TECHNO INDIA GROUP OF PUBLIC SCHOOLS

NEET (XII)

Monthly Mock Test - 2 (29.08.2025)

Time Allowed: **3 hours**　　　　　　　　　　　　　　　Maximum Marks: **720**

General Instructions:

1. This test will be a 3 hours Test, Maximum Marks 720.

2. This test consists of 180 questions of Physics, Chemistry and Biology. All questions are COMPULSORY to attempt.

3. Each question is of 4 marks.

4. There are three parts in the question paper, consisting Part-I Physics (Q. No. 1 to 45), Part-II Chemistry (Q. no. 46 to 90), Part-III Biology (Q. no. 91 to 180).

5. There will be only one correct choice in the given four choices for each question. For each question <u>4 marks will be</u> awarded for correct choice, <u>1 mark will be deducted</u> for incorrect choice and zero mark will be awarded for unattenuated question.

6. Any textual, printed or written material, mobile phones, calculator, etc. is not allowed for the students appearing for the test.

7. All calculations / written work should be done in the rough sheet provided.

PHYSICS

1. A convex lens is immersed in a liquid of refractive index greater than that of glass. It will behave as a
   ① convergent lens
   ② divergent lens
   ③ plane glass
   ④ homogenous liquid

2. A plano convex lens of focal length 16 cm, is to be made of glass of refractive index 1.5. The radius of curvature of the curved surface should be
   ① 8 cm
   ② 12 cm
   ③ 16 cm
   ④ 24 cm

3. A plano-convex lens is made of material of refractive index 1.6. The radius of curvature of the curved surface is 60 cm. The focal length of the lens is
   ① 50 cm
   ② 100 cm
   ③ 200 cm
   ④ 400 cm

4. A convex lens is in contact with concave lens. The magnitude of the ratio of their powers is 2/3. Their equivalent focal length is 30 cm. What are their individual focal lengths (in cm)?
   ① –15, 10
   ② –10, 15
   ③ 75, 50
   ④ –75, 50

5. If two +5 dioptre lenses are mounted at some distance apart, the equivalent power will always be negative if the distance is
   ① greater than 40 cm
   ② equal to 40 cm
   ③ equal to 10 cm
   ④ less than 10 cm

6. Match Column–I with Column–II

	Column-I		Column-II
(a)	Lens of power +2.0 D	(p)	Convex lens of focal length 200 cm
(b)	Lenses of combination of power +0.25 D and +0.25 D	(q)	Concave lens of focal length 40 cm
(c)	Lens of power –2.0 D	(r)	Convex lens of focal length 50 cm
(d)	Lenses combination of power –6 D and +3.5 D	(s)	Concave lens of focal length 50 cm

   ① (a → p), (b → q), (c → r), (d → s)
   ② (a → r), (b → p), (c → s), (d → q)
   ③ (a → s), (b → r), (c → p), (d → q)
   ④ (a → r), (b → s), (c → q), (d → p)

7. **Statement I:** The air bubble shines in water.

   Statement II: Air bubble in water shines due to refraction of light.

   ① Statement I is incorrect but Statement II is correct.
   ② Both Statement I and Statement II are correct.
   ③ Both Statement I and Statement II are incorrect.
   ④ Statement I is correct but Statement II is incorrect.

8. A ray of light is incidenting normally on a plane mirror. The angle of reflection will be

   ① 0°   ② 90°   ③ will not be reflected   ④ none of the above

9. If angle between mirror is 80° then total deviation produced by this mirror system for given ray will be
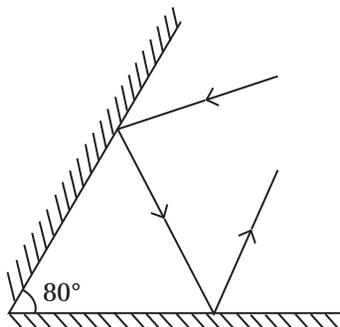
   ① 200°   ② 160°   ③ 20°   ④ None of the above

10. These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

    Assertion: The focal length of an equiconvex lens of radius of curvature R made of material of refractive index $\mu = 1.5$ is R.

    Reason: The focal length of the lens will be $\frac{R}{2}$.

    ① If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

    ② If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

    ③ If the Assertion is correct but Reason is incorrect.

    ④ If the Assertion is incorrect and Reason is correct.

11. An object is placed at a distance of f/2 from a convex lens. The image will be

    ① at one of the focus, virtual and double   ② at 3f/2, real and inverted

    ③ at 2f, virtual and erect   ④ none of above

12. A prism has a refracting angle of 60°. When placed in the position of minimum deviation, it produces a deviation of 30°. The angle of incidence is

    ① 30°   ② 45°   ③ 15°   ④ 60°

13. A concave mirror is used for face viewing has focal length of 0.6 m. At what distance you should hold the mirror from your face to get an upright image with a magnification of 4?

    ① 0.20 m   ② 0.25 m   ③ 0.40 m   ④ 0.45 m

14. In figure find the total magnification after two successive reflections first on M_1 and then on M_2.

    ① +1

    ② −2

    ③ +2

    ④ −1

$f_1 = 10$ cm $f_2 = 20$ cm

M_2 M_1

10 cm   30 cm
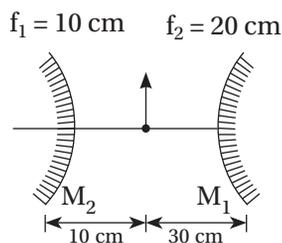
15. A car is fitted with a convex side-view mirror of focal length 20 cm. A second car 2.8 m behind the first car is overtaking the first car at a relative speed of 15 m/s. The speed of the second car as seen in the mirror of the first one is:

① $\frac{1}{15}$ m/s   ② 10 m/s   ③ 15 m/s   ④ $\frac{1}{10}$ m/s

16. **Statement I:** A object is placed at a distance of f from a convex mirror or focal length f its image will form at infinity.

Statement II: Image formed by convex mirror can be real.

① Statement I is incorrect but Statement II is correct.

② Both Statement I and Statement II are correct.

③ Both Statement I and Statement II are incorrect.

④ Statement I is correct but Statement II is incorrect.

17. Light travels through a glass plate of thickness t and refractive index μ. If c is the speed of light in vacuum, the time taken by light to travel this thickness of glass is

① μtc ② $\frac{tc}{\mu}$ ③ $\frac{t}{\mu c}$ ④ $\frac{\mu t}{c}$

18. Total internal reflection can take place only if

① light goes from optically rarer medium (smaller refractive index) to optically denser medium.

② light goes from optically denser medium to rarer medium.

③ The refractive indices of the two media are widely different.

④ The refractive indices of the two media are widely different.

19. When the angle of incidence of a light ray is greater that the critical angle it gets

① critically refracted   ② totally reflected

③ total internally reflected   ④ totally refracted

20. A point object is placed at the centre of a glass sphere of radius 6 cm and refractive index 1.5. The distance of virtual image from the surface of the sphere is

① 2 cm   ② 4 cm   ③ 6 cm   ④ 12 cm

21. These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

Assertion: When a convex lens $\left(\mu_g = \frac{3}{2}\right)$ of focal length f is dipped in water $\left(\mu_w = \frac{4}{3}\right)$, its focal length becomes 4f.

Reason: The focal length of convex lens is always half of its radius of curvature.

① If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

② If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

③ If the Assertion is correct but Reason is incorrect.

④ If the Assertion is incorrect and Reason is correct.

22. The interfering fringes formed by a thin oil film on water are seen in yellow light of sodium lamp. We find the fringes

① coloured   ② black and white

③ yellow and black   ④ coloured without yellow

23. The principle of superposition is basic to the phenomenon of

   ① polarisation   ② interference   ③ reflection   ④ refraction

24. The colour of bright fringe nearest to central achromatic fringe in the interference pattern with white light will be

   ① violet   ② red   ③ green   ④ yellow

25. In the Young's Double slit experiment when we place a converging lens after the slits and place the screen at the focus of the lens, it

   ① introduces an extra path difference in the parallel beam

   ② introduces no path difference in the parallel beam

   ③ introduces an extra phase difference in the parallel beam

   ④ introduces an extra fringe in the diffraction pattern

26. Match Column–I with Column–II

	Column-I		Column-II
(a)	Reflection	(p)	Used for reducing glare
(b)	Refraction	(q)	Change in path of light without change in medium
(c)	Interference	(r)	$\mu = \sin i / \sin r$
(d)	Polarization	(s)	Light added to light produces darkness

   ① $(a \rightarrow q), (b \rightarrow r), (c \rightarrow s), (d \rightarrow p)$

   ② $(a \rightarrow p), (b \rightarrow q), (c \rightarrow r), (d \rightarrow s)$

   ③ $(a \rightarrow s), (b \rightarrow r), (c \rightarrow q), (d \rightarrow p)$

   ④ $(a \rightarrow p), (b \rightarrow r), (c \rightarrow q), (d \rightarrow p)$

27. The fringe width in a young's double slit experiment can be increased if we decrease

   ① width of slits   ② separation of slits

   ③ wave lengths of light used   ④ distance between slits and screen

28. A Young's double slit experiment is conducted in olive oil of refractive index μ and a glass plate of thickness 1.8×10^{-5} m and refractive index 1.51 is placed in path of one slit. If the magnitude of the optical path difference at centre of screen will be 3.6×10^{-7} m, the find μ.

   ① 1.48   ② 1.33   ③ 1.28   ④ 1.11

29. In Young's double slit experiment the distance between two sources is 20 cm. Wave length of light used is 5460Å. The angular position of the dark fringe is

   ① 0.08°   ② 0.16°   ③ 0.20°   ④ 0.32°

30. If the width of the slit in single slit diffraction experiment is doubled, then the central maximum of diffraction pattern becomes

   ① broader and brighter   ② sharper and brighter

   ③ sharper and fainter   ④ broader and fainter

31. The conditions for producing sustained interference are

    I.   phase difference between interfering waves remains constant with time.

    II. interfering waves must have equal amplitude leaves.

    III. interfering waves are of same frequency.

    IV. interfering waves are moving in opposite directions.

    ① I and II   ② II and III   ③ III and IV   ④ I and IV

32. These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

Assertion: Interference pattern is made by using yellow light instead of red light, the fringes becomes narrower.

Reason: In YDSE, fringe width is given by $\beta = \dfrac{D\lambda}{d}$ and $\lambda_Y < \lambda_R$.

    ① If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

    ② If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

    ③ If the Assertion is correct but Reason is incorrect.

    ④ If the Assertion is incorrect and Reason is correct.

33. The ratio of intensities of two wave are given by 4 : 1. The ratio of maximum amplitude to minimum amplitude

    ① 2 : 1   ② 9 : 1   ③ 3 : 1   ④ 4 : 1

34. The condition for observing Fraunhoffer diffraction from a single slit is that the light wave front incident on the slit should be

    ① spherical   ② cylindrical   ③ plane   ④ elliptical

35. In Young's experiment, one slit is covered with a blue filter and the other (slit) with a yellow filter. Then the interference pattern

    ① will be blue   ② will be yellow   ③ will be green   ④ will not be formed

36. When an unpolarized light of intensity I_0 is incident on a polarizing sheet, the intensity of the light which does not get transmitted is

    ① $\dfrac{1}{4}I_0$ ② $\dfrac{1}{2}I_0$ ③ I_0 ④ zero

37. The focal length of the objective of a telescope is 60 cm. To obtain a magnification of 20, the focal length of the eye piece should be

    ① 2 cm   ② 3 cm   ③ 4 cm   ④ 5 cm

38. A plane wave passes through a convex lens. The geometrical shape of wave front that emerges is

    ① plane   ② diverging spherical   ③ converging spherical   ④ none of these

39. Wave front is the locus of all points, where the particles of the medium vibrate with the same

    ① phase   ② amplitude   ③ frequency   ④ period

40. Unpolarised light of intensity I is incident on a polariser and the emerging light strikes a second polarizing filter with its axis at 45° to that of the first. Then the intensity of the emerging beam and its state of polarization.

    ① $\dfrac{I}{4}$ and parallel to second filter   ② $\dfrac{I}{4}$ and perpendicular to second filter

    ③ $\dfrac{I}{8}$ and parallel to second filter   ④ $\dfrac{I}{8}$ and perpendicular to second filter

41. Two coherent sources of different intensities send waves that interfere. The ratio of maximum to minimum intensity is 25. The intensity ratio of the sources is:

① 25 : 1　　　　② 5 : 1　　　　③ 9 : 4　　　　④ 625 : 1

42. The path difference between two interfering waves at a point on the screen is $\frac{\lambda}{6}$ from central maximum. The ratio of intensity at this point and that at the central fringe will be:

① 0.75　　　　② 7.5　　　　③ 85.3　　　　④ 853

43. The fringe width is at a distance of 0.5 m from the slits in youngs's experiment for light of wavelength 6000Å is 0.048 cm. The fringe width at the same distance for $\lambda = 5000A$ will be equal to

① 0.04 cm　　　　② 0.6 cm　　　　③ 0.15 cm　　　　④ 0.55 cm

44. A plate of thickness t made of material of refractive index μ is placed in front of one of the slits in a double slit experiment. What should be the minimum thickness t which will make the intensity at the centre of the fringe pattern zero?

① $(\lambda-1)\frac{\lambda}{2}$　　　　② $(\mu-1)\lambda$　　　　③ $\frac{\lambda}{2(\mu-1)}$　　　　④ $\frac{\lambda}{(\mu-1)}$

45. In a single slit diffraction, the width of slit is 0.005 m, focal length of lens is 40 cm and wavelength of light is 4890Å. The distance of first dark fringe will be

① 3×10^{-5} m　　　　② 4×10^{-5} m　　　　③ 7×10^{-5} m　　　　④ 9×10^{-5} m

CHEMISTRY

46. Iron carbonyl, $Fe(CO)_5$ is :

① trinuclear　　　　② mononuclear　　　　③ tetranuclear　　　　④ dinuclear

47. E.D.T.A has co-ordination number :

① 3　　　　② 4　　　　③ 5　　　　④ 6

48. The type of isomerism shown by the complex $[COCl_2 (en)_2]$ is :

① Ionisation isomerism　　　　② Co-ordination isomerism
③ Geometrical isomerism　　　　④ Linkage isomerism

49. The complexes $[Co(NH_3)_6] [Cr(CN)_6]$ and $[Cr(NH_3)_6] [Co(CN)_6]$ are the examples of which type of isomerism?

① Ionisation isomerism　　　　② Co-ordination isomerism
③ Geometrical isomerism　　　　④ Linkage isomerism

50. The total number of possible isomers for the complex compound $[Cu^{II}(NH_3)_4] . [Pt^{II}Cl_4]$

① 3　　　　② 6　　　　③ 5　　　　④ 4

51. Which one of the following ions exhibits d – d transition and paramagnetism as well ?

① MnO_4^-　　　　② $Cr_2O_7^{2-}$　　　　③ CrO_4^{2-}　　　　④ MnO_4^{2-}

52. Which of the following pairs of d – d orbitals will have electron density along the axis ?

① dz^2, dxz　　　　② dxz, dyz　　　　③ dz^2, $dx^2 - y^2$　　　　④ dxy, $dx^2 - y^2$

53. The geometry and magnetic behaviour of the complex $[Ni(CO)_4]$ are :

① square planar geometry & paramagnetic　　　　② tetrahedral geometry and diamagnetic
③ square planar geometry & diamagnetic　　　　④ tetrahedral geometry & paramagnetic

54. The values of the crystal field stabilisation energies for a high spin d^6 metal ion in octahedral and tetrahedral fields respectively are :

① $-0.4\,\Delta_0$ and $-0.27\,\Delta_t$ ② $-1.6\,\Delta_0$ and $-0.4\,\Delta_t$ ③ $-2.4\,\Delta_0$ and $-0.6\,\Delta_t$ ④ $-0.4\,\Delta_0$ and $-0.6\,\Delta_t$

55. Crystal field stabilisation energy for high spin d^4 octahedral complex is :

① $-1.8\,\Delta_0$ ② $-1.6\,\Delta_0 + P$ ③ $-1.2\,\Delta_0$ ④ $-0.6\,\Delta_0$

56. Among the following complexes the one which shows zero crystal field stabilisation energy (CFSE) is :

① $[Mn(H_2O)_6]^{2+}$ ② $[Fe(H_2O)_6]^{3+}$ ③ $[Co(H_2O)_6]^{2+}$ ④ $[Co(H_2O)_6]^{3+}$

57. Mechanism of a hypothetical reaction $X_2 + Y_2 \longrightarrow 2xy$ is given below :

(i) $X_2 \rightleftharpoons x + x$ (fast)   (ii) $x + y_2 \rightarrow xy + y(s/w)$ (iii) $x + y \longrightarrow xy$ (fast)

The overall order of the reaction will be :

① 1   ② 2   ③ 0   ④ 1.5

58. Which one of the following statements for the order of a reaction is incorrect ?

① Order is not influenced by stoichio-metric co-efficient of the reaction

② Order of reaction is some of power to the concentration terms of reactants to express the rate of reaction

③ Order of reaction is always whole number

④ Order can be determined only experimentally

59. What is the order of a reaction which has following rate expression ? rate $= k\,[A]^{3/2}\,(B)^{-1}$

① $\dfrac{3}{2}$ ② $\dfrac{1}{2}$ ③ 0   ④ None of these

60. When initial concentration of a reactant is doubled in a reaction its half-life period is not affected. The order of the reaction is :

① 0   ② 1

③ 2   ④ more than zero but less than 1

61. When initial concentration of the reactant is doubled ; the half-life period of a zero order reaction :

① is tripled   ② is doubled   ③ is halved   ④ remain unchanged

62. In the reaction, $2N_2O_5 \longrightarrow 4NO_2 + O_2$, initial pressure is 500 atm and rate constant K is $3.38 \times 10^{-5}\,S^{-1}$. After 10 min, the final pressure of N_2O_5 is :

① 490 atm   ② 250 atm   ③ 480 atm   ④ 420 atm

63. Half-life period of a first order reaction is 1386 s. The specific rate constant of the reaction is :

① $5 \times 10^{-3}\,S^{-1}$ ② $0.5 \times 10^{-2}\,S^{-1}$ ③ $0.5 \times 10^{-3}\,S^{-1}$ ④ $5 \times 10^{-3}\,S^{-1}$

64. The half - life period for zero order reaction $A \longrightarrow$ product, is 100 min. How long will it take in 80% completion?

① 80 min   ② 160 min   ③ 100 min   ④ 200 min

65. What is the activation energy for a reaction if its rate doubles when temperature is raised from 20°c to 35° c ? [$R = 8.314\,J\ k\,(mole)^{-1}$]

① $269\,Kj\,(mole)^{-1}$ ② $34.7\,Kj\,(mole)^{-1}$ ③ $15.1\,Kj\,(mole)^{-1}$ ④ $342\,Kj\,(mole)^{-1}$

66. The activation energy of a reaction can be determined from the slope of which of the following graphs ?

① $\log_e k$ Vs T ② $\log_e\left(\dfrac{K}{j}\right)$ Vs T ③ $\log_e k$ Vs $\dfrac{1}{T}$ ④ $\dfrac{T}{l n u}$ Vs $\dfrac{1}{T}$

67. A reaction having equal energies of activation for forward and reverse reaction has :

① $\Delta G = 0$ ② $\Delta H = 0$ ③ $\Delta H = \Delta G = \Delta S = 0$ ④ $\Delta S = 0$

68. The variation of equivalent conduction of strong electrolyte with $\sqrt{\text{concentrates}}$ is correctly shown figure.

① $\wedge eq$

$\sqrt{c}$

② $\wedge eq$

$\sqrt{c}$

③ $\wedge eq$

$\sqrt{c}$

④ $\wedge eq$

$\sqrt{c}$
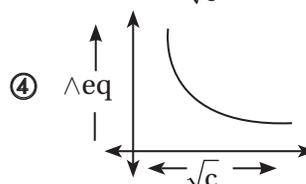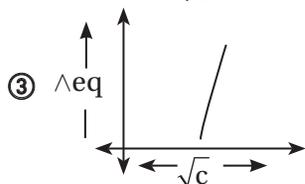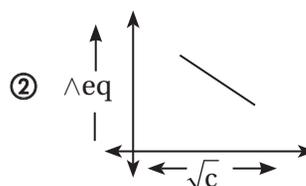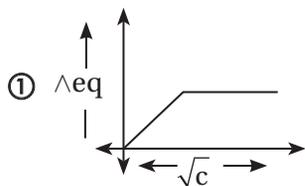
69. The spin only magnetic moment value (in Bohr magneti units) of Cr $(CO)_6$ is :

① 0   ② 2.84   ③ 4.90   ④ 5.92

70. The ionization isomers of $[Cr(H_2O)_4\,Cl(NO_2)]$ Cl is

① $[Cr(H_2O)_4\,(O_2N)]$ Cl_2 ② $[Cr(H_2O)_4\,Cl_2]\,(NO_2)]$

③ $[Cr(H_2O)_4\,Cl_2\,(ONO)]$ Cl   ④ $[Cr(H_2O)_4\,Cl_2\,(NO_2)]\,H_2O$

Assertion and Reason : (Q. No. 71 – 80)

Directions: Read the following questions and choose any one of the following four responses.
   a. Assertion and Reason both are correct and Reason is the correct explanation of Assertion.
   b. Assertion and Reason both are correct and Reason is not the correct explanation of Assertion.
   c. Assertion is correct but Reason is wrong.
   d. Assertion is wrong but Reason is correct.

71. Assertion (A): Zeise's salt contain C_2H_4 molecule as one of the ligands

Reason (R) : Zeise's salt is an organometallic compound

① a   ② b   ③ c   ④ d

72. Assertion (A): Oxidation state of Fe in $Fe(CO)_5$ is zero

Reason (R) : E.A.N of Fe in its complex is always 36.

① a   ② b   ③ c   ④ d

73. Assertion (A): $[Co(NH_3)_3\,Cl_3]$ does not give white ppt with Ag NO_3 solution.

Reason (R) : Chlorine is not present in the ionisable part of the given complex.

① a   ② b   ③ c   ④ d

74. Assertion (A): Tetrahedral complexes with chiral structure exhibit optical isomerism.

Reason (R) : They lack plane of symmetry.

① a   ② b   ③ c   ④ d

75. Assertion (A): In square planar complexes $dx^2 - y^2$ is higher energy than dxy.

Reason (R) : Ligands approach along x and y axis.

① a   ② b   ③ c   ④ d

76. **Assertion (A):** Oxidation no. of Cr in K_3CrO_8 is + 5

   Reason (R): It contain tetraperoxo species i.e $[Cr(O_2)_4]^{3-}$

   ① a ② b ③ c ④ d

77. **Assertion (A):** MnO_4^- is tetrahedral in shape

   Reason (R): $KMnO_4$ is purple in colour.

   ① a ② b ③ c ④ d

78. **Assertion (A):** Ebullioscopy or Cryoscopy can not be used for the determination of molecular weight of polyemers.

   Reason (R): High molecular weight solute leads to very low value of ΔT_b or ΔT_f

   ① a ② b ③ c ④ d

79. **Assertion (A):** Evaporation and vapour pressure depend upon available surface area of solvent at any temperature.

   Reason (R): Larger the surface area of solvent for evaporation more is evaporation.

   ① a ② b ③ c ④ d

80. **Assertion (A):** Galvanised iron does not rust.

   Reason (R): Zinc has more negative electrode potential than iron.

   ① a ② b ③ c ④ d

81. The vapour pressure of A and B at $25°C$ are 90 mm Hg and 1.5 mm Hg respectively. If A and B are mixed such that the more fraction of 'A' in the mixture is 0.6, then the mole fraction of 'B' in the vapour phase is :

   ① 2×10^{-1} ② 3×10^{-1} ③ 4×10^{-1} ④ 1×10^{-1}

82. At $20°C$, the vapour pressure of benzene is 70 torr and that of methyl benzene is 20 torr. The mole fraction of benzene in the vapour phase at $20°C$ above an equimolar mixture of benzene and methyl benzene is :

   ① 0.087 ② 0.87 ③ 0.78 ④ 0.078

83. To find the standard potential of M^{3+}/M electrode, the following cell is considered :

   $Pt|M / M^{3+} (0.001 \text{ mole(L)}^{-1})||Ag^+ (0.01 \text{ mole(L)}^{-1})/Ag$. The emf of the cell is formed to be 0.421 volt at 298 k. The standard potential of half reaction $M^{3+} + 3e^- \longrightarrow M$ at 298 k will be :

   (Given : $E° Ag+/Ag$ at 298 k = 0.80 volt.)

   ① 0.32 v ② 0.66 v ③ 0.38 v ④ 1.28 v

84. The rate of reaction quadruples when the temperature changes from 300 k to 310 k. The activation energy of this reaction is : (Assume activation energy and pre-exponential factor are independent of temperature ;

   $\log_e 2 = 0.693$; R = 8.314 j $(\text{mole})^{-1}$ $(k)^{-1}$.

   ① 53.6 k j $(\text{mole})^{-1}$ ② 26.8 k j $(\text{mole})^{-1}$ ③ 107.2 k j $(\text{mole})^{-1}$ ④ 214.4 k j $(\text{mole})^{-1}$

85. Mischmetal is an alloy consisting namely of :

   ① lanthanide metals ② actinoid and transition metals

   ③ lanthanide and actinoid metals ④ actinoid metals

86. Identify the ion having $4f^6$ electronic configuration.

   ① Gd^{3+} ② Sm^{3+} ③ Sm^{2+} ④ T_b^{3+}

87. $Nd^{2+} = $ _____?_____

① $4f^3$　　　　② $4f^4 6s^2$　　　　③ $4f^2 6s^2$　　　　④ $4f^2$

88. The number of geometrical isomers that can exist for square planar. $[Pt(Cl)(Py)(NH_3)(NH_2OH)]^+$ is (Py = pyridine)

① 2　　　　② 3　　　　③ 4　　　　④ 6

89. The element which shows only one oxidation state other than elemental form is :

① Cobalt　　　　② Nickel　　　　③ Scandium　　　　④ Titanium

90. For a reaction $A \xrightarrow{K_1} B \xrightarrow{K_2} C$, If the rate of formation of B is set to be zero then the concentration of 'B' is given by :

① $(K_1 + K_2)[A]$　　　② $(K_1 / K_2)[A]$　　　③ $(K_1 - K_2)[A]$　　　④ $K_1 K_2 [A]$

Biology

91. The following graph depicts changes in two populations (A and B) of herbivores in a grassy field. Select the correct option :
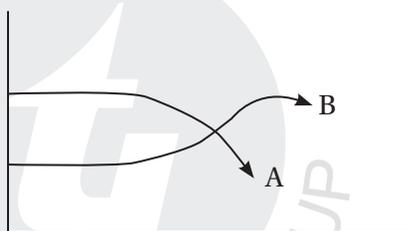
① Population A produced more offsprings than population B.

② Population A consumed the members of population B.

③ Both plant populations in this habitat decreased

④ Population B competed more successfully for food than population A.

92. The similarity of bone structure in the forelimbs of many vertebrates is an example of :

① Homology　　　② Analogy　　　③ Convergent evolution　④ Divergent evolution

93. Among the following sets of examples for divergent evolution, select the incorrect option :

① Forelimbs of man, bat and cheetah　　　② Heart of man, bat and cheetah

③ Brain of man, bat and cheetah　　　　　④ Eye of octopus, bat and man

94. According to Hugo de Vries, the mechanism of evolution is :

① Multiple step mutations　　　　② Saltation

③ Phenotypic variation　　　　　④ Minor mutations

95. Continental drift led to disappearance of a large number of South American mammals because :

① Alteration of vegetation was not conducive to their survival

② There was an outbreak of a number of infectious diseases

③ Sudden change in the climatic conditions

④ They were out competed by more highly evolved animals reaching here from North America.

96. The chronological order of human evolution from early to recent is :

① *Ramapithecus* ⟶ *Homo habilis* ⟶ *Australopithecus* ⟶ *Homo erectus.*

② *Ramapithecus* ⟶ *Australopithecus* ⟶ *Homo habilis* ⟶ *Homo erectus.*

③ *Australopithecus* ⟶ *Ramapithecus* ⟶ *Homo habilis* ⟶ *Homo erectus.*

④ *Australopithecus* ⟶ *Homo habilis* ⟶ *Ramapithecus* ⟶ *Homo erectus.*

97. Genetic drift operates in –

① Non reproductive population　　② Slow reproductive population

③ Small isolated population　　④ Large isolated population

98. What was the most significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors ?

① Upright posture　　② Shortening of jaws

③ Binocular vision　　④ Increasing cranial capacity

99. The extinct human who lived 1,00,000 to 40,000 years ago in Europe, Asia and parts of Africa, with short stature, heavy eye brows, retreating foreheads, large jaws with heavy teeth, stocky bodies, a lumbering gait and stooped posture was :

① *Ramapithecus*　　② *Homo habilis*

③ *Neanderthal man*　　④ Cromagnon humans

100. Which one of the following was the first to stand erect ?

① Peking Man　　② *Ausralopithecus*　　③ Java Man　　④ Cromagnon Man

101. Sweet potato is homologous to :

① Ginger　　② Turnip　　③ Potato　　④ Colocasia

102. Which one is correctly matched ?

① *de Vries* – Natural Selection　　② Mendel – Theory of Pangenesis

③ Weismann – Theory of Continuity of Germplasm　　④ Pasteur – Inheritance of Acquired Character

103. Select the correct statement :

① Darwinian variations are small and directionless

② Mutations are random and directionless

③ Fitness is the end result of the ability to adapt and get selected by nature

④ All mammals, except whales and camels, have seven cervical vertebrae.

104. A high density elephant population in an area will result in :

① Mutualism (Symbiosis)　　② Predation on one another

③ Interspecific competition　　④ Intraspecific competition

105. Industrial melanism, as found in peppered moth, proves that :

① Melanic form had no selective advantage in industrial area

② Lighter form had no selective advantage in polluted industrial area and non-polluted area

③ Melanism was a pollution generated feature

④ True black melanic forms develop by recurring random mutations.

106. Dark coloured moth is able to survive in industrial areas as compared to light coloured forms because of

① High fecundity ② Mimicry

③ Natural selection in smoky environment ④ Lethal mutation

107. Which of the following is used as an atmospheric pollution indicator ?

① Lepidoptera ② Lichens ③ Lycopersicon ④ Lycopodium

108. Adaptive radiation is :

① Evolution of different species from a common ancestor

② Adaptation due to geographical isolation

③ Migration of members of a species to different geographical areas

④ Power of adaptation of an individual to a variety of environments.

109. Two species of different genealogy shows resemblance due to similar adaptation. The phenomenon is :

① Convergent evolution ② Divergent evolution ③ Micro evolution ④ Co-evolution

110. Finches of Galapagos provide evidence for :

① Retrogressive evolution ② Special creation

③ Biogeographical evolution ④ Evolution due to mutation

111. Which one of the following is incorrect about protobionts in abiogenic origin of life?

① They were partially isolated from the surroundings

② They could maintain an internal environment

③ They were able to reproduce

④ They could separate combination of molecules from the surroundings.

112. Age of fossils in the past was generally determined by radiocarbon method and other methods, involving radioactive elements found in the rocks. More precise methods, which were used recently and led to the revision of the evolutionary periods for different groups of organisms, includes :

① Study of the conditions of fossilization ② Electron Spin Resonance (ESR) & fossil DNA.

③ Study of carbohydrates/proteins in rocks ④ Study of carbohydrates/ proteins in fossils.

113. What kind of evidence suggested that man is more closely related with chimpanzee than with other hominid apes?

① Comparison of chromosome morphology only

② Evidence from fossil remains and the fossil mitochondrial DNA alone.

③ Evidence from DNA extracted from sex chromosomes, autosomes and mitochondria

④ Evidence from DNA from sex chromosomes only.

114. Darwin, in his 'Natural Selection' Theory, did not believe in any role of which one of the following in organic evolution?

① Parasites and predators, as natural enemies   ② Survival of the fittest

③ Struggle for existence   ④ Discontinuous variations

115. Presence of gills in tadpoles indicate :

① Fishes evolved from frog like ancestors   ② Frogs will have gills in future.

③ Frogs evolved from gilled ancestors   ④ Fishes were amphibious in the past.

116. Which of the following has proved helpful in preserving pollen as fossils ?

① Sporopollenin   ② Oil content   ③ Cellulosic intine   ④ Pollenkitt

117. Pollen grains can be stored for several years in liquid nitrogen having a temperature of :

① – 120° C   ② – 80° C   ③ – 196° C   ④ – 160° C

118. Double fertilisation is :

① Fusion of two male gametes with two different eggs.

② Fusion of one male gametes with two polar nuclei.

③ Fusion of two male gametes with one egg.

④ Syngamy and triple fusion.

119. Functional megaspore in an angiosperm develops into :

① Ovule   ② Endosperm   ③ Embryo sac   ④ Embryo.

120. A dioecious flowering plant prevents both

① Autogamy and xenogamy   ② Autogamy and geitonogamy

③ Geitonogamy and xenogamy   ④ Cleistogamy and xenogamy

121. Flowers which have a single ovule in the ovary and are packed intto inflorescence are usually pollinated by

① Water   ② Bee   ③ Wind   ④ Bat

122. Attractants and rewards are required for :

① Anemophily   ② Entomophily   ③ Hydrophily   ④ Cleistogamy

123. The hollow foliar structure in a wheat embryo that encloses the shoot apex and a few leaf primordia is called :

① Coleoptile   ② Coleorhiza   ③ Epicotyl   ④ Hypocotyl

124. Select the correct statement :

① Franklin Stahl coined the term "Linkage"

② Punnette Square was developed by a British scientist

③ Spliceosomes take part in translation

④ Transduction was discovered by S. Altman.

125. Which of the following pairs is wrongly matched?

  ① Starch synthesis in pea : Multiple alleles   ② ABO blood grouping : Codominance

  ③ XO type sex determination : Grasshopper   ④ T. H. Morgan : Linkage.

126. Which of the following features represent "Inheritance of blood groups' in humans?

  I. Dominance   II. Co-dominance   III. Multiple dominance

  IV. Incomplete dominance   V. Polygenic inheritance

  ① II, III and V   ② I, II and III   ③ II, IV and V   ④ I, III and V .

127. The genotypes of a husband and wife are $I^A I^B$ and $I^A i$. Among the blood types of their children, how many different genotypes and phenotypes respectively, are possible ?

  ① 3 : 3   ② 3 : 4   ③ 4 : 3   ④ 4 : 4

128. If a colour blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour blind is

  ① 0.75   ② 1   ③ 0   ④ 0.5

129. A cell at telophase stage is observed by a student in a plant brought from a field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in

  ① Aneuploidy   ② Polyploidy   ③ Somaclonal variation   ④ Polyteny

130. Match the column :

	Column - I		Column - II
a.	Dominance	(i)	Many genes govern a single character.
b.	Co-dominance	(ii)	In a heterozygote organism, only one allele express itself.
c.	Pleiotropy	(iii)	In a heterozygote organism, both alleles express themselves fully.
d.	Polygenic inheritance	(iv)	A single gene influences inheritance of many character.

  ① a (ii), b (i), c (iv), d (iii) ② a (ii), b (iii), c (iv), d (i) ③ a (iv), b (i), c (ii), d (iii) ④ a (iv), b (iii), c (i), d (ii)

131. Removal of introns and joining of exons, in a defined order, during transcription is called

  ① Splicing   ② Looping   ③ Inducing   ④ Slicing

132. What are those structures that appear as 'beads-on-string' in the chromosomes, when viewed under electron microscope ?

  ① Base pairs   ② Genes   ③ Nucleotides   ④ Nucleosomes

133. In the history of Biology, Human genome project led to the development of

  ① Bioinformatics   ② Biosystematics   ③ Biotechnology   ④ Biomonitoring

134. $3' \rightarrow 5'$ phosphodiester linkage occurs between :

① One DNA and other DNA strands ② One nucleoside with another nucleoside

③ One nucleotide with another nucleotide ④ One nitrogenous base with pentose.

135. Segment of DNA which acts as an instrument for synthesis of protein is

① Nucleoside ② Nucleotide ③ Ribose ④ Gene

136. The contraceptive 'SAHELI'

① Blocks oestrogen receptors in the uterus, preventing eggs from getting implanted.

② Increases the concentration of oestrogen and prevents ovulation in females.

③ Is an IUD

④ Is a post-coital contraceptive.

137. Match the following STDs (Column I) with their causitive agents (Column II) and select the correct option :

	Column - I		Column - II
a.	Gonorrhoea	(i)	HIV
b.	Syphilis	(ii)	*Neisseria*
c.	Genital warts	(iii)	*Treponema*
d.	AIDS	(iv)	Human Papilloma Virus

Codes :

① a – ii, b – iii, c – iv, d – i ② a – iii, b – iv, c – i, d – ii

③ a – iv, b – ii, c – iii, d – i ④ a – iv, b – iii, c – ii, d – i

138. In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation?

① intrauterine transfer ② GIFT ③ AI ④ ICSI

139. The function of copper ions in copper releasing IUDs is –

① they suppress sperm motility and fertilising capacity of sperms.

② they inhibit gametogenesis

③ they make the uterus unsuitable for implantation

④ they inhibit ovulation

140. Which one of the following is no an IUD ?

① Vaults ② Cu T ③ Multiload 375 ④ Progestasert

141. Select the correct option :

① IUI can help a woman, with premature menopause to bear a child.

② GIFT involves IVF to help women, who cannot produces ovum, to bear a child.

③ ZIFT involves IVF to help women, who cannot produces ovum, to bear a child.

④ ZIFT involves IVF to help women, who have damaged fallopian tubes, to bear a child.

142. In Lactational amenorrhoea, ovulation does not occur during the period of intense lactation because of

① High levels of FSH and LH   ② Surge of oestrogen

③ Stimulation of GnRH   ④ High level of prolactin

143. Embryo, with more than 16 blastomeres, formed due to in vitro fertilisation, is transferred into :

① Fimbriae   ② Cervix   ③ Uterus   ④ Fallopian tube

144. Which one of the following is incorrect regarding vasectomy –

① Vas deferentia is cut and tied   ② Irreversible sterility

③ No sperm occurs in seminal fluid   ④ No sperm occurs in epididymis.

145. Which of the following is hormone releasing IUD ?

① Lippes loop   ② Cu 7   ③ LNG–20   ④ Multiload 375

146. Which of the following approaches does not give the defined action of contraceptive?

①	Barrier Methods	Prevent fertilisaion
②	Intra uterine	Increase phagocytosis of sperms, suppress sperm motility and fertilising capacity of sperms
③	Hormonal Contraceptives	Prevent / retard entry of sperms, prevent ovulation and fertilisation
④	Vasectomy	Prevents spermatogenesis

147. Hormones secreted by the placenta to maintain pregnancy are :

① hCG, hPL, progestogens, prolactin   ② hCG, hPL, oestrogens, relaxin, oxytocin

③ hCG, hPL, progestogens, oestrogens   ④ hCG, progestogens, oestrogens, glucocorticoids

148. The amnion of a mammalian embryo is derived from –

① Ectoderm and mesoderm   ② Endoderm and mesoderm

③ Trophoblast and mesoderm   ④ Ectoderm and endoderm

149. Capacitation occurs in –

① Rete testis   ② Epididymis

③ Vas deferens   ④ Female reproductive tract

150. Signals for the onset of parturition originate from :

① Mother's hypothalamus   ② Foetus and placenta

③ Mother's uterus   ④ Mother's pituitary

151. Identify the correct statement on inhibin :

① Inhibits the secretion of LH, FSH and Prolactin

② Is produced by granulose cells in ovary and inhibits the secretion of FSH.

③ Is produced by granulose cells in ovary and inhibits the secretion of LH.

④ Is produced by the nurse cells in testis and inhibits the secretion of LH.

152. Changes in GnRH pulse frequency in females is controlled by circulating levels of :

① Oestrogen and progesterone   ② Oestrogen and inhibin

③ Progesterone only   ④ Progesterone and inhibin

153. Select the incorrect statement :

① FSH stimulates the Sertoli cells, which help in spermiogenesis.

② LH triggers ovulation in ovary.

③ LH and FSH decrease gradually during the follicular phase

④ LH triggers secretion of androgens from the Leydig cells.

154. Fertilisation in humans is practically feasible only if :

① The sperms are transported into vagina just after release of ovum in the fallopian tube.

② The ovum and sperms are transported simultaneously to ampullary – isthmic junction of the fallopian tube.

③ The ovum and sperms are transported simultaneously to the cervix.

④ The sperms are transported into cervix within 48 hours of release of ovum in uterus .

155. Which of these is not an important component of initiation of parturition in humans ?

① Release of oxytocin   ② Release of prolactin

③ Increase in oestrogen and progesterone ratio   ④ Synthesis of prostaglandins.

156. Capacitation refers to changes in the

① Ovum after fertilisation   ② Sperm after fertilisation

③ Sperm before fertilisation   ④ Ovum before fertilisation

157. Which of the following cells during gametogenesis, is normally diploid ?

① Spermatogonia   ② Secondary polar body

③ Primary polar body   ④ Spermatid

158. In human females, meiosis II is not complete until –

① Fertilisation   ② Uterine implantation   ③ Birth   ④ Puberty

159. Which of the following layers in an antral follicle is acellular ?

① Theca interna   ② Stroma   ③ Zona pellucida   ④ Granulosa

160. The secretory phase in the human menstrual cycle is also called :

① Luteal phase and lasts for about 6 days.   ② Follicular phase and lasts for about 6 days

③ Luteal phase and lasts for about 13 days   ④ Follicular phase and lasts for about 13 days

161. In which disease does mosquito transmitted pathogen cause chronic inflammation of lymphatic vessels ?

① Elephantiasis   ② Ascariasis

③ Ringworm   ④ Amoebiasis

162. Match Column I with Column II and select the correct option :

	Column - I		Column - II
a.	*Plasmodium*	(i)	Ringworm
b.	*Wuchereria*	(ii)	Amoebiasis

c.	*Entamoeba*	(iii)	Elephantiasis
d.	*Microsporum*	(iv)	Malaria

① a (iv), b (iii), c (ii), d (i)   ② a (iv), b (i), c (ii), d (iii)

③ a (iv), b (iii), c (i), d (ii)   ④ a (i), b (iii), c (ii), d (i)

163. Which of the following sets of diseases is caused by bacteria ?

① Tetanus and mumps   ② Herpes and influenza

③ Cholera and tetanus   ④ Typhoid and small pox

164. Infection of *Ascaris* usually occurs by :

① Mosquito bite   ② Drinking water containing eggs of *Ascaris*

③ Eating imperfectly cooked pork   ④ Tse-tse fly.

165. Motile zygote of *Plasmodium* occurs in

① Human liver   ② Gut of female *Anopheles*

③ Salivary glands of *Anopheles*   ④ Human RBCs

166. Common cold is not cured by antibiotics because it is

① Caused by a gram negative bacterium   ② Not an infectious diseases

③ Caused by a virus   ④ Caused by a germ positive bacterium

167. Where will you find the sporozoites of the malarial parasites ?

① gut of freshly moulted female *Anopheles* mosquito.   ② Saliva of infected female *Anopheles* mosquito

③ RBCs of humans suffering from malaria   ④ Spleen of infected humans

168. Ringworm in humans is caused by :

① Fungi   ② Nematodes   ③ Viruses   ④ Bacteria

169. Pair of viral diseases is :

① Ringworm, AIDS   ② Typhoid, TB

③ Dysentry, common cold   ④ Common cold, AIDS

170. Which is showing accurate pairing ?

① Syphilis – *Treponema pallidum*   ② AIDS – *Bacillus conjugalis*

③ Gonorrhoea – *Leishmania donovani*   ④ Typhoid – *Mycobacterium leprae*

171. Similarity in *Ascaris lumbricoides* and *Anopheles stephensi* is :

① Sexual dimorphism   ② Metamerism

③ Anaerobic respiration   ④ Endoparasitism

172. Which of the following diseases is now considered completely eradicated from India ?

① Small pox   ② Poliomyelitis   ③ Plague   ④ Kala-azar

173. Which of the following events is not associated with ovulation in human females ?

① Full development of graafian follicle   ② Release of secondary oocyte

③ LH surge   ④ Decrease in oestradiol

174. What is the correct sequence of sperm formation ?

① Spermatogonia, Spermatocyte, Spermatid, Spermatozoa

② Spermatid, Spermatocyte, Spermatogonia, Spermatozoa

③ Spermatogonia, Spermatocyte, Spermatozoa, Spermatid

④ Spermatogonia, Spermatozoa, Spermatocyte, Spermatid

175. Which one of the following statements is false with respect to viability of mammalian sperms ?

① Sperms must be concentrated in a thick suspension

② Sperm is viable for only 24 hours

③ Survival of sperm depends on the pH of the medium and is more active in alkaline medium

④ Viability of sperm is determined by its motility.

176. Which is correct about morula ?

① Less cytoplasm and less DNA than zygote

② Same amount of cytoplasm and DNA as zygote

③ More cytoplasm and more DNA than zygote

④ Same amount of cytoplasm but more DNA than zygote

177. Secretions from which of the following is rich in fructose, calcium and some enzymes ?

① Male accessory glands ② Pancreas   ③ Liver   ④ Salivary glands

178. Ectopic pregnancies are referred to as :

① Implantation of embryo at a site other than uterus

② Implantation of defective embryo in the uterus.

③ Pregnancies terminated due to hormonal imbalance

④ Pregnancies with genetic abnormalities.

179. What is the work of progesterone which is present in oral contraceptive pills ?

① To inhibit ovulation

② To check oogenesis

③ To check entry of sperms into cervix and to make them inactive

④ To check sexual behaviour

180. Foetal sex can be determined by examining cells from the amniotic fluid by looking for :

① Chiasmata   ② Kinetochore   ③ Barr bodies   ④ Autosomes