $\dfrac{U^2 \sin 2\theta}{g}$

(3) $\dfrac{U^2 \sin 2\theta}{2g}$

(4) $\dfrac{U^2 \sin^2 \theta}{2g}$

6. Equation of motion of a projectile is

(1) $y = x \tan \theta - \dfrac{gx^2}{2u^2 \cos^2 \theta}$

(2) $y = x \tan \theta + \dfrac{gx^2}{2u^2 \cos^2 \theta}$

(3) $y = x \sin \theta - \dfrac{gx^2}{2u \cos^2 \theta}$

(4) $y = x \sin \theta + \dfrac{gx^2}{2u^2 \cos^2 \theta}$

7. A cannon on a level plane is aimed at an angle α above the horizontal and a shell is fired with a muzzle velocity v towards a vertical cliff a distance R away. The height from the bottom at which the shell strikes the side walls of the cliff is-

(1) $R \tan \alpha - \dfrac{1}{2} \dfrac{gR^2}{v_0^2 \cos^2 \alpha}$

(2) $R \tan \alpha - \dfrac{1}{2} \dfrac{gR^2}{v_0^2}$

(3) $R \sin \alpha - \dfrac{1}{2} \dfrac{gR^2}{v_0^2 \sin^2 \alpha}$

(4) $R \tan \alpha + \dfrac{1}{2} \dfrac{gR^2}{v_0^2}$

8. A player kicks up a ball at an angle θ to the horizontal. The horizontal range is maximum when θ equals-

(1) $30°$ (2) $45°$

(3) $60°$ (4) $90°$

9. The angle of projection of a body is $15°$. The other angle for which the range is the same as the first one is equal to-

(1) $30°$ (2) $45°$

(3) $60°$ (4) $75°$

10. A particle is projected such that the horizontal range and vertical height are the same. Then the angle of projection is-

(1) $\pi/4$

(2) $\tan^{-1}(4)$

(3) $\tan^{-1}(1)$

(4) $\pi/3$

11. A ball is thrown at an angle of 45º with the horizontal with kinetic energy E. The kinetic energy at the highest point during the flight is-

(1) Zero   (2) E/2

(3) E   (4) $(2)^{1/2}E$

12. A ball is thrown with initial energy 100J at an angle θ to the horizontal . If its energy at the top becomes 30 J then angle of projection-

(1) $\theta = 45º$ (2) $\theta = 30º$

(3) $\theta = \cos^{-1}(3/10)$.   (4) $\theta = \cos^{-1}(3/10)^{1/2}$

13. The horizontal and vertical distances travelled by a particle in time t are given by $x = 6t$ and $y = 8t - 5t^2$. If $g = 10$ m/sec^2, then the initial velocity of the particle is-

(1) 8 m/sec   (2) 10 m/sec

(3) 5 m/sec   (4) zero

14. A body is thrown with a velocity of 9.8 m/s making an angle of 30º with the horizontal. It will hit the ground after a time-

(1) 3 s   (2) 2 s

(3) 1.5 s   (4) 1 s

15. The maximum range of a projectile is 22 m. When it is thrown at an angle of 15º with the horizontal, its range will be-

(1) 22 m   (2) 6 m

(3) 15 m   (4) 11 m

16. The maximum range of a gun on a horizontal terrain is 16 km. If $g = 10$ m/sec^2 , the muzzle velocity of the shell must be-

(1) 400 m/sec   (2) $160\sqrt{10}$ m/sec

(3) 1600 m/sec   (4) $200\sqrt{2}$ m/sec

17. The range of the particle which is projected at an angle of 15º is 1.5 km. What will be the range for\ an angle of projection 45º

(1) 0.5 km   (2) 1.5 km

(3) 2.5 km   (4) 3 km

18. The kinetic energy of a projectile at the highest point is-

(1) Zero

(2) Maximum

(3) Minimum

(4) Equal to total energy

19. The equation of a projectile is $y = \sqrt{3}\,x - \dfrac{gx^2}{2}$. The angle of projection is-

(1) 30º   (2) 60º

(3) 45º   (4) None

20. The equation of projectile is $y = 16x - \dfrac{5x^2}{4}$. The horizontal range is-

(1) 16 m   (2) 8 m

(3) 3.2 m   (4) 12.8 m

21. For angles of projection of a projectile at angles $(45 + \theta)$ and $(45 - \theta)$, the horizontal ranges describe by the projectile are in the ratio of (if $\theta \leq 45º$)-

(1) 2 : 1

(2) 1: 2

(3) 1: 1

(4) 2 : 3

22. A projectile thrown with a speed v at an angle θ has a range R on the surface of the earth. For same v and θ, its range on the surface of moon will be-

(1) R/6   (2) 6R

(3) R/36   (4) 36 R

23. In a projectile motion the velocity -

(1) is always perpendicular to the acceleration

(2) is never perpendicular to the acceleration

(3) is perpendicular to the acceleration for one instant only

(4) is perpendicular to the acceleration for two instant

24. Two projectile A and B are projected with angle of projection 15º for the projectile A and 45º for the projectile B. If R_A and R_B be the horizontal range for the two projectiles, then -

(1) $R_A < R_B$

(2) $R_A = R_B$

(3) $R_A > R_B$

(4) The information is insufficient to decide the relation of R_A with R_B

25. A body is projected with a speed 'u' at an angle to the horizontal to have maximum range at the highest point the velocity is–

(1) Zero   (2) u

(3) $\dfrac{u}{\sqrt{2}}$ (4) $u\sqrt{2}$

26. If two stones projected from the same point with same initial speed but an angle π/3 and π/6 respectively have their ranges R_1 and R_2, then-

(1) $R_1 = 2R_2$

(2) $R_1 = R_2$

(3) $R_1 = 5R_2$

(4) $R_1 = 25R_2$

27. The time of flight of projectile is 10 second\ and its range is 500 m. The maximum height reached by it will be (g = 10 m/s²)-

(1) 25 m   (2) 50 m

(3) 82 m   (4) 125 m

28. If four balls A, B, C, D are projected with same speed at angles of 15º, 30º, 45º and 60º with the horizontal respectively, the two balls which will fall at the same place will be-

(1) A and B   (2) A and D

(3) B and D   (4) A and C

29. A ball is thrown at an angle θ with the horizontal. Its kinetic energy is 100 J and it becomes 30 J at the highest point. The angle of projection is-

(1) 45º   (2) 30º

(3) $\cos^{-1}\left(\dfrac{3}{10}\right)$ (4) $\cos^{-1}\left(\sqrt{\dfrac{3}{10}}\right)$

30. The height y and the distance x along the horizontal plane of projection on a certain planet (with no surrounding atmosphere) are given by $y = (8t - 5t^2)$ metre and $x = 6t$ metre where t is in seconds. The velocity with which the projectile is projected is-

(1) 8 m/sec

(2) 6 m/sec

(3) 10 m/sec

(4) not obtainable from the data

31. A body is projected at an angle of 30º to the horizontal with a speed of 40 m/s. The angle with the horizontal after 2 seconds will be-

(1) 10°   (2) 30°

(3) 45°   (4) 0°

32. A marble A is dropped vertically, another identical marble B is projected horizontally from the same point at the same instant

(1) A will reach the ground earlier than B

(2) B will reach the ground earlier than A

(3) both A and B will reach the ground at the same instant

(4) none of the above

33. A stone is just released from the window of a train moving along a horizontal straight track. The stone will hit the ground following a

(1) straight line path

(2) circular path

(3) parabolic path

(4) hyperbolic path

34. The trajectory of a projectile fired horizontally with velocity u is parabola given by-

(1) $y = \dfrac{g}{2u^2} x^2$

(2) $y = -\dfrac{g}{2u^2} x^2$

(3) $y = \dfrac{g}{2u^2} y^2$

(4) $y = \dfrac{g}{2u^2} y^2$

35. A body projected from the top of a tower horizontally with an initial velocity 20 m/s hits the ground at an angle of 45º. The vertical component of velocity at the times of hitting is-

(1) 20 m/s

(2) $20\sqrt{2}$ m/s

(3) $20/\sqrt{2}$ m/s

(4) $10\sqrt{3}$ m/s

SECTION - B

36. A metal sphere is hung by a string fixed to a wall. The forces acting on the sphere are shown in fig. Which of the following statements is/are correct?
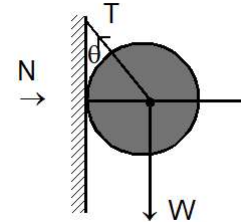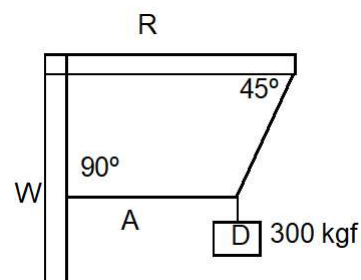

(1) $N + T + W = 0$　　(2) $T^2 = N^2 + W^2$

(3) $T = N + W$　　(4) $N = W \tan\theta$

(1) a, b, c　　(2) b, c, d

(3) a, b, d　　(4) a, b, c, d

37. A body of mass 5 kg is suspended by the strings making angles 60º and 30º with the horizontal -
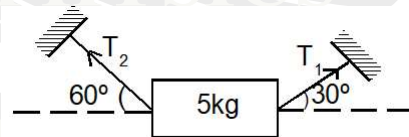
(1) $T_1 = 25$ N　　(2) $T_2 = 25$ N

(3) $T_1 = 25\sqrt{3}$ N　　(4) $T_2 = 25\sqrt{3}$ N

(1) a, b　　(2) a, d

(3) c, d　　(4) b, c

38. A block D weighing 300 kg is suspended by means of two cords A and B as shown in the figure. W is a vertical wall and R a horizontal rigid beam. The tension in the string A in kg is-

(1) zero　　(2) 150

(3) 300　　(4) 400

39. The ratio of angular speed of hours hand and seconds hand of a clock is-

(1) 1 : 1　　(2) 1 : 60

(3) 1 : 720　　(4) 3600 : 1

40. The ratio of angular speeds of minutes hand and hour hand of a watch is -

(1) 1 : 12   (2) 6 : 1

(3) 12 : 1   (4) 1:6

41. The angular velocity of earth about its axis of rotation is-

(1) $2\pi / (60 \times 60 \times 24)$ rad / sec

(2) $2\pi / (60 \times 60)$ rad / sec

(3) $2\pi / 60$ rad / sec

(4) $2\pi / (365 \times 24 \times 60 \times 60)$ rad / sec

42. The ratio of angular speeds of minutes hand and hour hand of a watch is -

(1) 1 : 12   (2) 6 : 1

(3) 12 : 1   (4) 1 : 6

43. A particle moves in circular path with uniform speed v. The change in its velocity on rotating through 60º is -

(1) $v\sqrt{2}$ (2) $\dfrac{v}{\sqrt{2}}$

(3) v   (4) Zero

44. Two bodies of masses 10 kg and 5 kg moving on concentric orbits of radii R and r such that their period of revolution are same. The ratio of their centripetal acceleration is -

(1) $\dfrac{R}{r}$ (2) $\dfrac{r}{R}$

(3) $\dfrac{R^2}{r^2}$ (4) $\dfrac{r^2}{R^2}$

45. If a particle moves in a circle describing equal angles in equal interval of times, its velocity vector

(1) remains constant

(2) changes in magnitude

(3) changes in direction

(4) changes both in magnitude and direction

46. The breaking tension of a string is 10 N. A particle of mass 0.1 kg tied to it is rotated along a horizontal circle of radius 0.5 metre. The maximum speed with which the particle can be rotated without breaking the string is-

(1) $\sqrt{5}$ m/sec   (2) $\sqrt{(50)}$ m/sec

(3) $\sqrt{(500)}$ m/sec   (4) $\sqrt{(1000)}$ m/sec

47. A particle completes 3 revolutions per second on a circular path of radius 8 cm. Find the values of angular velocity and centripetal acceleration of the particle -

(1) $6\pi \ \dfrac{rad}{s}$; $288\pi^2 \ \dfrac{cm}{s^2}$ (2) $\pi \ \dfrac{rad}{s}$; $275\pi^2 \ \dfrac{cm}{s^2}$

(3) $6\pi \ \dfrac{rad}{s}$; $288 \ \dfrac{cm}{s^2}$ (4) None

48. A car of mass 1000 kg moves on a circular track of radius 20 m. if the coefficient of friction is 0.64, what is the maximum velocity with which the car can be moved?

(1) 1.12 m/s   (2) 11.2 m/s

(3) $\dfrac{0.64 \times 20}{1000}$ m/s   (4) $\dfrac{1000}{0.64 \times 20}$ m/s

49. The earth, radius 6400 km, makes one revolution about its own axis in 24 hours. The centripetal acceleration of a point on its equator is nearly -

(1) $340 \ \dfrac{cm}{sec^2}$ (2) $3.4 \ \dfrac{cm}{sec^2}$

(3) $34 \ \dfrac{cm}{sec^2}$ (4) $0.34 \ \dfrac{cm}{sec^2}$

50. A car is travelling with linear velocity v on a circular road of radius r. If it is increasing it speed at the rate of 'a' metre/sec², then the resultant acceleration will be-

(1) $\sqrt{\left(\dfrac{v^2}{r^2} - a^2 \right)}$

(2) $\sqrt{\left(\dfrac{v^4}{r^2} + a^2 \right)}$

(3) $\sqrt{\left(\dfrac{v^4}{r^2} - a^2 \right)}$

(4) $\sqrt{\left(\dfrac{v^2}{r^2} + a^2 \right)}$

CHEMISTRY

SECTION - A

51. The total number of protons , electrons and neutrons in 12gm of $_6C^{12}$ is -

(1) 1.084×10^{25} 　　 (2) 6.022×10^{23}

(3) 6.022×10^{22} 　　 (4) 18

52. Number of Ca^{+2} and Cl^- ion in 111 g of anhydrous $CaCl_2$ are -

(1) N_A, $2N_A$ 　　 (2) $2N_A$, N_A

(3) N_A, N_A 　　 (4) None

53. The weight of a substance that displaces 22.4 litre air at NTP is -

(1) Mol. wt. 　　 (2) At. wt.

(3) E wt. 　　 (4) all

54. Mol. wt. = vapour density × 2, is valid for -

(1) metals 　　 (2) non metals

(3) solids 　　 (4) gases

55. Equal masses of O_2 , H_2 and CH_4 are taken in a container. The respective mole ratio of these gases in container is -

(1) 1 : 16 : 2 　　 (2) 16 : 1 : 2

(3) 1 : 2 : 16 　　 (4) 16 : 2 : 1

56. The percent of N in 66% pure $(NH_4)_2 SO_4$ sample is -

(1) 32 　　 (2) 28

(3) 14 　　 (4) None of these

57. The empirical formula of a compound is CH. Its molecular weight is 78. The molecular formula of the compound will be -

(1) C_2H_2 　　 (2) C_3H_3

(3) C_4H_4 　　 (4) C_6H_6

58. An oxide of a metal (M) contains 40% by mass of oxygen. Metal (M) has atomic mass of 24. The empirical formula of the oxide is-

(1) M_2O 　　 (2) MO

(3) M_2O_3 　　 (4) M_3O_4

59. 12 litre of H_2 and 11.2 litre of Cl_2 are mixed and exploded. The composition by volume of mixture is -

(1) 24 litre of HCl

(2) 0.8 litre Cl_2 and 20.8 lit HCl.

(3) 0.8 litre H_2 & 22.4 litre HCl

(4) 22.4 litre HCl

60. For the reaction : A + 2B → C

5 mole of A and 8 mole of B will produce -

(1) 5 mole of C

(2) 4 mole of C

(3) 8 mole of C

(4) 13 mole of C

61. An element A is tetravalent and another element B is divalent. The formula of the compound formed from these elements will be-

(1) A_2B 　　 (2) AB

(3) AB_2 　　 (4) A_2B_3

62. The moles of O_2 required for reacting with 6.8 gm of ammonia.

(..... NH_3 +..... O_2 → ..... NO + ... H_2O) is

(1) 5 　　 (2) 2.5

(3) 1 　　 (4) 0.5

63. Total no. of atoms in 44 gm of CO_2 is -

(1) 6.02×10^{23} 　　 (2) 6.02×10^{24}

(3) 1.806×10^{24} 　　 (4) 18.06×10^{22}

64. The % loss in weight after heating a pure sample of potassium chlorate (M. wt. 122.5) will be -

(1) 12.25 　　 (2) 24.50

(3) 39.17 　　 (4) 49.00

65. Find the volume of CO_2 obtained at S.T.P. on heating 200 gm of 50% pure $CaCO_3$ -

(1) 11.2 litre 　　 (2) 22.4 litre

(3) 44.8 litre 　　 (4) None of these

66. A sample of AlF_3 contains 3.0×10^{24} F^- ions. The number of formula units in this sample are -

(1) 9.0×10^{24}

(2) 3.0×10^{24}

(3) 0.75×10^{24}

(4) 1.0×10^{24}

67. The mass of 70% pure H_2SO_4 required for neutralisation of 1 mol of NaOH -

(1) 49 gm   (2) 98 gm

(3) 70 gm   (4) 34.3 gm

68. 1.5 gm of divalent metal displaced 4 gm of copper (at. wt. = 64) from a solution of copper sulphate. The atomic weight of the metal is-

(1) 12   (2) 24

(3) 48   (4) 6

69. Avogadro's number of Rupees can be spent in ....years if 10 lac rupees per second are spent -

(1) 1.91×10^{10} year   (2) 2.91×10^{10} year

(3) 3.91×10^{10} year   (4) 4.91×10^{10} year

70. The amount of sulphur required to produce 100 moles of H_2SO_4 is -

(1) 3.2×10^3 gm   (2) 32.65 gm

(3) 32 gm   (4) 3.2 gm

71. In the reaction,

$3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow$

$5Br^- + BrO_3^- + 6HCO_3^-$

(1) Bromine is oxidised and carbonate is reduced

(2) Bromine is oxidised as well as reduced

(3) Bromine is reduced and water is oxidised

(4) Br_2 is neither oxidised nor reduced

72. Oxidation state of hydrogen in CaH_2 is -

(1) +1   (2) –1

(3) + 2   (4) 0

73. Oxidation number of C in CH_2Cl_2 is -

(1) +2   (2) + 4

(3) – 4   (4) 0

74. Which one of the following is a redox reaction ?

(1) $H_2 + Br_2 = 2HBr$

(2) $2NaCl + H_2SO_4 = Na_2SO_4 + 2HCl$

(3) $HCl + AgNO_3 = AgCl + HNO_3$

(4) $NaOH + HCl = NaCl + H_2O$

75. The oxidation number of carbon in $C_{12}H_{22}O_{11}$ is

(1) 0   (2) – 6

(3) + 6   (4) + 2

76. In the reaction

$2Na_2S_2O_3 + I_2 \rightarrow Na_2S_4O_6 + 2NaI$,

the oxidation state of S is -

(1) Increased   (2) Decreased

(3) Remains same   (4) None

77. The oxidation state of iodine in $H_4IO_6^-$ is:

(1) +7   (2) –1

(3) +5   (4) +1

78. In the reaction $MnO_4^- + SO_3^{2-} + H^+ \longrightarrow$ $SO_4^{2-} + Mn^{2+} + H_2O$

(1) MnO_4^- and H^+ both are reduced

(2) MnO_4^- is reduced and H^+ is oxidised

(3) MnO_4^- is reduced and SO_3^{2-} is oxidised

(4) MnO_4^- is oxidised and SO_3^{2-} is reduced

79. Which of the following halogens always shows only one oxidation state-

(1) Cl   (2) F

(3) Br   (4) I

80. In which of the following reactions, the underlined element has decreased its oxidation number during the reaction ?

(1) $\underline{Fe} + CuSO_4 \rightarrow Cu + FeSO_4$

(2) $\underline{H}_2 + Cl_2 \rightarrow 2HCl$

(3) $\underline{C} + H_2O \rightarrow CO + H_2$

(4) $\underline{Mn}O_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$

81. Oxidation number of Ni in $Ni(CO)_4$ is-

(1) 0   (2) 4

(3) 8   (4) 2

82. The oxidation number of nitrogen in NH_2OH is-

(1) + 1   (2) – 1

(3) – 3   (4) – 2

83. O.N. of hydrogen in KH, MgH_2 and NaH respectively would be-

(1) –1, – 1 and –1

(2) +1, + 1, and + 1

(3) +2, +1 and –2

(4) –2, –3 and –1

84. Which one can act as oxidising & reducing agent both-

(1) HNO_2 (2) H_2O_2

(3) H_2SO_3 (4) all

85. Maximum & minimum oxidation number of elements are given which one is in currect match-

elements	Min O.N.	Max O.N.
(1) P	– 3	+ 5
(2) Cr	+ 2	+ 6
(3) Cl	– 1	+ 7
(4) e	– 4	+ 4

SECTION - B

86. For the redox reaction

$$MnO_4^- + C_2O_4^{--} + H^+ \rightarrow$$

$$Mn^{2+} + CO_2 + H_2O$$
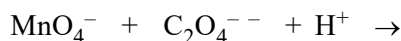
the correct coefficients for the balanced reaction are –

	MnO_4^-	$C_2O_4^{2-}$	H^+
(1)	2	5	16
(2)	16	5	2
(3)	5	16	2
(4)	2	16	5

87. For the redox reaction

$$MnO_4^- + Fe^{++} + H^+ \rightarrow$$

$$Mn^{2+} + Fe^{3+} + H_2O$$
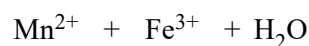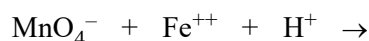
in the balanced equation, correct coefficient are –

	MnO_4^-	Fe^{2+}	H^+
(1)	1	5	8
(2)	16	5	2
(3)	5	16	2
(4)	2	16	5

88. In the chemical reaction,

$$K_2Cr_2O_7 + XH_2SO_4 + YSO_2 \rightarrow$$

$$K_2SO_4 + Cr_2(SO_4)_3 + ZH_2O$$
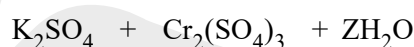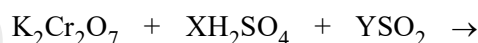
X, Y and Z are –

(1) 1, 3, 1

(2) 4, 1, 4

(3) 3, 2, 3

(4) 2, 1, 2

89. $Cu + X \longrightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2$. Here X is-

(1) $4HNO_3$

(2) $2HNO_3$

(3) $4HNO_2$

(4) $6HNO_3$

90. In the reaction:

$$A^{-n}_2 + xe \rightarrow A^{-n}_1$$
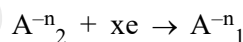
Here x will be –

(1) $n_1 + n_2$

(2) $n_2 - n_1$

(3) $n_1 - n_2$

(4) $n_1.n_2$

91. The equivalent weight of $Na_2S_2O_3$ (Mol. wt = M) in the reaction,

$$2Na_2S_2O_3 + I_2 \rightarrow Na_2S_4O_6 + 2NaI \text{ is –}$$
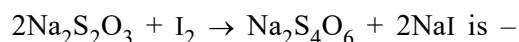
(1) M/4   (2) M/3

(3) M/2   (4) M

92. What is the equivalent weight of NH_3 in the given reaction ?
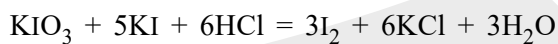
$$3CuO + 2NH_3 = 3Cu + N_2 + 3H_2O$$
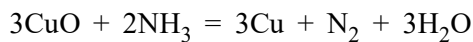
(1) 17

(2) $\dfrac{17}{4}$

(3) $\dfrac{17}{2}$

(4) $\dfrac{17}{3}$

93. Consider the following statement in the reaction –

$$KIO_3 + 5KI + 6HCl = 3I_2 + 6KCl + 3H_2O$$

(1) KI is oxidised to I_2

(2) KIO_3 is oxidised to I_2

(3) KIO_3 is reduced to I_2

(4) Oxidation number of I increases from (-1) in KI to zero in I_2 of these statements

(1) a, c and d are correct

(2) a, b and d are correct

(3) b and d are correct

(4) a alone is correct

94. Match list – I (compounds) with list – II

(Oxidation state of nitrogen) and select the correct answer using the codes given below the lists –

	List – I		List – II
(1)	NaN_3	(1)	+5
(2)	N_2H_4	(2)	+2
(3)	NO	(3)	$-1/3$
(4)	N_2O_5	(4)	-2

Codes :–

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

95. Oxygen shows oxidation state of -1 in the compound –

(1) NO_2

(2) MnO_2

(3) PbO_2

(4) Na_2O_2

96. Carbon is in the lowest oxidation state in –

(1) CH_4

(2) CCl_4

(3) CF_4

(4) CO_2

97. Which of the following reactions does not involve either oxidation or reduction –

(1) $VO^{2+} \rightarrow V_2O_3$

(2) $Na \rightarrow Na^+$

(3) $Zn^{+2} \rightarrow Zn$

(4) $CrO_4^{-2} \rightarrow Cr_2O_7^{-2}$

98. Oxidation numbers of two Cl atoms in bleaching powder, $CaOCl_2$ is –

(1) $-1, -1$

(2) $+1, -1$

(3) $+1, +1$

(4) $0, -1$

99. In Wustite $Fe_{0.93}$ O, the oxidation number of iron is

(1) 200/93

(2) 100/93

(3) 0.4

(4) 0.3

100. Oxidation number of carbon in diamond is -

(1) -4

(2) $+4$

(3) 0

(4) $+2$

BIOLOGY

SECTION - A

101. Bilirubin and bilivirdin are found in-

(1) Blood   (2) Bile

(3) Saliva   (4) None of these.

102. Casien present in milk, which is -

(1) bacterium   (2) sugar

(3) protein   (4) fat

103. Amylase enzyme acts on the -

(1) Starch   (2) Protein

(3) Fat   (4) Cane sugar

104. Liver cells secrete-

(1) amylopsin   (2) trypsin

(3) lipase   (4) bile and no enzyme

105. Milk protein is curdled into calcium paracacinate by-

(1) Maltose   (2) Rennin

(3) Trypsin   (4) lactose

106. Amino acids are absorbed in-

(1) Blood cappillaries of villi

(2) Wall of rectum

(3) lacteals and blood capillaries of villi

(4) lacteals of villi

107. Proteins are broken down into amino acids in-

(1) Buccal cavity   (2) Stomach

(3) Intestine   (4) Rectum

108. Ptyalin cannot work in stomach, because it becomes-

(1) Inactive due to HCl

(2) Inactive due to Renin

(3) Inactive due to Pepsin

(4) None of these

109. Glycogen is stored in-

(1) Blood   (2) Liver

(3) Lungs   (4) Kidney

110. Digestion of carbohydrates, proteins and fats completes in-

(1) Stomach   (2) Liver

(3) Small intestine   (4) Large intestine

111. Absorption of digested food chiefly occurs in-

(1) Stomach   (2) Colon

(3) Small Intestine   (4) Large Intestine

112. Pancreatic juice takes part in digestion of-

(1) Proteins carbohydrate and fats

(2) Proteins and fats

(3) Protein, carbohydrate

(4) Proteins only

113. The enzyme trypsinogen is secreted from-

(1) Duodenum   (2) Pancreas

(3) Liver   (4) Stomach

114. Which one is differ from the category of other three-

(1) Gastrin   (2) Glucagon

(3) Secretin   (4) Ptyalin

115. A Carbohydrate splitting enzyme is secreted by -

(1) Liver

(2) Zymogen cells of gastic glands

(3) Spleen

(4) Crypts of Lieberkuhn

116. Intake of food is called-

(1) Ingestion   (2) Egestion

(3) Digestion   (4) Nutrition

117. Enterokinase stimulates which of the following-

(1) Pepsinogen   (2) Trypsin

(3) Pepsin   (4) Trypsinogen

118. Absence of which of these in bile will make fat digestion difficult-

(1) Cholesterol   (2) Salts

(3) Pigment   (4) Acids

119. Lacteals take part-

(1) Digestion of milk

(2) Absorption of fat

(3) Digestion of lactic acid

(4) None of the above

120. Muscular contraction of Alimentary canal are-

(1) Circulation   (2) Deglutition

(3) Churning   (4) Peristalsis

121. Stool of a person contain whitish grey colour due to malfunction of which type of organ:

(1) Pancreas   (2) Spleen

(3) Kidney   (4) Liver

122. Scurvy is a disease caused by-

(1) A virus

(2) Deficiency of Vit E

(3) Deficiency of Vit. C

(4) Deficiency of Vit. D

123. Vitamines are -

(1) Inorganic substances and can't be synthesized by animals.

(2) Inorganic substances and can be synthesized by animals.

(3) Organic substances which cannot mostly be synthesized by animals.

(4) Organic substances which can mostly be synthesized by animals.

124. Which of the following is the best source of Vit-A

(1) Carrot   (2) Apple

(3) Peanuts   (4) Honey

125. Vitamin necessary for blood clotting -

(1) A   (2) E

(3) C   (4) K

126. Beri-Beri is caused due to-

(1) Def. of Vit B_1 (2) Def. of Vit B_2

(3) Def. of Vit B_{12} (4) Def. of Vit C

127. Ascorbic acid is the-

(1) Vit A   (2) Vit-C

(3) Vit E   (4) Biotin

128. Night blindness is caused due to deficiency of Vitamin

(1) B   (2) C

(3) D   (4) A

129. Meat, milk and egg mainly supply us with-

(1) Hormones   (2) Carbohydrates

(3) Proteins   (4) Fats

130. Protein are mainly required in the body for-

(1) Growth   (2) Repair

(3) Both of these   (4) None of these

131. Rickets is caused by the deficiency of-

(1) Vit A   (2) Vit C

(3) Vit D   (4) Vit B

132. Which vitamins are water soluble-

(1) Vit B & C   (2) Vit A & C

(3) Vit C & D   (4) Vit A & B

133. Pernicious anaemia is caused by deficiency of vitamin-

(1) C   (2) B_1

(3) B_{12} (4) B_6

134. Vit D is also called-

(1) Calciferol   (2) Ascorbic acid

(3) Retinol   (4) Folic Acid

135. The mineral element whose deficiency in human body may leads to goitre is-

(1) Iodine   (2) Fluorine

(3) Calcium   (4) Sodium

SECTION - B

136. Deficiency of Vit E brings about-

(1) Scurvy

(2) Beri- Beri

(3) Slow clotting of blood

(4) Impotence

137. Bow - shaped legs in children are due to deficiency of Vitamin-

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

138. Deficiency of protein leads to :-

(1) Rickets   (2) Scurvy

(3) Kwashiorker   (4) Carotenemia

139. Vitamin which induces maturation of R.B.C.:-

(1) B_1 (2) A

(3) B_{12} (4) D

140. Pantothenic acid & Biotin associated with:

(1) Vitamin D   (2) Vitamin B complex

(3) Vitamin K   (4) Vitamin E

141. Fluoride pollution mainly affects :

(1) Brain   (2) Heart

(3) Teeth   (4) Kidney

142. Which of the following vitamins is essential for D.N.A. synthesis and cell division :

(1) Vitamin E
(2) Vitamin D
(3) Folic Acid
(4) Vitamin K

143. Marasmus disease is caused due to :

(1) Protein deficiency
(2) Obesity
(3) Dwarfism
(4) Deficiency of vitamins

144. Respiration is

(1) Physical process
(2) Chemical process
(3) Physico chemical process
(4) None

145. Larynx is a modified portion of

(1) Pharynx
(2) Trachea
(3) Bronchus
(4) Lungs

146. Cartilaginous rings in trachea are incomplete at which surface.

(1) Dorsal
(2) Ventral
(3) Lateral
(4) Ventrolateral

147. Wall of alveoli is composed of

(1) Simple squamous epithelium
(2) Simple cuboidal epithelium
(3) Pseudostratified epithelium
(4) Simple columnar epithelium

148. Which part of thyroid cartilage in larynx is closed

(1) Dorsal
(2) Ventral
(3) Anterior
(4) Posterior

149. The function of tracheal cilia is to

(1) Pass mucus out
(2) Pass mucus in
(3) Pass air out
(4) Pass air in

150. Each lung is enclosed in a double membrane called as pleura. The membrane which closely covers the lung is

(1) Lung pleura
(2) Visceral pleura
(3) Peritoneal pleura
(4) Parietal pleura

SECTION - A

151. Respiratory system is derived from

(1) Ectoderm
(2) Endoderm
(3) Both A & B
(4) Endo mesoderm

152. The structure which prevents the entry of food into respiratory tract is

(1) pharynx
(2) Larynx
(3) Glottis
(4) Epiglottis

153. Nasal chamber is lined by

(1) Olfactory epithelium
(2) Glandular epithelium
(3) Highly vascularised epithelium
(4) All

154. Signet ring cartilage of larynx is

(1) Cricoid
(2) Arytenoid
(3) Thyroid
(4) All

155. In thoracic cavity of man one is present

(1) Lungs only
(2) Lungs + Heart
(3) Lungs + heart + Stomach
(4) Hearts only

156. Number of alveoli present in human lungs is

(1) 7-10 million
(2) 70-100 million
(3) 300-400 million
(4) 800-1000 million

157. Vocal cords are attached with

(1) Cricoid
(2) Arytenoid
(3) Thyroid and arytenoid
(4) None

158. Oxygen in lungs ultimately reaches

(1) Alveoli
(2) Trachea
(3) Bronchus
(4) Bronchioles

159. In humans sound is produced by

(1) Syrinx
(2) Larynx
(3) Bronchus
(4) Trachea

160. Lungs are covered by

(1) Perichondrium
(2) Pleural sac
(3) Pericardium
(4) Peristomium

161. Which is a common passage for food and air :-

(1) Trachea   (2) Oesophagus

(3) Pharynx   (4) Glottis

162. The alveolar epithelium in the lung is

(1) Nonciliated colomnar

(2) Nonciliated squamous

(3) Ciliated columnar

(4) Ciliated squamous

163. Air is breathed through

(1) Trachea → lungs → larynx → pharynx → alveoli

(2) Nose → larynx → pharynx → bronchus → alveoli → bronchioles

(3) Nostrils → pharynx → larynx → trachea → bronchi → bronchioles → alveoli

(4) Nose → mouth → lungs

164. Which one protects the lungs

(1) Rib   (2) Vertebral colum

(3) Sternum   (4) All above

165. Match the columns

Column-I	Column-II
(1) Larynx	(p) Lid of larynx
(2) Trachea	(q) Air sacs
(3) Alveoli	(r) Voice box
(4) Epiglottis	(s) Wind pipe
	(t) Common passage.

(1) a-r, b-s, c-q, d-p

(2) a-t, b-s, c-p, d-q

(3) a-r, b-s, c-q, d-t

(4) a-r, b-t, c-q, d-p

166. Adam's Apple represents

(1) Arytenoid cartilage of larynx

(2) Cricoid cartilage of larynx

(3) Thyroid cartilage of larynx

(4) All the above

167. Arytenoid cartilage is found in

(1) Hyoid   (2) Sternum

(3) Larynx   (4) Nose

168. The epithelium of bronchioles is :-

(1) Pseudostratified and columnar

(2) Squamous and sensory

(3) Pseudostratified and sensory

(4) Cuboidal and columnar

169. The type of tissue lining the nasal passage, bronchioles and fallopian tubes is –

(1) columnar ciliated epithelium

(2) cuboidal epithelium

(3) neurosensory epithelium

(4) germinal epithelium

170. The process of exchange of O_2 from the atmosphere with CO_2 produced by the cells is called

(1) biological respiration

(2) photosynthesis

(3) biological assimilations

(4) gaseous exchange

171. Number of teeth which are monophycodont in man is-

(1) 4   (2) 22

(3) 32   (4) 12

172. Islets of langerhans are-

(1) Modified lymph glands

(2) Ductless glands in pancreas

(3) Specialized area in pituitary

(4) Small tubules in kidney

173. Which substance of saliva destroy the harmful bacteria-

(1) Cerumin   (2) Chyme

(3) Lysozyme   (4) Secretin

174. Peristaltic movements found in different parts of alimentary canal In which one of these there is least peristalsis-

(1) Stomach

(2) duodenum

(3) rectum

(4) Oesophagus

175. The enzyme invertase hydrolase-

    (1) Glucose into sucrose

    (2) Sucrose into glucose and fructose

    (3) Starch into maltose

    (4) Starch into sucrose

176. Some proteolytic enzymes are-

    (1) Trypsin, Erepsin, Pepsin

    (2) Amylase, Lipase, Zymase

    (3) Ampylopsin, Steapsin, Ptyalin

    (4) Urease, Dehydrogenase, Zymase

177. A Carbohydrate splitting enzyme is secreted by -

    (1) Liver

    (2) Zymogen cells of gastic glands

    (3) Spleen

    (4) Crypts of Lieberkuhn

178. Enzyme maltase in human gut acts on food at a pH of -

    (1) More than seven to change starch into maltose.

    (2) Less than 7 to change starch into maltose.

    (3) More than 7 to change maltose into glucose.

    (4) Less than 7 to change maltose into glucose

179. Point out the odd one-

    (1) Rennin   (2) Secretin

    (3) Calcitonin   (4) Oxytocin

180. Castle's intrinsic factor is connected with internal absorption of-

    (1) Pyridoxine   (2) Riboflavin

    (3) Thiamine   (4) Cobalamine

181. Inhibition of gastric and stimulation of gastric, pancreatic and bile secretion are controlled by-

    (1) Gastrin, secretin, Enterokinin and CCK

    (2) Enterogastrin, gastrin, pancreozymin and CCK

    (3) Gastrin, Enterogastrone, CCK and pancreozymin

    (4) Secretin, Enterogastrone, Secretion and enterokinin

182. During prolonged fasting-

    (1) First fats are used up, followed by carbohydrate from liver and muscles, and protein in the end

    (2) First carbohydrate are used up, followed by fat and proteins towards end

    (3) First lipids, followed by proteins and carbohydrates towards end.

    (4) None of the above

183. Glucose is transported to cell by :-

    (1) Na^+ Symport   (2) K^+ Symport

    (3) Na^+ Antiport   (4) K^+ Antiport

184. Stool of a person contain whitish grey colour due to malfunction of which type of organ:

    (1) Pancreas   (2) Spleen

    (3) Kidney   (4) Liver

185. The chief function of bile is to :

    (1) Digest fat by enzymatic action

    (2) Emulsify fats for digestion

    (3) Eliminate waste products

    (4) Regulate digestion of proteins

SECTION - B

186. What is the common passage for bile and pancreatic juices

    (1) Ampulla of Vater   (2) Ductus Choledochus

    (3) Duct of Wirsung   (4) Duct of Santorini

187. Continuous bleeding from an injured part of body is due to deficiency of :

    (1) Vitamin A   (2) Vitamin B

    (3) Vitamin K   (4) Vitamin E

188. Select the incorrect statements :

    (1) alimentary canal begins with an anterior cavity called buccal cavity.

    (2) tooth is embedded in a socket of mandible bone only.

    (3) human shows strict diphyodont type of dentition.

    (4) oesophagus and the trachea does not open into the pharynx.

    (1) a, b, c & d   (2) a, b & c

    (3) a, c & d   (4) a, b & d

189. Select the correct statements.

(1) Salivary glands situated just outside the buccal cavity.

(2) Liver is the largest digestive gland.

(3) Cystic duct not arises from gall bladder.

(4) Sphincter of oddi can regulate the released of pancreatic and bile juice in duodenum.

(1) a, b, c & d

(2) a, b & d

(3) b, c & d

(4) a, b & c

190. All of the following is correct w.r.t. large intestine except.

(1) No significant digestive activity.

(2) Absorption of some water

(3) Absorption of certain minerals.

(4) Absorption of remaining glucose and amino acid

191. Gluconeogenesis is :

(1) formation of ammonia from glucose

(2) breakdown of glucose

(3) formation of glycogen

(4) formation of glucose from sources other than carbohydrate

192. In mammals the teeth are

(1) of different types

(2) embedded in the cuplike socket in the jaw bones

(3) only two sets, present throughout life

The condition are referred as :

(1) heterodont, thecodont, diphyodont

(2) thecodont, heterodont, diphyodont

(3) diphyodont, thecodont, heterodont

(4) heterodont, diphyodont, thecodont

193. Find out the correct match :

Column I	Column II
A. Hepatic loluble	i. Sub mucosal glands
B. Brunner's glands	ii. Base of villi
C. Crypts of lieberkuhn	iii. Glisson's capsule
D. Sphincter of Oddi	iv. Gall bladder
E. Cystic duct	v. Hepatopancreatic duct
	vi. Serous glands

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

194. A patient is generally advised to specially, consume more meat, lentils, milk and eggs in diet only when the suffers from :

(1) Kwashiorkar   (2) Rickets

(3) Anaemia   (4) Scurvy

195. Which one of the following is the correct matching of the site of acion on the given substrate, the enzyme acting upon it and the end product :
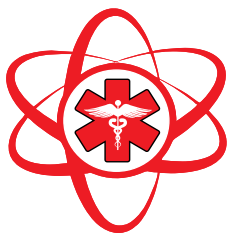
(1) Small intestine : proteins $\xrightarrow{pepsin}$ amino acids

(2) Stomach : fats $\xrightarrow{lipase}$ micelles

(3) Duodenum : tryglycerides $\xrightarrow{trypsin}$ monoglycerides

(4) Small intestine : starch $\xrightarrow{\alpha-amylase}$ disaccharide (maltose)

196. Carrier ions like Na^+ facilitate the absorption of substances like

(1) Fructose and some amino acids

(2) Amino acids and glucose

(3) Glucose and fatty acids

(4) Fatty acids and glycerol

197. Fructose is absorbed into the blood through mucosa cells of intestine by the process called

(1) Simple diffusion

(2) Co-transport mechanism

(3) Active transport

(4) Facilitated transport

198. Where do certain symbiotic microorganisms normally occur in human body

(1) Caecum

(2) Oral lining and tongue surface

(3) Vermiform appendix and rectum

(4) Duodenum

199. Contraction of gall bladder is carried by :

(1) citric acid + acetyl Co-A

(2) gastrin

(3) cholecystokinin

(4) none of these

200. Fatty liver syndrome is due to excessive intake of

(1) Morphine
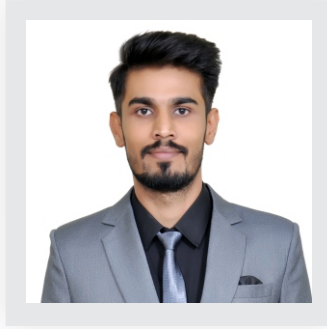
(2) Alcohol

(3) Tobacco

(4) Both '1' and '2'

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