CODE - A

TEST ID 001910

NTPL

ALL INDIA TEST SERIES

AIIMS - 2019

FULL TEST - 3

Time : $3^{1/2}$ Hours *Maximum Marks : 200*

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

You are not allowed to leave the Examination Hall before the end of the test.

INSTRUCTIONS

1. This booklet is your Question Paper containing **200 questions**.
2. The test is of **$3^{1/2}$ hours** duration. The question paper consists of **4 sections** (Physics, Chemistry, Biology & General Knowledge).
3. Each question carries **1 mark**. For each correct response the candidate will get **1 mark**. For each incorrect response, **-1/3 mark** will be deducted. The maximum marks are **200.**
4. Fill the bubbles completely and properly using a **Blue/Black Ball Point Pen** only.
5. No additional sheets will be provided for rough work.
6. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers, and electronic gadgets in any form are not allowed to be carried inside the examination hall.
7. The answer sheet, a machine-readable Optical mark recognition sheet (OMR Sheet), is provided separately.
8. DO NOT TAMPER WITH / MUTILATE THE OMR OR THE BOOKLET.
9. Do not break the seals of the question-paper booklet before being instructed to do so by the invigilator.

Name of the Candidate (in Capitals) _____

Test Centre _____ Centre Code _____

Candidate's Signature _____ Invigilator's Signature _____

PHYSICS

SECTION – I

1. The angle of deviation for a glass prism is equal to its angle of prism. The refractive index of glass is 1.5. Then the angle of prism is :

   (a) $2\cos^{-1}(3/4)$ (b) $\sin^{-1}(3/4)$ (c) $2\sin^{-1}(3/2)$ (d) $\cos^{-1}(3/2)$

2. An arrow is projected into air. Its time of flight is 5s and range 200m. What is the maximum height reached by it? (Take $g = 10\ m\ s^{-2}$)

   (a) 31.25 m (b) 24.5 m (c)/ 18.25 m (d) 46.75 m

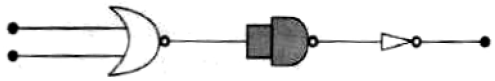
3. A bottle weighing 220 g and of area of cross-section 50 cm^2, and height 4 cm oscillates on the surface of water in vertical position. Its frequency of oscillation is :

   (a) 1.5 Hz (b) 2.5 Hz (c) 3.5 Hz (d) 4.5 Hz

4. A cyclist is moving in a circular track of radius 80 m with a velocity of 36 km h^{-1}. He has to lean from the vertical approximately through an angle (Take $g = 10\ m\ s^{-2}$) :

   (a) tan(4) (b) $\tan^{-1}(1/8)$ (c) $\tan^{-1}(1/4)$ (d) tan–1(2)

5. The circuit as shown in figure :



   The equivalent gate is :

   (a) NOR gate (b) OR gate (c) AND gate (d) NAND gate

6. A satellite is in an orbit around the earth. If its kinetic energy is doubled, then :

   (a) It will maintain its path

   (b) It will fall on the earth

   (c) It will rotate with a great speed

   (d) It will escape out of earth's gravitational field

7. 2, 4 and 6 S are the conductances of three conductors. When they are joined in parallel, their equivalent conductance will be:

   (a) 12S (b) (1/12)S (c) (12/11)S (d) 11/12 S

8. Two parallel long wires *A* and *B* carry currents i_1 and $i_2 (< i_1)$. When i_1 and i_2 are in the same direction, the magnetic field at a point mid way between the wires is $10\,\mu T$. If i_2 is reverse, the field becomes $30\,\mu T$. The ratio i_1 / i_2 is :

(a) 1 (b) 2 (c) 3 (d) 4

9. Two conducting circular loops of radii R_1, and R_2 are placed in the same plane with their centres coinciding. If $R_1 >> R_2$, the mutual inductance *M* between them will be directly proportional to :

(a) R_1 / R_2 (b) R_2 / R_1 (c) R_1^2 / R_2 (d) R_2^2 / R_1

10. The acceleration due to gravity is measured by $T = 2\pi\sqrt{\ell / g}$? Given fractional errors in *T* and *l* are + x and + y respectively. Then fractional error in g is

(a) X + y (b) x – y (c) 2 x + y (d) 2x – y

11. A steel wire with cross-section 3 cm^2 has elastic limit 2.4 × 108 N m^{-2}. The maximum upward acceleration that can be given to a 1200 kg elevator supported by this cable wire if the stress is not to exceed one-third of the elastic limit is (Take g = 10m s^{-2}) :

(a) $12 ms^{-2}$ (b) $10\ ms^{-2}$ (c) $8\ ms^{-2}$ (d) $7\ ms^{-2}$

12. 70 calories of heat are required to raise the temperature of 2 moles of an ideal gas at constant pressure from 30°C to 35°C. The amount of heat required to raise the temperature of the same sample of the gas through the same range at constant volume is (Gas constant = 1.99 cal/K-mole) :

(a) 30 cal (b) 50 cal (c) 70 cal (d) 90 cal

13. 3 mole of hydrogen is mixed with 1 mole of neon. The molar specific heat at constant pressure is :

(a) $\frac{9R}{4}$ (b) $\frac{9R}{2}$ (c) $\frac{134}{R}$ (d) $\frac{13R}{2}$

14. A heavy truck moving with a velocity of 60 km h^{-1} collides with a light drum at rest. If the collision be elastic, then the velocity of the drum immediately after collision will be :

(a) Zero (b) 60 km h^{-1} (c) 120km h^{-1} (d) Data insufficient

15. Two waves represented by $y = a\sin(\omega t - kx)$ and $y = a\cos(\omega t - kx)$ are superposed. The resultant wave will have an amplitude :

(a) a (b) $\sqrt{2a}$ (c) $2a$ (d) zero

16. If the wavelength of 1st line of Balmer series of hydrogen is 6561 Å, the wavelength of the 2nd line of series will be :

(a) 9780 Å (b) 4860 Å (c) 8857 Å (d) 4429 Å

17. n-alpha particles per second are emitted from N atoms of a radioactive element. The half-life of the radioactive element is :

(a) $\frac{n}{N}s$ (b) $\frac{N}{n}s$ (c) $\frac{0.693N}{n}s$ (d) $\frac{0.693n}{N}s$

18. The light of wavelength 4000 Å falls on a photosensitive substance whose work function is 2 eV. Its stopping potential is :

(a) 1.1 V (b) 1.8 V (c) 1.26 V (d) 0.8 V

19. Resolving power of reflecting microscope increases with :

(a) Decrease in wavelength of incident light (b) Increase in wavelength of incident light

(c) Increase in diameter of objective lens (d) None of these

20. The most suitable metal for making electromagnets and transformer cores is :

(a) Steel (b) Iron (c) Copper (d) Aluminium

21. An inductive circuit contains a resistance of 10Ω and an inductance of 2 H. If an AC voltage of 120 V and frequency 60 Hz is applied to this circuit, the current would be nearly :

(a) 0.72 A (b) 0.16 A (c) 0.48 A (d) 0.80 A

22. The diameter of the plate of a parallel plate condenser is 6 cm. If its capacity is equal to that of a sphere of diameter 200 cm, the separation between the plates of the condenser is :

(a) 4.5 × 10 m (b) 2.25×10^{-4} m (c) 6.75 × 10m (d) 9 × 10 m

23. In a uniform electric field a charge of 3 C experiences a force of 3000 N. The potential difference between two points 1 cm apart along the electric line of force will be :

(a) 10 V (b) 30 V (c) 300 V (d) 100 V

24. A long straight wire carries 10 A d.c. current, an electron travels perpendicular to the plane of this wire at a distance 0.1 m with velocity 5.0×10^6 m s^{-1}. Force acting on the electron due to current in wire is :

(a) Zero N (b) 2.3×10^{-17} N (c) 2.4×10^{-17} N (d) 2.2×10^{-17}N

25. A block of mass 2 kg is placed on the floor. The coefficient of static friction is 0.4. If a force of 2.8 N is applied on the block parallel to the floor, the force of friction between the block and the floor is $\left(\sigma = 10\, ms^{-2}\right)$:

(a) 2.8 N (b) 2 N (c) 8 N (d) Zero

26. A particle moves in a circular path with decreasing speed. Choose the correct statement.

(a) Angular momentum remains constant

(b) Acceleration a is towards the centre

(c) Particle moves in a spiral path with decreasing radius

(d) The direction of angular momentum remains constant

27. A body of mass 2 kg is thrown up vertically with kinetic energy of 490 J. The height at which the kinetic energy of the body becomes half of its original value is:

(a) 50 m (b) 12.25 m (c) 25 m (d) 10 m

28. Two homogeneous spheres *A* and *B* of masses m and 2 m having radii 2*a* and *a* respectively are placed in touch. The distance of centre of mass from first sphere is :

(a) a (b) 2a (c) 3a (d) None of these

29. What will be the effect on the weight of a body placed on the surface of earth, if earth suddenly stops rotating?

(a) No effect (b) Weight will increase

(c) Weight will decrease (d) Weight will become zero

30. The time period of a particle undergoing SHM is 16s. It starts motion from the mean position. After 2 s, its velocity is 0.4 m s^{-1}. The amplitude is :

(a) 1.44 m (b) 0.72 m (c) 2.88 m (d) 0.36 m

31. A 5.5 metre length of string has a mass of 0.035 kg. If the tension in the string is 77 N, the velocity of the wave on the string is :

(a) 210 m s^{-1} (b) 40 ms^{-1} (c) 110 m s^{-1} (d) 55 m s^{-1}

32. The near point of distinct vision is at 1 m for an elderly person. What power of lens is to be used to bring the near point to the minimum distance of distinct vision (25 cm)?

(a) 2.5 D (b) 3 D (c) 3.5 D (d) 4 D

33. Which of the given statements about transistor is not true?

(a) Emitter is heavily doped

(b) Base is thin

(c) Base is lightly doped

(d) Collector region is smaller comparative to emitter in size

34. In a Young's double slit experiment the intensity of light when slit is at a distance l from central is I. What will be the intensity at the distance of slit $\lambda/6$?

(a) $\frac{I}{6}$ (b) $\frac{I}{12}$ (c) $\frac{3}{4}I$ (d) $\frac{I}{8}$

35. A child is standing with folded bands at the centre of a platform rotating about its central axis. The kinetic energy of the system is K. The child now stretches his arms so that the moment of inertia of the system doubled. The kinetic energy of the system now is :

(a) $2K$ (b) $\frac{K}{2}$ (c) $\frac{K}{4}$ (d) $4K$

36. A triply ionized Beryllium (Be^{3+}) has the same orbital radius as the ground state of hydrogen. Then the quantum state n of Be^{3+} is :

(a) n = 1 (b) n = 2 (c) n = 3 (d) n = 4

37. A particle is moving eastwards with a velocity of 5 m/s in 10s, the velocity changes to 5 m/s northwards. The average acceleration in this time is :

(a) zero (b) $\frac{1}{\sqrt{2}}$ m s^{-2} towards north-west

(c) $\frac{1}{\sqrt{2}}$ m s^{-2} towards north-east (d) $\frac{1}{\sqrt{2}}$ m s^{-2} towards north

38. A spring of spring constant 5×10^3 N m^{-1} is stretched initially by 5 cm from the unstretched position. The work required to stretch it further by another 5 cm is :

(a) 6.25 Nm (b) 1250 Nm (c) 18.75 Nm (d) 25.00 Nm

39. According to kinetic theory of gases, molecules of a gas behave like :

(a) Inelastic spheres (b) Perfectly elastic rigid spheres

(c) Perfectly elastic non-rigid spheres (d) Inelastic non-rigid spheres

40. A particle of charge q and mass m starts moving from the origin under the action of an electric field $\vec{E} = E_0\hat{i}$ and $\vec{B} = B_0\hat{i}$ with a velocity $\vec{v} = v_0 j$. The speed of the particle will become $\frac{\sqrt{5}}{2}v_0$ after a time

(a) $\frac{mv_0}{qE_0}$ (b) $\frac{mv_0}{2qE_0}$ (c) $\frac{\sqrt{3}mv_0}{2qE_0}$ (d) $\frac{\sqrt{5}mv_0}{2qE_0}$

Directions : In the following questions (41–60), a statement of assertion is followed by a statement of reason. Mark the correct choice as :

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) If assertion is true but reason is false.

(d) If both assertion and reason are false.

41. **Assertion :** Short wave communication over long distance is not possible via ground waves.

Reason : The ground waves can bend round the corners of the objects on earth.

42. **Assertion :** The edges of the images of white object formed by a concave mirror on the screen appear white.

Reason : Concave mirror does not suffer from chromatic aberration.

43. **Assertion :** The relative velocity between any two bodies moving in opposite direction is equal to sum of the velocities of two bodies.

Reason : Sometimes relative velocity between two bodies is equal to difference in velocities of the two bodies.

44. **Assertion :** Current is passed through a metallic wire so that it becomes red hot. When cold water is poured on half of its portion, the rest of the half portion becomes more hotter.

Reason : Resistance decreases due to decrease in temperature.

45. **Assertion :** Long distance transmission of a.c. is carried out at extremely high voltages.

Reason : Because when the distance is large, voltage has to be large.

46. **Assertion :** A body subject to three concurrent forces may be in equilibrium.

Reason : For equilibrium the sum of all the concurrent forces acting at a point should be zero.

47. **Assertion :** A quick collision between two bodies is more violent than a slow collision, even when the initial and the final velocities are identical.

Reason : The rate of change of momentum is greater in the first case.

48. **Assertion :** The ratio for time taken for light emission from an atom to that for release of nuclear energy in fission is 1: 100.

Reason : Time taken for the light emission from an atom is of the order of 10^{-8} s.

49. **Assertion :** The resistance of a junction of a spoiled transistor is low when forward biased or reverse biased.

Reason : The resistance of a junction of a transistor in working order is high always.

50. **Assertion :** A charged panicle free to move in an electric field always moves along an electric field line.

Reason : The electric field lines diverge from a negative charge and converge at a positive charge.

51. **Assertion :** Sky wave signals are used for long distance radio communication. These signals are in general, less stable than ground wave signals.

Reason : The state of ionosphere varies from hour to hour, day to day and season to season.

52. **Assertion :** The velocity of a body at the bottom of an inclined plane of given height is more when it slides down the plane compared to when it is rolling down the same plane.

Reason : In rolling down, a body acquires both kinetic energy of translation and rotation.

53. **Assertion :** If an electron and proton possessing same kinetic energy enter an electric field in a perpendicular direction, the path of the electron is more curved than that of the proton.

Reason : Electron forms a larger curve due to its small mass.

54. **Assertion :** Static crashes are heard on radio, when lightning flash occurs in the sky.

Reason : Electromagnetic waves having frequency of radio wave range interfere with radio waves.

55. **Assertion :** When height of a tube is less than liquid rise in the capillary tube, the liquid does not overflow.

Reason : Product of radius of meniscus and height of liquid in the capillary tube always remain constant.

56. **Assertion :** The periodic time of a hard spring is less as compared to that of a soft spring.

Reason : The periodic time depends upon the spring constant, which is large for hard spring.

57. **Assertion :** It is not possible for a system, unaided by an external agency to transfer heat from a body at lower temperature to another body at a higher temperature.

Reason : It is not possible to violate the second law of thermodynamics.

58. **Assertion :** To hear distinct beats, difference in frequencies of two sources should be less than 10 Hz.

Reason : More the number of beats per sec more difficult to hear them.

59. **Assertion :** g-radiation emission occurs after *a* and *b* decay.

Reason : Energy levels occur in nucleus.

60. **Assertion :** An electron microscope is based on de Broglie hypothesis.

Reason : A beam of electrons behaves as a wave which can be converged by electric and magnetic lenses

CHEMISTRY

SECTION – II

61. Maltose is made of the units :

(a) α-D glucose and β-D glucose (b) α-D glucose and β-D fructose

(c) α-D glucose and α-D glucose (d) α-D glucose and β-D galactose

62. Which of the following is not sp^2 hybridised?

(a) Graphite (b) Graphenc (c) Fullerene (d) Dry ice

63. Which one of the following forms propaneni-trile as the major product?

(a) Propyl bromide + alcoholic KCN (b) Ethyl bromide + alcoholic KCN

(c) Ethyl bromide + alcoholic AgCN (d) Propyl bromide + alcoholic AgCN

64. $KMnO_4$ in alkaline medium changes to :

(a) Mn^{3+} (b) MnO_2 (c) MnO_4^{2-} (d) $Mn(OH)_4^-$

65. Rhombic sulphur dissolves best in :

(a) CS_2 (b) H_2O (c) Ethanol (d) Ether.

66. Which is a bactericidal antibiotic?

(a) Penicillin (b) Erythromycin (c) Tetracycline (d) Chloramphenicol

67. Least coordination number is shown :

(a) $Co_2(CO)_8$ (b) $Mn_2(CO)_{10}$ (c) $[Fe(en)_2NH_3]$ (d) $[Cr(OH)_3(NH_3)_3]$

68. Enrichment of U-235 is done by :

(a) IF_7 (b) ClF_3 (c) IF_5 (d) CIF_5

69. Which halogen forms only one oxoacid (HOX)?

(a) F (b) Cl (c) Br (d) I

70. Which is correct regarding size of atom?

(a) N < O (b) B < Ne (c) V > Ti (d) Na > K

71. Which is correct regarding acidity?

(a) $H_2S < H_2Se$ (b) $H_2S > H_2Se$ (c) $H_2Se > H_2Te$ (d) None of these

72. Slag formed in blast furnace, removes impurity of :

(a) SiO_2 (b) CaO (c) CO_2 (d) FeO

73. When CO_2 is passed through sodium aluminate precipitate which compound is formed?

(a) $Al(OH)_3$ (b) $A1_2O_3$ (c) Na_2CO3 (d) No ppt.

74. Purification of colloids is done by :

(a) Dialysis (b) Peptisation (c) Electrophoresis (d) Coagulation.

75. Which does not give Cannizzaro reaction?

(a) HCHO (b) CH_3CHO (c) Ph-CHO (d) Ph-CH_2-CHO

76. Monomers of nylon 2-nylon 6 are :

(a) Glycine and amino caproic acid (b) Glycine and caproic acid

(c) Hexamethylene diamine and adipic acid (d) Alanine and amino caproic acid.

77. A diatomic gas at pressure P, compressed adiabatically to half of its volume, what is the final pressure?

(a) $(2)^{1.4}P$ (b) $P/(2)^{1,4}$ (c) $(2)5^{/3}P$ (d) $P/(2)^{5/3}$

78. Choose the correctly paired gaseous cation and it magnetic (spin only) moment (in (B.M.) :

(a) Ti^{2+}, 3.87 B.M. (b) Cr^{2+}, 4.90 B.M. (c) Co^{3+}, 3.87 B.M. (d) Mn^{2+}, 4,90 B.M.

79. H_2S converts into SO_2 in the presence of?

(a) Mn only (b) MnS only (c) MnS+S (d) S only

80. Which of the following has highest concentration of PAN?

(a) Smoke (b) Ozone (c) Photochemical smog (d) Reducing smog

81. The equilibrium constant for the reaction

$$\tfrac{1}{2}H_2(g)+\tfrac{1}{2}I_2(g)\rightleftharpoons HI(g) \text{ is } K_c$$

Equilibrium constant for the reaction,

$$2HI(g)\rightleftharpoons H_2(g)+I_2(g) \text{ is ?}$$

(a) 1/Kc (b) $1/(Kc)^2$ (c) 2/Kc (d) $2/(Kc)^2$

82. 75% of a zero order reaction complete in 4 h 87.5% of the same reaction completes in :

(a) 6h (b) 12 h (c) 8 h (d) 2 h

83. For the reaction $A_{(g)} \rightarrow B_{(g)} + C_{(g)}$, the rate constant is given as : (P_i is initial pressure and P_t is pressure at time t)

(a) $k = \frac{2.303}{t}\log\frac{P_i}{P_t}$ (b) $k = \frac{2.303}{t}\log\frac{P_i}{(2P_i - P_t)}$

(c) $k = \frac{2.303}{t}\log\frac{2P_i - P_t}{P_i}$ (d) $k = \frac{2.303}{t}\log\frac{P_i - P_t}{2P_i}$

84. Which of the following pairs represent isotones?

(a) ${}^{77}_{33}As$, ${}^{78}_{34}Se$ (b) ${}^{195}_{78}Pt$, ${}^{190}_{76}OS$ (c) ${}^{108}_{47}Ag$, ${}^{112}_{48}Cd$ (d) ${}^{178}_{72}Hf$, ${}^{137}_{56}Ba$

85. In O_3 molecule, the formal charge on the central O-atom is :

(a) 0 (b) –1 (c) –2 (d) +1

86. The number of atoms in 52 g of He is:

(a) 78.299×10^{24} atoms (b) 7.820×10^{24} atoms

(c) 7.829×10^{24} atoms (d) 78.234×10^{25} atoms

87. Which of the following represents the correct bond order?

(a) $O_2^+ < O_2^- > O_2^{2-}$ (b) $O_2^- > O_2^{2-} > O^{2+}$ (c) $O_2^{2-} > O_2^+ > O_2^-$ (d) $O_2^+ > O_2^- > O_2^{2-}$

88. What is the oxidation number of Br in $KBrO_4$?

(a) +6 (b) +7 (c) +8 (d) +5

89. Which of the following reactions Increases the production of dihydrogen from synthesis gas?

(a) $CH_{4(g)} + H_2O_{(g)} \xrightarrow{1270\ K} CO_{(g)} + H_{2(g)}$ (b) $C_{(s)} + H_2O_{(g)} \xrightarrow{1270\ K} CO_{(g)} + H_{2(g)}$

(c) $CO_{(g)} + H_2(O)_{(g)} \xrightarrow{673\ K} CO_{2(g)} + H_{2(g)}$ (d) $C_2H_6 + 2H_2O \xrightarrow{1270\ K} 2CO + 5H_2$

90. Which of the following statements is incorrect?

(a) Li^+ has minimum degree of hydration (b) The oxidation state of K in KO_2 is +1

(c) Na is used to make a Na/Pb alloy (d) $MgSO_4$ is readily soluble in water

91. The purity of an organic compound is determined by :

(a) Chromatography (b) Crystallisation

(c) Melting or boiling point (d) Both (a) and (c)

92. The IUPAC name of the given compound is $(CH_3)_3CCH_2C(CH_3)_3$:

(a) 2, 3, 4, 4-tetramethylpentane (b) 1, 2, 2, 4-tetramethylpentene

(c) 2, 2, 4, 4-tetramethylpentane (d) 3, 3-dimethylpentane.

93. The value of Henry's constant KH is :

(a) Greater for gases with higher solubility (b) Greater for gases with lower solubility

(c) Constant for all gases (d) Not related to the solubility of gases

94. In a solid, atom M occupies cp lattice and 1/3rd of tetrahedral voids are occupied by atom N. Find the formula of solid formed by M and N.

(a) M_3N_2 (b) M_2N_3 (c) M_4N_3 (d) M_3N_4

95. Which one of the following is an example for homogeneous catalysis?

(a) Manufacture of ammonia by Haber's process

(b) Manufacture of sulphuric acid by contact process

(c) Hydrogenation of oil

(d) Hydrolysis of sucrose in presence of dilute hydrochloric acid

96. Which one of the following is not employed as antihistamine?

(a) Dimetane (b) Chloramphenicol (c) Seldane (d) Both (a) and (b)

97. A forms hcp lattice and B are occupying 1/3rd of tetrahedral voids, then the formula of compound is :

(a) AB (b) A_3B_2 (c) A_2B_3 (d) AB_4

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

(a) Hydrogen (b) Carbon dioxide (c) Methane (d) N_2O

99. During the dehydration of alcohols to alkenes by heating with cone. H_2SO_4, the initiating step is :

(a) Elimination of water (b) Protonation of an alcohol molecule

(c) Formation of an ester (d) Formation of carbocation

100. In Clemmensen reduction, compound is treated with :

(a) Zinc amalgam + HCl (b) Sodium amalgam + HCl

(c) Zinc amalgam + HNO_3 (d) Sodium amalgam + HNO_3

Directions : In the following questions (101–120), a statement of assertion is followed by a statement of reason. Mark the correct choice as :

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) If assertion is true but reason is false.

(d) If both assertion and reason are false.

101. **Assertion :** Co(IV) is known but Ni(IV) is not.

Reason : Ni(IV) has d^4 electronic configuration.

102. **Assertion :** The correct order of oxidising power is :

$$VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$$

Reason : The oxidation state of Mn is +7.

103. **Assertion :** O_2 has higher bond length than O_3.

Reason : O_3 is paramagnetic.

104. **Assertion :** Insulin is water soluble.

Reason : Insulin is a globular protein.

105. **Assertion :** Monoclinic sulphur is an example of monoclinic crystal system.

Reason : For a monoclinic system $a \neq b \neq c$ and $\alpha = \gamma = 90°, \beta \neq 90°$.

106. **Assertion :** Chemistry of actinoids is more complicated than lanthanoids.

Reason : Actinoid elements are radioactive.

107. **Assertion :** Coagulation power of Al^{3+} is more than Na^+.

Reason : Greater the valency of the flocculating ion added, greater is its power to cause precipitation (Hardy-Schulze rule).

108. **Assertion :** Mixture of CH_3COOH and CH_3COONH_4 is an example of acidic buffer.

Reason : Acidic buffer contains equimolar mixture of weak acid and its salt with weak base.

109. **Assertion :** Al becomes passive in cone. HNO_3.

Reason : Cone. HNO_3 has no action on aluminium metal.

110. **Assertion :** Chloroform is stored in dark coloured bottles.

Reason : Chronic chloroform exposure may cause damage to liver and kidneys.

111. **Assertion :** Saturated hydrocarbons are chemically less reactive.

Reason : All isomeric paraffins have same parent name.

112. **Assertion :** $(CH_3)_3CCOOH$ does not give HVZ reaction.

Reason : $(CH_3)_3CCOOH$ does not have a-hydrogen atom.

113. **Assertion :** An ideal solution obeys Raoult's Law

Reason : In an ideal solution, solute-solute as well as solvent-solvent interactions are similar to solute-solvent interactions.

114. **Assertion :** All the hydrogen atoms in $CH_2 = C = CH_2$ lie in one plane.

Reason : All the carbon atoms in its are sp^2 hybridized.

115. **Assertion :** Conductivity of all electrolytes decreases on dilution.

Reason : On dilution number of ions per unit volume decreases.

116. **Assertion :** Permanent hardness of water is removed by treatment with washing soda.

Reason : Washing soda reacts with soluble calcium and magnesium chlorides and sulphates in hard water to form insoluble carbonates.

117. **Assertion :** Linkage isomerism arises in coordination compounds containing ambidentate ligand.

Reason : Ambidentate ligand has two different donor atoms.

118. **Assertion :** Ortho and para-nitrophenol can be separated by steam distillation.

Reason : Para-nitrophenol is steam volatile due to intramolecular hydrogen bonding.

119. **Assertion :** Natural rubber is a polymer of isoprene.

Reason : isoprene is a pentene.

120. **Assertion :** H_3PO_3 is dibasic acid.

Reason : Two hydrogen atoms are directly attached to the P.

BIOLOGY

SECTION – III

121. Phenetic classification is based on

(a) sexual characteristics

(b) the ancestral lineage of existing organisms

(c) observable characteristics of existing organisms

(d) dendograms based of DNA characteristics

122. African sleeping sickness is due to

(a) *Plasmodium vivax* transmitted by Tse tse fly

(b) *Trypanosoma lewsii* transmitted by Bed Bug

(c) *Trypanosoma gambiense* transmitted by Glossina palpalis

(d) *Entamoeba gingivalis* spread by Housefly.

123. The "walking" fern is so named because

(a) It is dispersed through the agency of walking animal

(b) It propagates vegetatively by its leaf tips

(c) it knows how to walk by itself

(d) its spores are able to walk

124. A bacterium divides every 35 minutes. If a culture containing 10^5 cells per ml is grown for 175 minutes, what will be the cell concentration per ml after 175 minutes?

(a) 5×10^5 cells (b) 35×10^5 cells (c) 32×10^5 cells (d) 175×10^5 cells

125. A child of blood group O can not have parents of blood group

(a) AB and AB/O (b) A and B (c) B and B (d) O and O

126. On selfing a plant of F_1 generation with genotype "AABbCC" the genotypic ratio in F_2 generation will be

(a) 3:1 (b) 1:2:1 (c) 9:3:3:1 (d) 27:9:9:9:3:3:3:1

127. The following ratio is generally constant for a given species:

(a) $\frac{A+G}{C+T}$ (b) $\frac{T+C}{G+A}$ (c) $\frac{G+C}{A+T}$ (d) $\frac{A+C}{T+G}$

128. DNA elements which can which their position are called

(a) Exons (b) Introns (c) Cistrons (d) Transposons

129. Aril represents the edible part of

(a) Banana (b) Litchi (c) Mango (d) Apple

130. Bicarpellary gynoecium and oblique ovary occurs in

(a) Mustard (b) Banana (c) Pisum (d) Brinjal

131. Main function lenticel is

(a) transpiration (b) Guttation (c) gaseous exchange (d) bleeding

132. A common structure feature of vessel elements and sieve tube elements are

(a) pores on lateral walls (b) presence of p-protein

(c) enucleate condition (d) thick secondary condition

133. Suppose an aquatic plant is placed in a test tube containing distilled water and the tube is stoppered. The tube is left outdoors for 24 hours and the pH value of the water is then measured at regular intervals. Which of the following is the most probable result?

(a) The pH value is lowest just before sunrise (b) The pH value is highest just before sunrise

(c) The pH value is lowest at noon (d) The pH value is lowest just before sunset

134. Which one of the following statements is correct?

(a) Both Azotobacter and Rhizobium fix atmospheric nitrogen in root nodules of plants

(b) Cyanobacteria such as Anabaena and Nostoc are important mobilizers of phosphates and for plant nutrition in soil

(c) At present it is not possible to grow maize without chemical fertilizers

(d) Extensive use of chemical fertilizers may lead to eutrophication of nearby water bodies.

135. As compared to a C_3 – plant, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C_4 – plants?

(a) two (b) six (c) twelve (d) zero

136. How many ATP molecules could maximally be generated from one molecule of glucose, if the complex oxidation of one mole of glucose to CO_2 and H_2O yield 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal?
(a) Thirty (b) Fifty seven (c) One (d) Two

137. The arrangement of the nuclei in a normal embryo sac in the dicot plants is
(a) 3 + 2 + 3 (b) 2 + 3 + 3 (c) 3 + 3 + 2 (d) 2 + 4 + 2

138. In which one pair both the plants can be vegetatively propagated by leaf pieces?
(a) *Agave* and *Kalanchoe* (b) *Bryophyllum* and *Kalanchoe*
(c) *Asparagns* and *Bryophyllum* (d) *Chrysanthemum* and *Agave*

139. How does pruning help in making the hedge dense?
(a) It free axillary buds from apical dominance
(b) The apical shoot grows faster after pruning
(c) It releases wound hormones
(d) It induces the differentiation of new shoots from the rootstock

140. In an ecosystem, which one shows one-way passage
(a) Free energy (b) Carbon (c) Nitrogen (d) Potassium

141. Sound becomes hazardous noise pollution at level
(a) Above 30 dB (b) Above 80 dB (c) Above 100 dB (d) Above 120 dB

142. Golden rise is a transgenic crop of the future with the following improved trait:
(a) Insect resistance (b) High lysine (essential amino acid) content
(c) high protein content (d) high vitamin – A content

143. Which one of the following is non-symbiotic biofertiliser?
(a) *Azotobacter* (b) *Anabaena* (c) *Rhizobium* (d) VAM

144. First life on earth was
(a) Cyanobacteria (b) Chemoheterotrophs (c) Autotrophs (d) Photoautotrophs

145. During its life – cycle, *fasciola hepatica* (liver fluke) infects its intermediate host and primary host at the following larval stages respectively:
(a) Miracidium and metacercaria (b) redia and Miracidium
(c) cercaria and redia (d) metacercaria and cercaria

146. Most appropriate term to describe the life cycle of Obelia is

(a) Metagenesis (b) Metamorphosis

(c) Alternation of generations (d) Neoteny

147. Association between Sucker Fish (Remora) and Shark is

(a) Commensalism (b) Symbiosis (c) Predation (d) Parasitism

148. Total number of meiotic divisions required for forming 100 zygotes/100 grains of wheat is

(a) 100 (b) 75 (c) 125 (d) 50

149. A drop of each of the following, is placed separately on four slides. Which of them will not coagulate?

(a) blood serum

(b) sample from the thoracic duct of lymphatic system

(c) whole blood from pulmonary vein

(d) blood plasma.

150. Brunner's gland is the characteristic feature of

(a) jejunum of small intestine (b) ileum

(c) duodenum (d) fundic region of stomach

151. Haemoglobin is

(a) an oxygen carrier in human blood (b) a protein used as food supplement

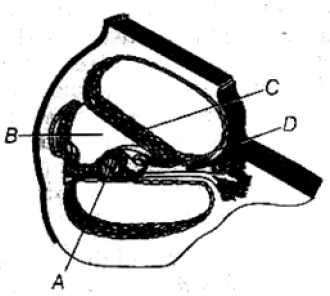
(c) an oxygen scavenger in root nodules (d) a plant protein with high lysine content

152. Prodocytes occur in

(a) large intestine (b) Glomerulus of kidney

(c) loop of Henle (d) collecting duct

153. Which of the following is correctly labelled?



(a) A – Reissner's membrane

(b) B – Scala vestibule

(c) C – Basilar membrane

(d) D – Tectorial membrane

154. Biomagnification can be defined as

(a) decomposition of organic waste in water by the action of microbes

(b) breeding of crops that are rich in minerals, good proteins and heating fats

(c) increase in concentration of the toxicant at successive trophic levels

(d) exploring the products of economic importance at molecular, genetic and species level diversity

155. The 24 hour (diurnal) rhythm of our body such as the sleep-wake cycle is regulated by the hormone

(a) Calcitonin (b) prolactin (c) adrenaline (d) melatonin

156. Progestasert and LNG – 20 are

(a) implants (b) copper releasing IUDs

(c) non – medicated IUDs (d) hormone releasing IUDs

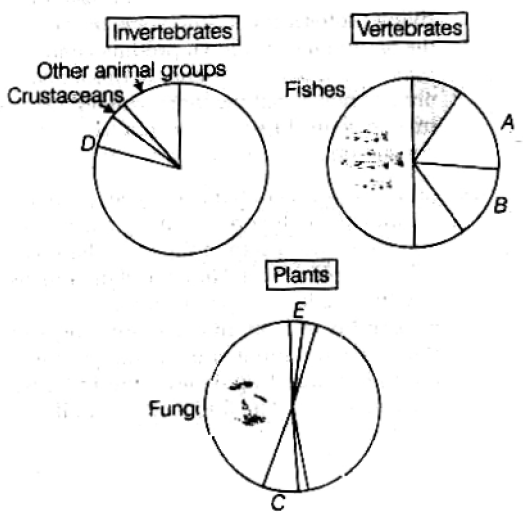
157. Cessation of menstrual cycle in women is called

(a) menopause (b) lactation (c) ovulation (d) parturition

158. The contractile element present in a striated muscle fibril, between in a striated muscle fibril, between two successive Z-lines, called

(a) sarcomere (b) sarcoplasm (c) sarcosomes (d) All of these

159. Refer to the following figure representing global biodiversity. Indentify A-E and choose the correct option.



	A	*B*	*C*	*D*	*E*
(a)	Birds	Reptiles	Algae	Molluscs	Mosses
(b)	Mammals	Birds	Lichens	Molluscs	Mosses
(c)	Birds	Amphibbians	Mosses	Insects	Algae
(d)	Birds	Reptiles	Algae	Insects	Mosses

160. Arrange in correct order according to the given figures.

(a) A – Imbricate, B – Quincuncial, C- Valvate

D – Twisted, E – Vexillary

(b) A – Vexillary, B – Valvate, C – Twisted.

D – Imbricate, E – Quincuncial

(c) A – Quincuncial, B – Twisted, C – Vexillary

D – Imbricate, E – Valvate

(d) A – Valcate, B – Twisted, C – Imbricate,

D – Quincuncial, E = Vexillary

Directions : In the following questions (161–180), a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

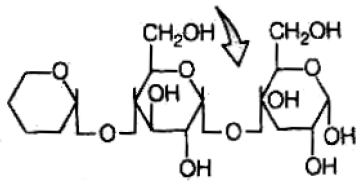
(c) Assertion is true, but Reason is false

(d) Both Assertion and Reason are false

161. Assertion (A) Urinary bladder is lined by transitional epithelium.

Reason (R) Transitional epithelium keeps the size of the urinary bladder constant at all times.

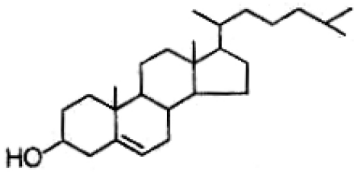
162. Assertion (A) The structure given below contains a, 1-4 glycosidic bonds.



Reason (R) This is a polysaccharide and has right end as reducing end and its left end is called the non-reducing end.

(a) A (b) B (c) C (d) D

163. Assertion (A) The structure given is the most important animal steroid which is insoluble in water and chemically unreactive.



Reason (R) It is important because it is a structural component of cells.

(a) A (b) B (c) C (d) D

164. Assertion (A) Interphase is resting stage.

Reason (R) The interphase cell is metabolically very active.

165. Assertion (A) Photomodulation of flower is Phytochrome regulated process.

Reason (R) Active form of Phytochrome (Pfr) directly induces floral induction in shoot buds.

166. Assertion (A) Tongue is a gustatoreceptor.

Reason (R) Receptors for gustatosensation are located in taste buds.

167. Assertion (A) In recombinant DNA technology, human genes are often transferred into bacteria (prokaryotes) or yeast (eukaryotes).

Reason (R) Both bacteria and yeast multiply very fast to form huge population which express the desired gene.

168. Assertion (A) *Agrobacterium tumefaciens* is a popular genetic engineer because this bacterium is associated with the roots of all cereal and pulse crops.

Reason (R) A gene incorporated in the bacterial chromosomal genome gets automatically suppressed into the crop with which the bacterium is associated.

169. Assertion (A) Interspecific competition is the only potent force in organic evolution.

Reason (R) Unexceptionally two closely related species competing for the same resource cannot coexist indefinitely.

170. Assertion (A) With few exceptions tropics harbour more species than temperate or polar areas.

Reason (R) Species diversity decreases as we move away from the equator towards the poles.

171. Assertion (A) Aflatoxins are produced by *Aspergillus flavus*.

Reason (R) These toxins are useful to mankind.

172. Assertion (A) Birds have one ovary.

Reason (R) This reduces the body weight for flight.

173. Assertion (A) Ginger has a prostrate growing rhizome.

Reason (R) Shoot growth is not affected by the gravity.

174. Assertion (A) Mitochondria and chloroplasts are semiautonomous organelles.

Reason (R) They are formed by division of pre-existing organelles as well as contain DNA but lack protein synthesising machinery.

175. Assertion (A) Glucose is the favoured respiratory substrate.

Reason (R) When glucose is used as respiratory substrate, it is completely oxidised and RQ is 1.

176. Assertion (A) Large intestine also shows the presence of villi like small intestine.

Reason (R) Absorption of water, some salts are drugs is done by inner wall of large intestine.

177. Assertion (A) Granulocytes are white blood cells.

Reason (R) They contain lobed nuclei and tiny granules.

178. Assertion (A) Maize is an albuminous seed.

Reason (R) It's endoperm is completely absorbed by its growing embryo.

179. Assertion (A) In plant tissue culture, somatic embryos can be induced from any plant cell.

Reason (R) Any viable plant cell can differentiate into somatic embryos.

180. Assertion (A) Mitochondria help in photosynthesis.

Reason (R) Mitochondria have enzymes for dark reaction.

GENERAL KNOWLEDGE

SECTION – IV

181. The Dandi March by Gandhiji began on :
(a) 12th March, 1930 (b) 1st March, 1930 (c) 26th January, 1930 (d) 10th May, 1930

182. Who was the first Home Minister of India after independence?
(a) Dr. V.V. Girl (b) Dr. Zakir Hussain
(c) Morarji Desai (d) Sardar Vallabhbhai Patel

183. Which of the following is an outcome of the rotation of the earth?
(a) Eclipse (b) Gravitation force (c) Coriolis force (d) Tidal force

184. Aluminium oxide is a/an :
(a) Basic oxide (b) Amphoteric oxide (c) Neutral oxide (d) Acidic oxide

185. The Forward Bloc was founded by :
(a) Bhagat Singh (b) Jai Prakash Narayan
(c) Subhas Chandra Bose (d) Ram Manohar Lohia

186. World Environment Day is celebrated on :
(a) June 5 (b) October 5 (c) July 7 (d) March 7

187. Who wrote 'Indica'?
(a) Vishakhadatta (b) Chanakya (c) Ashoka (d) Megasthenes

188. Kalachakra ceremony is associated with :
(a) Jainism (b) Buddhism (c) Sikhism (d) Din-e-ilahi

189. Which of the following states does not have an Upper House (Vidhan Parishad)?
(a) Andhra Pradesh (b) Bihar (c) Uttar Pradesh (d) Odisha

190. Who wrote 'Natya Shastra'?
(a) Bharata Muni (b) Ravi Shankar (c) Kalidasa (d) Manmohan Ghosh

191. In which year did the adult suffrage change from 21 to 18 in India?
(a) 1978 (b) 2000 (c) 1989 (d) 1984

192. Who was the first woman Prime Minister in the world?
(a) Indira Gandhi (b) Gold Meir
(c) Margaret Thatcher (d) Sirimavo Bandaranaike

193. Who presides over the joint session of Lok Sabha and Rajya Sahha?
(a) President (b) Vice President (c) Speaker (d) Chief Justice

194. Which of the following authorities, has the right to issue 'aadhar card' to the residents of India?
(a) Intelligence Bureau (b) Planning Commission
(c) State Government (d) Election Commission

195. In which city Ashoka Pillar is believed to have originated?
(a) Varanasi (b) Sanchi (c) Sarnath (d) Vaishali

196. Who has won Nobel Prize award twice?
(a) Marie Curie (b) Neil Bohr (c) Ernest Rutherford (d) Albert Einstein

197. Maximum sugarcane production occurs in which country?
(a) India (b) China (c) Brazil (d) Indonesia

198. What is the full form of GST bill passed by parliament?
(a) Goods and Service Tax (b) Grand Sports Tourer
(c) Gnome System Tools (d) General Set Theory

199. The famous Kashi Vishwanath temple at Varanasi is dedicated to which Hindu god?
(a) Lord Shiva (b) Lord Vishnu (c) Lord Brahma (d) Lord Krishna

200. In which country is 'Pali' language taught?
(a) Myanmar (b) Malaysia (c) Vietnam (d) China

ANSWER KEY

PHYSICS									
1	2	3	4	5	6	7	8	9	10
A	A	B	B	A	D	A	B	D	C
11	12	13	14	15	16	17	18	19	20
B	B	C	C	B	B	C	A	A	B
21	22	23	24	25	26	27	28	29	30
B	B	A	A	A	A	B	B	B	A
31	32	33	34	35	36	37	38	39	40
C	B	D	C	B	B	B	C	B	B
41	42	43	44	45	46	47	48	49	50
A	A	B	A	B	A	A	A	C	D
51	52	53	54	55	56	57	58	59	60
B	A	D	A	A	A	A	A	A	A
CHEMISTRY									
61	62	63	64	65	66	67	68	69	70
C	D	B	C	A	A	A	B	A	B
71	72	73	74	75	76	77	78	79	80
A	A	A	A	D	A	A	B	D	C
81	82	83	84	85	86	87	88	89	90
B	A	B	A	D	C	D	B	C	A
91	92	93	94	95	96	97	98	99	100
D	C	B	A	D	B	B	C	B	A
101	102	103	104	105	106	107	108	109	110
D	B	D	B	A	B	A	D	C	B
111	112	113	114	115	116	117	118	119	120
B	A	A	D	A	A	A	C	C	C
BIOLOGY									
121	122	123	124	125	126	127	128	129	130
C	C	B	C	A	B	C	D	B	D
131	132	133	134	135	136	137	138	139	140
A	C	A	D	C	B	A	B	A	A
141	142	143	144	145	146	147	148	149	150
B	D	A	B	B	A	A	C	A	C
151	152	153	154	155	156	157	158	159	160
A	B	D	C	D	D	A	A	A	D
161	162	163	164	165	166	167	168	169	170
C	A	A	B	C	B	A	D	D	A
171	172	173	174	175	176	177	178	179	180
C	A	C	C	A	D	B	C	A	D
GENERAL KNOWLEDGE									
181	182	183	184	185	186	187	188	189	190
A	D	C	B	C	A	D	B	D	A
191	192	193	194	195	196	197	198	199	200
C	D	C	B	C	A	C	A	A	A