



NTPL

ALL INDIA TEST SERIES

CODE - A

TEST ID 001916

AIIMS - 2019

FULL TEST - 9

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 electron in a hydrogen atom makes a transition $n_1 \rightarrow n_2$ where n_1 and n_2 are the principal quantum numbers of the two states. Assume the Bohr model to be valid. The time period of the electron in the initial state is eight times that in the final state. What are the possible values of n_1 and n_2 ?
- (a) $n_1 = 1, n_2 = 3, n_1 = 2, n_2 = 6$ and so on (b) $n_1 = 1, n_2 = 2, n_1 = 2, n_2 = 4$ and so on
(c) $n_1 = 2, n_2 = 1, n_1 = 4, n_2 = 2$ and so on (d) $n_1 = 2, n_2 = 3, n_1 = 3, n_2 = 6$ and so on
2. Two identical bar magnets each of length L and pole strength m are placed at right angles to each other with the north pole of one touching the south pole of the other. Magnetic moment of the system will be
- (a) $\frac{mL}{2}$ (b) $\frac{mL}{3}$ (c) $\frac{mL}{\sqrt{2}}$ (d) $(\sqrt{2})mL$
3. A concave mirror of focal length 10 cm and a convex mirror of focal length 15 cm are placed facing each other 40 cm apart. A point object is placed between the mirrors, on their common axis and 15 cm from concave mirror. The position of image produced by the successive reflection first on concave mirror then at convex mirror is
- (a) 10 cm behind the convex mirror (b) 6 cm in front of the convex mirror
(c) 6 cm behind the convex mirror (d) 10 cm in front of the convex mirror
4. A leaky parallel plate capacitor is filled completely with a material having dielectric constant $K = 5$ and electrical conductivity $\sigma = 7.4 \times 10^{-12} \Omega^{-1} m^{-1}$. If the charge on the plate at the instant $t = 0$ is $q = 8.85 \mu C$, then the leakage current at the instant $t = 12$ sec will be
- (a) $1.23 \mu A$ (b) $0.2 \mu A$ (c) $0.1 \mu A$ (d) $1.56 \mu A$
5. An AC source of angular frequency ω is fed across a resistor R and a capacitor C in series. The current registered is 1. If now the frequency of the source is changed to $\omega/3$ (but maintaining the same voltage), the current in the circuit is found to be halved. The ratio of reactance to resistance at the original frequency ω will be
- (a) $\sqrt{\frac{5}{7}}$ (b) $\sqrt{\frac{6}{11}}$ (c) $\sqrt{\frac{2}{9}}$ (d) $\sqrt{\frac{3}{5}}$

6. Two guns, situated on the top of a hill of height 10 m, fire one shot each with the same speed $5\sqrt{3}$ m/sec at some interval of time. One gun fired horizontally and other fires upward at an angle of 60° with the horizontal. The shots collide in air at point, the time interval between the firings is
 (a) 3 sec (b) 2 sec (c) 1 sec (d) 4 sec
7. What is increased in a step down transformer?
 (a) wattage (b) current (c) voltage (d) nothing
8. Lines of constant dip are called
 (a) isoclinic lines (b) isodynamic lines (c) isogonic lines (d) isobaric lines
9. An electron and a proton of equal momentum enter a uniform magnetic field normal to the lines of force. If the radii of their paths be r_e and r_p respectively then
 (a) $\frac{r_e}{r_p} = \sqrt{\frac{m_p}{m_e}}$ (b) $\frac{r_e}{r_p} = \frac{m_p}{m_e}$ (c) $\frac{r_e}{r_p} = 1$ (d) $\frac{r_e}{r_p} = \sqrt{\frac{m_e}{m_p}}$
10. The e.m.f. of a cell is E volt and internal resistance is $r\Omega$. The resistance in external circuit is also $r\Omega$. The p.d. across the cell will be
 (a) $2E$ (b) $\frac{E}{2}$ (c) E (d) $\frac{E}{4}$
11. In an achromatic doublet
 (a) convex lens is made of flint glass (b) concave lens is made of crown glass
 (c) convex lens is made of crown glass (d) both the lenses are made of the same glass
12. The horizontal range of a projectile is $4\sqrt{3}$ times its maximum height. The angle of projector is
 (a) 60° (b) 45° (c) 30° (d) none of these
13. The current gain of a transistor in common base circuit is 0.98. What change in collector current is to be produced in order to produce a change of 5 mA in emitter current?
 (a) 4.9 mA (b) 2.45 mA (c) 0.196 mA (d) 5.1 mA
14. The binding forces in a metallic crystal are
 (a) magnetic forces (b) Van der Waal forces of attraction
 (c) electrostatic forces of attraction (d) covalent forces
15. The mass of helium nucleus is less than that of its constituent particles by 0.03 amu. The binding energy per nucleon of ${}_2\text{He}^4$ nucleus will be
 (a) 3.5 MeV (b) 14 MeV (c) 7 MeV (d) 21 MeV

16. A radiation worker receives a total dose equivalent of $450 \mu S_v$ during a working week of 30 hour. Calculate the average dose equivalent rate
(a) $15 \mu S_v$ per hour (b) $15 S_v$ per minute (c) $45 S_v$ per second (d) none of these
17. The ratio of the radii of sulphur and helium atoms in the ground state will be
(a) $1:\sqrt{8}$ (b) 1:4 (c) 1:8 (d) 1:3
18. The energy of a photon is 3×10^{-19} joule. Its momentum is
(a) 10^{-11} kg-m/sec (b) 9×10^{-11} kg-m/sec (c) 10^{-27} kg-m/sec (d) 3×10^7 kg-m/sec
19. In Milliken's oil drop experiment, a charged drop of mass 1.8×10^{-14} kg is stationary between the plates. The distance between the plates is 0.90 cm and potential difference between them is 2.0 kV. The number of electrons on the drop is
(a) 5 (b) 50 (c) 500 (d) 0
20. On increasing the length of microscope tube, its magnifying power will
(a) decrease (b) remain unchanged (c) increase (d) become zero
21. The spectrum of the sun is
(a) line emission and continuous absorption (b) line emission
(c) line absorption (d) continuous emission and line absorption
22. A person can not see the objects beyond 50 cm. The power of a lens to correct this vision will be
(a) + 5D (b) – 2D (c) + 2D (d) 0.5D
23. The frequency from 3×10^9 Hz to 3×10^{10} Hz is
(a) metro high frequency band (b) super high frequency band
(c) high frequency band (d) very high frequency band
24. The average power dissipation in a pure capacitor in A.C. circuit is
(a) $2CV^2$ (b) zero (c) $\frac{1}{2}CV^2$ (d) CV^2
25. A metal conductor of length 1 m rotates vertically about one of its ends at angular velocity 5 radian per second. If the horizontal component of earth's magnetic field is $0.2 \times 10^{-4} T$, the e.m.f. developed between the two ends of the conductor is
(a) 50 mV (b) $5 \times 10^{-4} V$ (c) 5 mV (d) $50 \mu V$
26. Research in nuclear and atomic physics caused the invention of
(a) nuclear bombs (b) generators (c) motors (d) hydraulic machines

27. The value of $\frac{d}{dx}(x^2)$ is equal to
(a) $2x$ (b) $\frac{x}{2}$ (c) x (d) x^2
28. The mass and volume of a body are respectively 22.42 g and 4.7 cm^3 and the errors in their measurements are 0.01 g and 0.1 cm^3 . The maximum error in the measurement of density will be
(a) 7% (b) 2.17% (c) 0.2% (d) 10%
29. A car covers the first half of the distance between two places at a speed of 40 km/h and the other half at 60 km/h. The average speed of the car is
(a) 50 km/h (b) 48 km/h (c) 40 km/h (d) 60 km/h
30. A helicopter is climbing vertically with a velocity of 15 ms^{-1} , when an object is released from it. If the object hits the ground 4s later, the velocity of the object as it hits the ground is
(a) 55 ms^{-1} downwards (b) 25 ms^{-1} downwards (c) 0 (d) none of the above
31. The resultant of $\vec{A} \times \vec{0}$ will be equal to
(a) zero vector (b) zero (c) A (d) unit vector
32. The angle between the two vectors $\vec{A} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{B} = 3\hat{i} + 4\hat{j} - 5\hat{k}$ will be
(a) 90° (b) 45° (c) zero (d) 180°
33. A rod of mass 5 kilogram is used to push from rest a block of mass 15 kg on a frictionless surface. The block moves a distance of 2 metre in 2 second. The net force acting on the stick is
(a) 15 newton (b) 10 newton (c) 5 newton (d) 20 newton
34. When an elevator cabin falls down, the cabin and all the bodies fixed in the cabin are accelerated with respect to
(a) man standing in the cabin (b) ceiling of the elevator
(c) floor of the elevator (d) man standing on the earth
35. A particle of mass $4.65 \times 10^{-26} \text{ kg}$ moving towards the wall of a vessel with a velocity of 600 m/s strikes the wall of the vessel at an angle 60° to the normal and rebounds at the same angle at the same speed. Find the impulse of the force received by the wall during the impact
(a) 2.79×10^{-25} newton (b) 2.79×10^{-23} newton-sec
(c) zero (d) 4×10^{-20} newton-sec

36. Machine of a constant power makes a body move on a straight path. The distance s traveled in t second is proportional to
(a) $t^{3/2}$ (b) t^3 (c) $t^{1/2}$ (d) t^2
37. The mass of an electron is 9.1×10^{-31} kg. Positron also has the same mass. On meeting they compose a photon by annihilation. What is the energy of photon? ($c = 3 \times 10^8$ m/s)
(a) 100 eV (b) 10 MeV (c) 1 keV (d) 1.02 MeV
38. If the value of g at the surface of the earth is 9.8 m/s^2 , then the value of g at a place 480 km above the surface of the earth will be (Radius of the earth is 6400 km)
(a) 7.2 m/s^2 (b) 9.8 m/s^2 (c) 8.4 m/s^2 (d) 4.2 m/s^2
39. The intensity of earth's gravitational field at a point situated at a distance of 7400 km from the centre of the earth is 1.5 newton/kg. What is the gravitational potential at the point?
(a) $+1.11 \times 10^7 \text{ joule kg}^{-1}$ (b) $5 \times 10^6 \text{ joule kg}^{-1}$
(c) $10 \times 10^7 \text{ joule kg}^{-1}$ (d) $-1.11 \times 10^7 \text{ joule kg}^{-1}$
40. How much of heat is required to heat 2 mole of a monoatomic ideal gas from 0°C to 100°C if no mechanical work is done during heating. The specific heat of gas at constant pressure is $2.5R$, R is the universal gas constant
(a) 378.6 cal (b) 728.2 cal (c) 592.8 cal (d) 417.1 cal

Instruction for Q. No. 41 to 60

Direction : Each of the questions given below consists of two statements, an assertions (A) and reason (R). Select the number corresponding to the appropriate response in the answer sheet as follows.

- (a) If both assertion and reason are true and the reason is a correct explanation of the assertion
(b) If both assertion and reason are true but the reason is not a correct explanation of the assertion
(c) If the assertion is true, but the reason is false
(d) If both assertion and reason are false
41. **Assertion (A)** : If a convex lens of glass is immersed in water its power decreases.
Reason (R) : In water it behaves as a concave lens.
42. **Assertion (A)** : The power factor in a series resonance circuit is unity.
Reason (R) : In case of series resonance the inductive and capacitive reactances are equal.
43. **Assertion (A)** : When a current is drawn from a cell, there is a fall in potential differences across its terminals.
Reason (R) : Every cell has internal resistance.

44. **Assertion (A)** : Ammeter is always connected in series with a circuit to measure the current flowing through it.
Reason (R) : Ammeter has very low resistance.
45. **Assertion (A)** : During boiling, if an amount dQ of heat is absorbed, pdV is the work done by the system, then $dQ = pdV$
Reason (R) : Boiling is an isothermal process, So $dU = 0$ in equation $dQ = dU + pdV$, which is based on first law of thermodynamics.
46. **Assertion (A)** : When one mole of an ideal gas expands under adiabatic condition so that its state changes from (P_1, V_1, T_1) to (P_2, V_2, T_2) , the work done by the gas is given by $\Delta W = C_v(T_1 - T_2)$.
Reason (R) : During adiabatic expansion $\Delta Q = 0$ and $\Delta U = C_v(T_2 - T_1)$ in the expression $\Delta Q = \Delta U + \Delta W$.
47. **Assertion (A)** : A beam of light which emerges from a convex lens must be convergent.
Reason (R) : A convex lens is a converging lens while a concave lens is diverging lens, whatever may be the medium in which they are placed.
48. **Assertion (A)** : When light passes from one medium to another of different density the only quantity which is unchanged is its wavelength.
Reason (R) : The wavelength of light is not related to the refractive index of the medium.
49. **Assertion (A)** : α - particles produce more intense ionization than β - particles.
Reason (R) : α - particles are positively charged.
50. **Assertion (A)** : Lightning conductors protect buildings from damage.
Reason (R) : These send off the charge to earth.
51. **Assertion (A)** : Two bodies of unequal masses dropped from the same height hit the ground with equal kinetic energies.
Reason (R) : The force gravity acting on them are equal.
52. **Assertion (A)** : If the law of gravitation becomes inverse cubelaw even then a line joining the Sun and the planet sweeps equal areas in equal time intervals.
Reason (R) : A planet moves in an elliptical path.
53. **Assertion (A)** : A telescopic objective is rendered achromatic by cementing a convex lens of crown glass and a concave lens of flint glass.
Reason (R) : A convex lens produces greater chromatic aberration than a concave lens.
54. **Assertion (A)** : A solid floats in a liquid so that it is just submerged. When the liquid is heated the solid sinks to the bottom.
Reason (R) : Weight of the solid increases with the rise in temperature.

55. **Assertion (A) :** The resistance of a platinum wire increases as temperature is raised.
Reason (R) : This is because the length of the wire increases as the temperature is raised.
56. **Assertion (A) :** When a dielectric medium is filled between the plates of a condenser, its capacitance increases.
Reason (R) : The dielectric medium reduces the potential difference between the plates of the condenser.
57. **Assertion (A) :** A thin polythene bag weighs the same when empty and when filled with air at atmospheric pressure.
Reason (R) : Air is weightless
58. **Assertion (A) :** A balloon stops rising after attaining a certain maximum height.
Reason (R) : Upthrust due to air decreases with height till it just balances the weight of the balloon.
59. **Assertion (A) :** In series A.C. circuit, the voltage across the combination of capacitor and inductor is zero at resonance.
Reason (R) : At series resonance the current in the circuit is zero.
60. **Assertion (A) :** It is necessary to use artificial satellite for long distance TV transmission.
Reason (R) : Ionospheric disturbances are minimised by satellite communication.

CHEMISTRY**SECTION – II**

61. The radius of the nucleus is related to the mass number A by:
(a) $R = R_0 A^2$ (b) $R = R_0 A$ (c) $R = R_0 A^{1/2}$ (d) $R = R_0 A^{1/3}$.
62. Which of the following species has the highest ionization energy ?
(a) Al^+ (b) Mg^+ (c) Li^+ (d) Ne.
63. As per the modern periodic law the physical and chemical properties of elements are periodic function of their:
(a) atomic weight (b) electronic configuration
(c) atomic volume (d) atomic size.
64. The pH of a solution is increased from 3 to 6. Its H^+ ion concentration will be:
(a) reduced by 1000 times (b) doubled
(c) reduced to half (d) increased by 1000 times.
65. Silver chloride dissolves in excess of NH_4OH . The cation present in this solution is:
(a) $[Ag(NH_3)_4]^+$ (b) $[Ag(NH_3)_2]^+$ (c) Ag^+ (d) $[Ag(NH_3)_6]^+$.
66. Be^{2+} is isoelectronic with:
(a) Li^+ (b) Na^+ (c) Mg^{2+} (d) H^+ .
67. The cell reaction of a cell is $Mg_{(s)} + Cu^{2+}_{(aq)} \rightarrow Cu_{(s)} + Mg^{2+}_{(aq)}$. If the standard reduction potentials of Mg and Cu are -2.37 and $+0.34$ V respectively. The EMF of the cell is:
(a) $+2.71$ V (b) -2.03 V (c) $+2.03$ V (d) -2.71 V.
68. 4.5 mole each of H_2 and I_2 are heated in a sealed ten litre vessel. At equilibrium 3 mole of HI were found. The equilibrium constant for $H_2 + I_2 \rightleftharpoons 2HI$ is:
(a) 5 (b) 10 (c) 1 (d) 0.33.
69. Mortar is a mixture of:
(a) $CaCO_3 + Silica + H_2O$ (b) slaked lime + plaster of pairs + H_2O
(c) plaster of pairs + silica (d) slaked lime + silica + H_2O .
70. The number of moles of AgCl precipitated when excess of $AgNO_3$ is added to one mole of $[Cr(NH_3)_4Cl_2]Cl$ is:
(a) 2.0 (b) 1.0 (c) zero (d) 3.0.

71. A mixture contains four solid organic compounds A, B, C and D. On heating only C changes from solid to vapour state. C can be separated from rest in the mixture by:
- (a) fractional distillation (b) sublimation
(c) distillation (d) crystallisation.
72. The homologue of ethyne is:
- (a) C₃H₈ (b) C₂H₆ (c) C₂H₄ (d) C₃H₆.
73. By which of the following reactions can one get N-methyl aniline from aniline?
- (a) benzylation (b) acetylation (c) alkylation (d) bromination.
74. When an alkyl halides reacts with an alkoxide the product is:
- (a) ether (b) unsaturated hydrocarbon
(c) hydrocarbon (d) alcohol.
75. Acetaldehyde when treated with dilute NaOH gives :
- (a) $\text{CH}_3\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\text{CHO}$ (b) CH₃COOH
(c) CH₃CH₂OH (d) H₃C—CH₃.
76. C₂H₅CHO and (CH₃)₂CO can be distinguished by testing with:
- (a) fehling solution (b) hydroxylamine (c) phenyl hydrazine (d) sodium bisulphate.
77. Silica is soluble in:
- (a) H₂SO₄ (b) HNO₃ (c) HCl (d) HF.
78. The IUPAC name of: $\text{CH}_3-\underset{\text{Cl}}{\text{C}}=\underset{\text{CH}_3}{\text{C}}-\underset{\text{C}_2\text{H}_5}{\text{CH}}-\text{CH}_2-\text{C}\equiv\text{CH}$ is:
- (a) 2-chloro-4-ethyl-3-methyl-hept-2-en-6-yne (b) 6-chloro-4-ethyl-5-methyl-hept-1-yn-5-ene
(c) 6-chloro-4-ethyl-5-methyl-hept-5-en-1-yne (d) 2-chloro-4-ethyl-3-methyl-hept-6-yn-2-ene.
79. Gammexane is:
- (a) chloral (b) benzene hexachloride
(c) DDT (d) hexachloro ethane.
80. The ability of an ion to bring about coagulation of a given colloid depends upon:
- (a) magnitude of its charge (b) sign of its charge alone
(c) its size (d) both magnitude and sign of its charge.

81. The compound obtained by heating a mixture of a primary amine and chloroform with ethanoic potassium hydroxide (KOH) is:
- (a) an amide (b) an alkyl halide
(c) an alkyl isocyanide (d) an amide and nitro compound.
82. The function of enzymes in the living system is to:
- (a) catalyse biochemical reactions (b) provide immunity
(c) transport oxygen (d) provide energy.
83. ${}_{92}\text{U}^{235} + {}_0\text{n}^1 \longrightarrow$ Fission products + Neutron + 3.20×10^{-11} J. The energy released, when 1 gram of ${}_{92}\text{U}^{235}$ finally undergoes fission is:
- (a) 8.21×10^5 kJ (b) 18.60×10^9 kJ (c) 12.75×10^8 kJ (d) 6.55×10^6 kJ.
84. Which one of the following is used to make 'non stick' cookware?
- (a) polyethylene terephthalate (b) polystyrene
(c) PVC (d) polytetrafluoroethene.
85. Number of water molecules in Mohr's salt is :
- (a) 5 (b) 6 (c) 7 (d) 8
86. The poisonous gas that comes out with petrol burning in a car is:
- (a) CO_2 (b) C_2H_6 (c) CH_4 (d) CO .
87. Philosopher's wool when heated with BaO at 1100°C gives a compound. Identify the compound:
- (a) BaCdO_2 (b) $\text{Ba} + \text{ZnO}_2$ (c) BaZnO_2 (d) $\text{BaO}_2 + \text{Zn}$.
88. The lanthanide contraction is responsible for the fact that:
- (a) Zr and Hf have about the same radius (b) Zr and Nb have similar oxidation state
(c) Zr and Y have about the same radius (d) Zr and Zn have same oxidation state.
89. Which of the following 0.1 m aqueous solutions will have the lowest f.p. ?
- (a) KI (b) $\text{C}_5\text{H}_{10}\text{O}_5$ (c) $\text{Al}_2(\text{SO}_4)_3$ (d) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$.
90. Which of the following is redox reaction?
- (a) nitrogen oxides from nitrogen and oxygen by lightning
(b) in atmosphere, O_3 from O_2 by lightning
(c) H_2SO_4 with NaOH
(d) evaporation of water.

91. In a reaction $\text{CH}_2 = \text{CH}_2 \xrightarrow[\text{acid}]{\text{Hypochlorous}} \text{M} \xrightarrow{\text{R}} \begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$ M = Molecule, R = Reagent, M and R are:
- (a) $\text{CH}_3\text{CH}_2\text{OH}$ and HCl (b) $\text{CH}_2\text{Cl}-\text{CH}_2\text{OH}$ and aq. NaHCO_3
(c) $\text{CH}_3\text{CH}_2\text{Cl}$ and NaOH (d) $\begin{array}{c} \text{CH}_2-\text{CH}_2 \\ \diagdown \quad \diagup \\ \text{O} \end{array}$ and heat
92. Who developed long form of periodic table ?
(a) Mendeleev (b) Neils Bohr (c) Lothar Mayer (d) Moseley.
93. The product D of the reaction $\text{CH}_3\text{Cl} \xrightarrow{\text{KCN}} (\text{A}) \xrightarrow{\text{H}_2\text{O}} (\text{B}) \xrightarrow{\text{NH}_3} (\text{C}) \xrightarrow{\Delta} (\text{D})$ is:
(a) HCONH_2 (b) CH_3CN (c) $\text{CH}_3\text{CH}_2\text{NH}_2$ (d) CH_3CONH_2 .
94. The IUPAC name of $\text{K}_3[\text{Fe}(\text{CN})_6]$:
(a) potassium ferrihexacyanate (II) (b) potassium hexaferrocyanate (III)
(c) potassium ferrocyanide (II) (d) potassium hexacyanoferrate (III).
95. Among the following compound which have more than one type of hybridisation for carbon atom?
(i) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_3$ (ii) $\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CH}_3$
(iii) $\text{H}_2\text{C}=\text{CH}-\text{C}\equiv\text{CH}$ (iv) $\text{H}-\text{C}\equiv\text{C}-\text{H}$
(a) (iii) and (iv) (b) (i) (c) (ii) and (iii) (d) (iv)
96. If the equilibrium constant for the reaction $2\text{AB} \rightleftharpoons \text{A}_2 + \text{B}_2$ is 49. What is the value of equilibrium constant for $\text{AB} \rightleftharpoons \frac{1}{2}\text{A}_2 + \frac{1}{2}\text{B}_2$?
(a) 7 (b) 2401 (c) 49 (d) 0.02.
97. The reagent used for converting ethanoic acid to ethanol is:
(a) PCl_3 (b) BH_3 (c) LiAlH_4 (d) $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}^+$.
98. Compound A reacts with PCl_5 to get B which on treatment with KCN followed by hydrolysis gave propionic acid. What are A and B respectively?
(a) $\text{C}_2\text{H}_5\text{Cl}$ and $\text{C}_2\text{H}_5\text{Cl}_2$ (b) C_2H_6 and $\text{C}_2\text{H}_5\text{Cl}$
(c) C_3H_8 and $\text{C}_3\text{H}_7\text{Cl}$ (d) $\text{C}_2\text{H}_5\text{OH}$ and $\text{C}_2\text{H}_5\text{Cl}$.
99. In Wurtz reaction the reagent used is:
(a) Na/dry ether (b) Na/liq. NH_3 (c) Na (d) Na/dry alcohol .

100. Which one of the following reactions is an example for calcination process?

- (a) $2\text{ZnS} + 3\text{O}_2 \rightarrow 2\text{ZnO} + 2\text{SO}_2$ (b) $2\text{Zn} + \text{O}_2 \rightarrow 2\text{ZnO}$
(c) $2\text{Ag} + 2\text{HCl} + (\text{O}) \rightarrow 2\text{AgCl} + \text{H}_2\text{O}$ (d) $\text{MgCO}_3 \rightarrow \text{MgO} + \text{CO}_2$.

Instructions for Q. No. 101 to 120

Directions: Each of the questions given below consists of two statements, an assertion (A) and reason (R). Select the number corresponding to the appropriate response in the answer sheet as follows:

- (a) If both assertion and reason are true and the reason is a correct explanation of the assertion
(b) If both assertion and reason are true but the reason is not a correct explanation of the assertion
(c) If the assertion is true, but the reason is false
(d) If both assertion and reason are false

101. **Assertion (A)** : In case of degenerate orbitals if two electrons with opposite spins are placed in the same orbital, a state of high stability will be obtained.

Reason (R) : The most stable electronic arrangement is one in which there is maximum number of paired electrons in the degenerate set of orbitals.

102. **Assertion (A)** : In transition elements *ns* orbital is filled up first and $(n - 1) d$ afterwards, during ionization *ns* electrons are lost prior to $(n - 1) d$ electrons.

Reason (R) : The effective nuclear charge felt by $(n - 1) d$ electrons is higher as compared to that by *ns* electrons.

103. **Assertion (A)** : The carbonic acid is stronger acid than phenol.

Reason (R) : The hybrid of bicarbonate ion has two equivalent contributing structures, while hybrid of phenoxide ion does not contain such equivalent contributing structures.

104. **Assertion (A)** : Water has greater dipole-dipole attraction than hydrogen sulphide.

Reason (R) : Oxygen has higher electronegativity than sulphur.

105. **Assertion (A)** : When 20 ml of ethanol is mixed with 20 ml of water, the volume of resulting solution will be less than 40 ml.

Reason (R) : The hydrogen bond between water and alcohol molecules is weaker than hydrogen bond between the like molecules.

106. **Assertion (A)** : Ortho-nitrophenol has much lower boiling point and lower solubility in water than meta and para isomers.

Reason (R) : Ortho-nitrophenol involves intramolecular hydrogen bonding and the possibility of association of the molecules is absent.

107. **Assertion (A)** : All molecules which have polar bonds have zero dipole moment.

Reason (R) : Asymmetrical molecules with polar bonds have zero dipole moment.

108. **Assertion (A)** : In the covalent compounds of hydrogen, the hydrogen atom has the electronic configuration analogous to that of hydride ion.
Reason (R) : Hydride ion is formed when hydrogen atom loses an electron.
109. **Assertion (A)** : The bond order of helium is always zero.
Reason (R) : The number of electrons in bonding molecular orbital and antibonding molecular orbital is equal
110. **Assertion (A)** : The H—N—H bond angle in NH_3 molecule is much greater than the H—As—H bond angle in AsH_3 .
Reason (R) : Formation of NH_3 molecule involves sp^3 hybridisation, while no hybridisation occurs in AsH_3 .
111. **Assertion (A)** : Cyclobutane is less stable than cyclopentane.
Reason (R) : The presence of bent bonds causes loss of orbital overlap.
112. **Assertion (A)** : A spectral line will be seen for the transition $2px$ to $2py$.
Reason (R) : Energy is released in the form of wave of light when the electron drops from $2px$ to $2py$ orbital.
113. **Assertion (A)** : Sodium ions are discharged in preference of hydrogen ions at mercury cathode.
Reason (R) : The nature of the cathode affects the order of discharge of ions.
114. **Assertion (A)** : Among halogens fluorine can oxidize an element to its highest oxidation state.
Reason (R) : Due to small size of fluoride ion it is difficult to oxidise fluoride ion to fluorine. Hence reverse reaction takes place more easily.
115. **Assertion (A)** : A trimester of glycerol and palmitic acid on boiling with aqueous sodium hydroxide gives a solid cake having soapy touch.
Reason (R) : Free glycerol is liberated which is a greasy solid.
116. **Assertion (A)** : When an atom in group 1 A of the periodic table undergoes radioactive decay by emitting a positron, the resulting element belongs to zero group.
Reason (R) : When an atom emits a positron, its atomic number increases by one unit.
117. **Assertion (A)** : A certain element X, forms three binary compounds with chlorine containing 59.68%, 68.95% and 74.75% chlorine respectively. These data illustrate the law of multiple proportions.
Reason (R) : According to law of multiple proportions, the relative amounts of an element combining with some fixed amount of a second element in a series of compounds are the ratios of small whole numbers.

118. **Assertion (A)** : The name butanol is not specific, whereas the name butanone represents one specific compound.

Reason (R) : Alcohols show phenomenon of isomerism where as ketones do not show isomerism.

119. **Assertion (A)** : Alkenes and cycloalkanes series of hydrocarbons have same general formula.

Reason (R) : Either insertion of a double bond or formation of a ring reduce the number of hydrogen atoms of corresponding alkane by 2.

120. **Assertion (A)** : The carbon atoms of the benzene ring may be numbered for identification of substituent groups, just as a continuous chains of carbon atoms are numbered.

Reason (R) : Smallest set of numbers designating the substituents is the preferred set.

BIOLOGY**SECTION – III**

121. Pollination by snail and slug is known as:
(a) ornithophilous (b) chiropterophilous (c) entomophilous (d) malacophilous.
122. Single filament of *Nostoc* without mucilage sheath is known as:
(a) mycelium (b) colony (c) trichome (d) hyphae.
123. Which of the following is dissolved in water for making Bordeaux mixture?
(a) calcium chloride (b) copper sulphate (c) sodium chloride (d) none of these.
124. Phytotron is a device by which:
(a) mutations are produced in plants (b) plants are grown in controlled environment
(c) protons are liberated (d) leaf fall occurs on abscission layer.
125. Middle piece of a mammalian sperm contains:
(a) nucleus (b) centriole (c) mitochondria (d) vacuole.
126. Antiserum contains:
(a) antigens (b) leucocytes (c) antibodies (d) none of these.
127. Mechanism of uric acid excretion, in a nephron, is:
(a) osmosis (b) diffusion (c) secretion (d) ultrafiltration.
128. Secretion of which of the following is under neurosecretory nerve axons?
(a) pineal (b) adrenal cortex (c) anterior pituitary (d) posterior pituitary.
129. Galapagos islands are associated with the name of:
(a) Wallace (b) Malthus (c) Darwin (d) Lamarck.
130. Malathion, parathion belong to group of:
(a) triazines (b) carbamates (c) pyrethroids (d) organophosphates.
131. In sweet peas, genes C and P are necessary for colour in flowers. The flowers are white in the absence of either or both the genes. What will be the percentage of coloured flowers in the offspring of the cross $CcPp \times ccPp$?
(a) 25% (b) 50% (c) 75% (d) 100%.

132. The plants in desert, in order to tolerate water stress, have:
- (a) no stomata (b) long root system to reach the water level
(c) stipular spines (d) stems which are converted into leaf type.
133. Positive pollution of soil is due to:
- (a) reduction in soil productivity (b) addition of wastes on soil
(c) excessive use of fertilizers (d) all of these.
134. The lining of bone marrow cavity is called:
- (a) endosteum (b) endomyosium (c) endoneurium (d) endothelium.
135. Which of the following is an example of sex-linked inheritance?
- (a) anaemia (b) cretinism (c) night-blindness (d) colour-blindness.
136. If the rate of addition of new members increases with respect to the individual host of the same population, then the graph obtained has:
- (a) declined growth (b) exponential growth
(c) zero population growth (d) none of these.
137. Plants which can withstand wide range of temperature tolerance are called:
- (a) stenothermic (b) eurythermic (c) monothermic (d) mesothermic.
138. Starch and cellulose are the compounds of many units of:
- (a) glycerol (b) fatty acids (c) amino acids (d) simple sugars.
139. Which of the following is most convincing reasons for increasing population growth in a country?
- (a) high birth rate (b) low mortality rate
(c) low population of old people (d) high population of young children.
140. where does the conversion of harmful prussic acid into potassium sulphocyanide takes place?
- (a) spleen (b) liver (c) bone marrow (d) lymph glands.
141. Knock-knee disease is due to:
- (a) hormonal imbalance (b) genetical abnormality in males
(c) deficiency in tyrosine amino acid (d) excess fluoride concentration in water body.
142. In mammals, the digestion of starch starts from:
- (a) mouth (b) stomach (c) oesophagus (d) duodenum.

143. The major constituent of vertebrate bone is:
(a) sodium chloride (b) calcium phosphate (c) potassium hydroxide (d) calcium carbonate.
144. The amphids are cuticular elevations on the ventrolateral lips of *Ascaris*. These are:
(a) chemoreceptors (b) tangoreceptors (c) tactoreceptors (d) olfactoreceptors.
145. Polyploidy leads to rapid formation of new species, because of:
(a) genetic recombination (b) mutation therapy
(c) isolation behaviour (d) development of multiple sets of chromosomes.
146. During interphase, RNAs and proteins are synthesized in:
(a) G₁-phase (b) S-phase (c) G₂-phase (d) all of these.
147. Photosynthetic pigments in chloroplast are embedded in the membrane of:
(a) matrix (b) photoglobin
(c) thylakoids (d) chloroplast envelope.
148. Buliform cells are present in:
(a) mesophyll (b) epidermis (c) bundle sheath (d) vascular bundles.
149. Preganglionic sympathetic fibres are:
(a) adrenergic (b) cholinergic (c) synergic (d) hypergognic.
150. Enzymes with two sites are called:
(a) apoenzyme (b) holoenzyme (c) allosteric enzyme (d) conjugate enzyme.
151. Meroblastic cleavage refers to which type of division of eggs?
(a) total (b) spiral (c) incomplete (d) horizontal.
152. Glycosidic bond is broken during the digestion of:
(a) protein (b) starch (c) lipid (d) all of these.
153. The presence of continuous phenotypic variation in an F₁-generation suggests that a character is inherited by:
(a) epistasis (b) recombination
(c) gene linkage (d) polygenic inheritance.
154. 'Genera Plantarum' was written by:
(a) Bessey (b) Linnaeus
(c) Hutchinson (d) Bentham and Hooker.

155. Zonula adherens is a kind of:
(a) desmosome (b) mesosome (c) filament (d) membrane.
156. Schuffner's dots are seen in red blood corpuscles of man due to which of the following disease?
(a) kala-azar (b) filarial (c) malaria (d) diabetes.
157. In *Selaginella*, reduction division occurs during the formation of:
(a) sperms (b) microspores only (c) megaspores only (d) both (b) and (c).
158. The process of the escape of liquid from the tip of uninjured leaf is called:
(a) guttation (b) transpiration
(c) evaporation (d) evapo-transpiration.
159. Diabetes insipidus occurs due to hyposecretion of:
(a) oxytocin (b) vasopressin (c) thymosine (d) insulin.
160. Which of the following RNAs picks up specific amino acid from amino acid pool in the cytoplasm to ribosome during protein synthesis?
(a) *t*-RNA (b) *m*-RNA (c) *r*-RNA (d) all of these.

Instructions for Q. No. 161 to 180

Directions: Each of the questions given below consists of two statements, an assertion (A) and reason (R). Select the number corresponding to the appropriate response in the answer sheet as follows:

- (a) If both assertion and reason are true and the reason is a correct explanation of the assertion
(b) If both assertion and reason are true but the reason is not a correct explanation of the assertion
(c) If the assertion is true, but the reason is false
(d) If both assertion and reason are false

161. **Assertion (A)** : Smoke reduces photosynthesis.

Reason (R) : Smoke contains SO_2 and oxides of nitrogen and hydrocarbons.

162. **Assertion (A)** : Putrefying bacteria decompose proteins of dead plants and animals to ammonia.

Reason (R) : *Nitrosomonas* and *Nitrobacter* perform the process of ammonification.

163. **Assertion (A)** : A tree growing near Bombay does not show prominent annual rings.

Reason (R) : Annual rings are not seen in dicot root though secondary growth occur in them.

164. **Assertion (A)** : Long day plants and short day plants are misnomers.

Reason (R) : Short day plant and long day plant growing in same location could not flower on the same day.

165. **Assertion (A)** : Blue and red both the lights are used directly for light reactions of photosynthesis.
Reason (R) : The absorption spectrum represents the graph plotted between the amount of CO₂ consumed and different wavelength of light absorbed by the same pigment.
166. **Assertion (A)** : Carbohydrates are more suitable to provide energy in the body than fat and proteins.
Reason (R) : Wheat and rice are the source of carbohydrates.
167. **Assertion (A)** : Oxygen enters the blood from alveolar air while carbon dioxide leaves the blood to enter the alveolar air.
Reason (R) : This is due to difference in the partial pressure of the gases.
168. **Assertion (A)** : Pulse can be feel on veins in each heart beat.
Reason (R) : Veins are deeply seated in the body.
169. **Assertion (A)** : Insulin is an anabolic hormone.
Reason (R) : It affects antagonistic to glucagons.
170. **Assertion (A)** : A man is unable to pass on a sex linked gene to his son.
Reason (R) : Sex linked genes are present on X-chromosome only.
171. **Assertion (A)** : Coenzyme is a non-protein group without which certain enzymes are inactive or incomplete.
Reason (R) : Coenzymes not only provide a point of attachment for the chemical group being transformed but also influence the properties of the group.
172. **Assertion (A)** : Transmission of the nerve impulse across a synapse is accomplished by neurotransmitters.
Reason (R) : Transmission across a synapse usually required neurotransmitters because there is small space, the synaptic cleft, that separates one neuron from another.
173. **Assertion (A)** : It is the brain, not the sense organs, that interprets the stimulus.
Reason (R) : Sense organs are transducers; they transform the energy of a stimulus to the energy of nerve impulse.
174. **Assertion (A)** : Cartilage (protein matrix) and bone (calcium matrix) are rigid connective tissues.
Reason (R) : Blood is connective tissue in which plasma is the matrix.
175. **Assertion (A)** : Hair cells on the basilar membrane (the organ of Corti) are responsible for hearing.
Reason (R) : Pressure waves, which begin at the oval window, cause the basilar membrane to vibrate so that the cilia of the hair cells touch the tectorial membrane. This causes the hair cells to initiate nerve impulses, which are carried by the auditory nerve to the brain.

176. **Assertion (A)** : The gramineous type of stomata are commonly found in gramineae and cyperaceae.
Reason (R) : The gramineous stomata possess guard cells of which the middle portions are much narrower than the ends so that cells appear in surface view like dumbbells.
177. **Assertion (A)** : The innermost distinct layer of the cortex is known as endodermis.
Reason (R) : The cells of endodermis are non-living and characterized by the presence of casparian strips.
178. **Assertion (A)** : Adenine can not pair with cytosine.
Reason (R) : Because there would be two hydrogen atoms near one of the bonding positions and none at the other.
179. **Assertion (A)** : Either megasporophyllous or microsporophyllous leaves occur in gymnosperms.
Reason (R) : The megasporophyllous leaves are small and less developed whereas microsporophyllous leaves are large, scaly and well developed.
180. **Assertion (A)** : Flagella found in green algae are of whiplash type.
Reason (R) : The flagella found in green algae have a smooth surface and are called tinsel or acronematic.

GENERAL KNOWLEDGE**SECTION – IV**

181. Who has been appointed as the acting Chairman of the Union Public Service Commission (UPSC)?
(a) Arvind Saxena (b) Sudha Jain (c) Kirti Kumar (d) Omi Agrawal
182. India's first-ever national police museum will establish in which city?
(a) Chennai (b) Delhi (c) Nagpur (d) Kolkata
183. Which country will host the 45th G7 summit 2019?
(a) Italy (b) Germany (c) France (d) Canada
184. Which country's women cricket team has clinched the Asia Cup Twenty-20 tournament 2018?
(a) SouthKorea (b) Bangladesh (c) India (d) Pakistan
185. Which of the following is NOT a petrochemical centre of India?
(a) Koyali (b) Jamnagar (c) Mangalore (d) Rourkela
186. Which of the following is a correct sequence of sea ports of India from "South to North"?
(a) Cochin → Thiruvananthapuram → Calicut → Mangalore
(b) Calicut → Thiruvananthapuram → Cochin → Mangalore
(c) Thiruvananthapuram → Cochin → Calicut → Mangalore
(d) Thiruvananthapuram → Calicut → Mangalore → Cochin
187. In which of the following circumstances, the prime minister of India cannot participate in voting on a No-confidence motion against his / her government?
(a) He / She leads a coalition government (b) He / she has minority in Rajya Sabha
(c) He / she is a member of Rajya Sabha (d) He / she is forbidden by speaker of Lok Sabh
188. Which of the following was most probably the first metal to be used in India?
(a) Iron (b) Copper (c) Gold (d) Silver
189. Which of the following statements is incorrect about the Lysosome?
(a) It is a membrane-bound organelle found in plant as well as animal cells
(b) It is also called the suicidal bag of the cell
(c) It helps in the synthesis of protein
(d) It acts as a dispatch station of protein products received from the endoplasmic reticulum (ER)

190. Which of the following is not present in animal cells?
(a) Cell walls (b) Mitochondria (c) Ribosomes (d) Cytoplasm
191. Hemoglobin in humans has the highest affinity for which of the following gases?
(a) Methane (b) Carbon Monoxide (c) Nitrous oxide (d) Carbon dioxide
192. Which of the following is the most commonly used chemical for ripening of mangoes in India?
(a) Potassium Iodide (b) Silver Iodide (c) Ammonium Nitrate (d) Calcium Carbide
193. What is the size of new Rs.500 Bank Note?
(a) 68 mm × 150 mm (b) 68 mm × 155 mm (c) 66 mm × 150 mm (d) 66 mm × 152 mm
194. Which among the following places is not a site for India's currency notes printing press?
(a) Nasik (b) Mysuru (c) Salboni (d) Jhansi
195. Which of the following countries / group of countries are known as G3 economies?
(a) India, China, Africa (b) US, EU, Japan
(c) India, Japan, China (d) US, China, Japan
196. Buddhism from India was introduced to which current region by Kasyapa Matanga?
(a) China (b) South East Asia (c) Sri Lanka (d) Africa
197. Which of the following states is India's largest Bauxite producer?
(a) Odisha (b) Jharkhand (c) Rajasthan (d) Karnataka
198. Which of the following is not a correct statement?
(a) One liter of cold air will be heavier than one liter of hot air
(b) Bats are blind but can fly in the dark because of echolocation
(c) In human body, Liver stores glucose as glycogen
(d) Foot and mouth disease of cattle is a viral disease
199. India's first Uranium Mine is located at which among the following places?
(a) Jadugauda (b) Tummalapalle (c) Pichli (d) Dalbhum
200. India shares land borders with how many countries?
(a) Six (b) Seven (c) Eight (d) Nine

ANSWER KEY

PHYSICS

1	2	3	4	5	6	7	8	9	10
C	D	C	B	D	C	B	A	C	B
11	12	13	14	15	16	17	18	19	20
C	C	A	C	C	A	C	C	A	A
21	22	23	24	25	26	27	28	29	30
D	B	B	B	D	A	A	B	B	B
31	32	33	34	35	36	37	38	39	40
A	A	C	D	B	A	D	C	D	C
41	42	43	44	45	46	47	48	49	50
C	A	A	A	D	A	D	D	B	A
51	52	53	54	55	56	57	58	59	60
D	B	C	C	C	A	C	A	C	B

CHEMISTRY

61	62	63	64	65	66	67	68	69	70
D	C	B	A	B	A	A	C	D	B
71	72	73	74	75	76	77	78	79	80
B	D	C	A	A	A	D	A	B	D
81	82	83	84	85	86	87	88	89	90
C	A	A	D	B	D	C	A	C	A
91	92	93	94	95	96	97	98	99	100
B	B	D	D	C	A	C	D	A	D
101	102	103	104	105	106	107	108	109	110
D	A	A	A	C	A	D	C	A	A
111	112	113	114	115	116	117	118	119	120
C	D	A	B	C	C	A	C	A	B

BIOLOGY

121	122	123	124	125	126	127	128	129	130
D	C	B	B	C	C	C	D	C	D
131	132	133	134	135	136	137	138	139	140
A	D	D	A	D	B	B	D	D	B
141	142	143	144	145	146	147	148	149	150
D	D	B	A	D	A	C	B	B	C
151	152	153	154	155	156	157	158	159	160
C	B	D	D	A	C	D	A	B	A
161	162	163	164	165	166	167	168	169	170
B	C	B	C	D	B	A	D	B	A
171	172	173	174	175	176	177	178	179	180
A	A	A	B	A	A	C	A	D	C

GENERAL KNOWLEDGE

181	182	183	184	185	186	187	188	189	190
A	B	C	B	D	C	C	B	D	A
191	192	193	194	195	196	197	198	199	200
B	D	C	D	B	A	A	B	A	B