

Common Entrance Examination-2024 (Admission for B. Tech/B. Pharmacy)

Time : 3:15 Hrs.

Booklet No.

Maximum Marks : 600

READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. Do not open the seal of the question booklet until you are asked to do so by the invigilator.
2. OMR answer-sheet will be supplied by the Centre Superintendent for answering the questions.
3. USE blue/black ink ball pen only to darken the appropriate circle/oval in the OMR answer-sheet. No sophisticated pens are allowed.
4. Darken one circle/oval deeply for each question in the OMR answer-sheet, as faintly darkened circle might be rejected by the scanner. Wrong Correct
5. This question booklet contains **40 pages** including blank pages for rough work. After you are permitted to open the seal, please check all pages and report discrepancies, if any, to the invigilator on duty.
6. Out of total of 180 questions, **150** are to be attempted which shall carry **600** marks. All these questions are of Multiple Choice Questions (MCQs). Each question has only one correct answer.
7. **Examination Pattern: -**

Subjects	Section -A (All 20 Questions are compulsory)	Section-B (Attempt 30 Questions out of 40 Questions)
PHYSICS	Question 1 to 20	Questions 21 to 60
CHEMISTRY	Questions 61 to 80	Questions 81 to 120
MATHEMATICS/BIOLOGY	Questions 121 to 140	Questions 141 to 180

8. a. Question 1 to 60 pertain to **Physics**, questions 61 to 120 pertain to **Chemistry**, questions 121 to 180 pertain to **Mathematics** or **Biology** and each question carries 4 marks. You are advised to attempt questions from one subject, either **Mathematics** or **Biology**. The question belonging to Physics and Chemistry subjects are compulsory for all. However, Mathematics is also compulsory for B. Tech course.
 - b. **For Section-B (MCQs):** Candidates need to attempt any 30 Questions out of 40 Questions given. In the event of a candidate attempting more than 30 questions, only the first 30 attempted questions will be considered for evaluation.
9. Rough work can be done on the question paper itself. Blank pages are provided at the end of the question booklet for rough work.
10. **Do not fold the OMR answer-sheet and don't put any mark on it to avoid rejection by the scanner.**
 11. Write your roll number carefully on the OMR answer-sheet and darken the appropriate circle/oval properly.
 12. On opening the question booklet, fill-up the required information with blue/black ball pen correctly both in the question booklet and the OMR answer-sheet.
13. Mobile phones/ electronic devices etc. are not allowed inside the examination hall.
14. The question booklet may be retained by the candidate after the entrance test is over.
15. **Four (+4) marks shall be awarded for each correct answer and one (-1) mark shall be deducted for each wrong answer. Un-answered/ un-marked question will be given no marks (0).**
16. Before the start of the examination, write your name and registration number in the space provided below using a blue/black ink ball point pen.

Name										
Registration Number										

PHYSICS-Section A

(Attempt all 20 Questions Compulsory)

- Number of Fundamental Forces in Nature are
 - infinite
 - 2
 - 3
 - 4
- One Fermi unit is equal to
 - 10^{15} m
 - 10^{-18} m
 - 10^{-15} m
 - 10^{18} m
- Water moves up a straw because of
 - Capillary Action of water
 - Cohesion of water
 - Adhesion of water
 - None of these
- A man pushes a wall and fails to displace it. He does
 - Negative work
 - positive but not maximum work
 - No work at all
 - Maximum work
- Which of the following statement is true?
 - In elastic collisions, the momentum is conserved but not in inelastic collision.
 - Both kinetic energy and momentum are conserved in inelastic as well as elastic collision.
 - Total kinetic energy is not conserved but momentum is conserved in inelastic collision.
 - Total kinetic energy is conserved in elastic collision but momentum is not conserved in elastic collision.
- When work of 1000 J is done in 2 seconds, the power utilized is
 - 100 W
 - 200 W
 - 500 W
 - 20 W
- An object is placed at 0.06 m from a convex lens of focal length 0.10 m. The position of image is
 - 15 cm
 - 15 cm
 - $4/15$ m
 - $-4/15$ m

8. Velocity of light in liquid is 1.5×10^8 m/s and in air is 3×10^8 m/s. If a ray of light passes from liquid into air, the critical angle is
- (A) 90° (B) 60°
(C) 45° (D) 30°
9. Time taken by light to travel 10 cm thick glass of $\mu = 1.5$ is
- (A) 0.5×10^{-10} s (B) 5×10^{-10} s
(C) 50×10^{-10} s (D) 0.05×10^{-10} s
10. Work done by force $\vec{F}(\text{N}) = 2\hat{i} + 3\hat{j} + 4\hat{k}$ on an object carried through a displacement of $10\hat{i} + 20\hat{j} + 5\hat{k}$ is
- (A) 10 unit (B) 50 unit
(C) 100 unit (D) 200 unit
11. Ratio of angular speed of hour-hand of watch and earth's rotation about its own axis is
- (A) 1:2 (B) 1:0.2
(C) 2:1 (D) 0.2:1
12. Which of the following is non-conservative force?
- (A) Coulomb Force (B) Gravitational Force
(C) Frictional Force (D) Magnetic Force
13. Force of attraction between two-point charges placed at a distance 'd' is 'F'. What distance apart should they be kept in the same medium so that force between them is F/3?
- (A) 3d (B) 9d
(C) $\sqrt{3}$ (D) None of the above
14. A body is moving in a room with a velocity of 20 m/s perpendicular to the two walls separated by 5 meters. There is no friction and the collision with the walls are elastic. The motion of the body is
- (A) Not periodic
(B) Periodic but not simple harmonic
(C) Periodic and simple harmonic
(D) Periodic with variable time period

15. The potential energy of a particle executing S.H.M. at a distance x from the mean position is proportional to
- (A) \sqrt{x} (B) x
(C) x^2 (D) x^3
16. The period of a simple pendulum is doubled when
- (A) its length is doubled.
(B) the mass of the bob is doubled.
(C) its length is made four times.
(D) the mass of the bob and the length of the pendulum are doubled.
17. The angular velocity of seconds hand of a wrist watch will be
- (A) $\pi/60$ rad / sec (B) $\pi/30$ rad / sec
(C) 60π rad / sec (D) 30π rad / sec
18. The maximum load a wire can withstand without breaking when its length is reduced to half of its original length, will
- (A) be doubled
(B) be half
(C) be four times
(D) remain the same
19. The acceleration due to gravity on Earth and Saturn are g_E and g_S respectively. The radius and mass of Saturn is twice as that of the Earth, the ratio of their acceleration due to gravity is
- (A) 2:1 (B) 1:2
(C) 1:4 (D) 4:1
20. Kepler's second law regarding constancy of areal velocity of a planet is a consequence of the law of conservation of
- (A) energy
(B) angular momentum
(C) linear momentum
(D) none of the above

PHYSICS-Section B

(Attempt any 30 Questions)

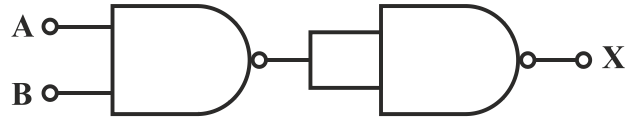
21. For red and violet light, the refractive index (μ) of the material of a prism is
- (A) min. for red and max. for violet.
 - (B) min. for violet and max. for red.
 - (C) same for both.
 - (D) none of the above.
22. In Young double slit experiment, out of blue, red and yellow, the fringe width will be maximum for
- (A) Blue
 - (B) Red
 - (C) Yellow
 - (D) Same for all
23. A body executing S.H.M. has equation $y = 0.30 \sin (220 t + 0.64)$ in meter. Then the frequency and maximum velocity of the body is
- (A) 35Hz, 66m/s
 - (B) 45Hz, 66m/s
 - (C) 58Hz, 113m/s
 - (D) 35Hz, 132m/s
24. For a photosensitive material, the stopping potential is V_s when illuminated with red color of wavelength $\sim 700\text{nm}$. When the same material is illuminated with violet color of wavelength $\sim 400\text{nm}$ at constant intensity. The stopping potential will
- (A) increase
 - (B) decrease
 - (C) become zero
 - (D) remain same.
25. Which of the following is true for standing waves?
- (A) The disturbance is confined to a particular region between the starting point and reflecting point of the wave.
 - (B) The amplitude of vibration of particles varies from zero at nodes to maximum at antinodes.
 - (C) The total energy associated with a stationary wave is twice the energy of each of incident and reflected wave. But there is no flow or transference of energy along the stationary wave.
 - (D) All of the above

26. An electric dipole of dipole moment 4×10^{-5} cm is placed in a uniform electric field of 10^{-3} NC^{-1} making an angle of 30° with the direction of field. The torque exerted by the electric field on the dipole is
- (A) $0.2 \times 10^{-8} \text{ Nm}$ (B) $2 \times 10^{-10} \text{ Nm}$
(C) $2 \times 10^{-8} \text{ Nm}$ (D) $22 \times 10^{-8} \text{ Nm}$
27. Work done in moving the test charge from one point of equipotential surface to other is
- (A) infinite (∞) (B) zero
(C) unity (D) None of these
28. Magnitude of electric field E, in terms of magnitude of electric potential V is given by
- (A) $E = \frac{dV}{dr}$ (B) $E = -\frac{dV}{dr}$
(C) Both of the above (D) None of the above
29. If potential difference across a capacitor is doubled, then what happens to charge of the capacitor and energy stored in the capacitor?
- (A) both charge and energy remain same.
(B) both charge and energy doubles.
(C) charge doubles but energy remains same.
(D) charge doubles while energy quadruples.
30. Two charges of magnitude $-2Q$ and Q are located at points $(a,0)$ and $(4a,0)$, respectively. The electric flux due to charges through a sphere of radius '3a' with its center at the origin is
- (A) $-\frac{Q}{\epsilon_0}$ (B) $-\frac{3Q}{\epsilon_0}$
(C) $-\frac{2Q}{3\epsilon_0}$ (D) $-\frac{2Q}{\epsilon_0}$
31. A 12pF capacitor is connected to a 50V battery. The electrostatic energy stored in the capacitor is
- (A) $15 \times 10^{-8} \text{ J}$ (B) $0.15 \times 10^{-8} \text{ J}$
(C) $1.5 \times 10^{-10} \text{ J}$ (D) $1.5 \times 10^{-8} \text{ J}$

32. If 'r' is the radius of a conducting wire, then the resistance of the wire is proportional to
- (A) $\frac{1}{r}$ (B) $\frac{1}{r^2}$
(C) r^2 (D) r
33. If the potential difference V applied across a conductor is doubled, then the drift velocity of the electron will become
- (A) double (B) half
(C) quadruple (D) None of the above
34. The color code for a resistor of resistance 3.5 k Ω with 5% tolerance is
- (A) Red, Green, Red-gold
(B) Orange, Green, Red-silver
(C) Orange, Green, Red-gold
(D) Orange, yellow, Red-gold
35. If 0.6 mole of electrons flow through a wire in 50 minutes. The total charge that passes through the wire is, (Avogadro's number = 6×10^{23} per mole)
- (A) 5.76×10^5 C, (B) 5.76×10^6 C,
(C) 5.76×10^4 C, (D) 576×10^5 C.
36. The potential difference applied across a given resistor is altered so that the heat produced per second increases by a factor of 9V. By what does the applied potential difference change?
- (A) By a factor of 2 (B) By a factor of 3
(C) By a factor of 4 (D) By a factor of $\frac{1}{2}$
37. The storage battery of a car has an emf of 12V. The internal resistance of the battery is 0.4 Ω . What is the maximum current that can be drawn from the battery?
- (A) 30 A (B) 3 A
(C) 0.3 A (D) 0.03 A
38. Proton and electron are moving in same magnetic field 'B'. If R_p and R_e are the radii of the circular paths followed by proton and electron, then
- (A) $R_e < R_p$ (B) $R_e > R_p$
(C) $R_e = R_p$ (D) None of these

39. What is not true about the poles of a magnet?
- (A) poles exist always in pairs.
 - (B) poles of a magnet are always unlike.
 - (C) poles of a magnet are of equal strength.
 - (D) poles are situated a little outwards from the geometrical ends of magnet.
40. Torque acting on a magnet held at an angle θ with a magnetic field is maximum, when ' $\theta =$ '
- (A) 0°
 - (B) 180°
 - (C) 60°
 - (D) 90°
41. Magnetic field strength due to a bar magnet at a point distant 'd' from the centre of magnet is proportional to
- (A) $1/d$
 - (B) d
 - (C) d^3
 - (D) $1/d^3$
42. The cause of the potential barrier in a p-n junction diode is
- (A) depletion of positive charges near the junction.
 - (B) concentration of positive charges near the junction.
 - (C) depletion of negative charges near the junction.
 - (D) concentration of positive and negative charges near the junction.
43. On which factor does the average kinetic energy of gas molecules depends on?
- (A) Nature of the gas
 - (B) Temperature
 - (C) Volume
 - (D) Mass
44. The Young's modulus of a wire of length 'L' and radius 'r' is 'Y'. If length is reduced to $L/2$ and radius $r/2$, then Young's modulus will be
- (A) $Y/2$
 - (B) $4Y$
 - (C) $2Y$
 - (D) Y
45. A transistor has three impurity regions. All the three regions have different doping levels. In order of increasing doping level, the regions are
- (A) emitter, base, and collector
 - (B) collector, base, and emitter
 - (C) base, emitter and collector
 - (D) base, collector and emitter

46. The output (X) of the logic circuit shown in Figure will be



- (A) $X = \overline{\overline{A} \cdot \overline{B}}$ (B) $X = A \cdot B$
(C) $X = \overline{A \cdot B}$ (D) $X = \overline{A + B}$

47. A p-n photodiode is fabricated from a semiconductor with a band gap of 2.5 eV. It can detect a signal of wavelength

- (A) 5000 nm (B) 4000 nm
(C) 4000 Å (D) 6000 Å

48. With the rise in temperature, the electric resistance

- (A) decreases for conductor but increases for semiconductor.
(B) increases for conductor but decreases for semiconductor.
(C) decreases for both conductors and semiconductors.
(D) increases for both conductors and semiconductors.

49. With an Increase in the area of hysteresis curve, power loss will

- (A) First decrease and then increase
(B) First increase and then decrease
(C) Decrease
(D) Increase

50. If the wavelength (λ) of the radio signals is to be transmitted then the length of the Hertz antenna is

- (A) λ (B) 2λ
(C) $\lambda/4$ (D) $\lambda/2$

51. Which of the following relation is true?

- (A) $3Y = K(1 - \sigma)$ (B) $\sigma = \frac{0.5Y - \eta}{\eta}$
(C) $K = \frac{9\eta Y}{Y + \eta}$ (D) $\sigma = (6K + \eta) Y$

52. A neutron decays into a proton, an electron and ...
- (A) a beta-particle (B) an alpha-particle
(C) an antineutrino (D) a neutrino
53. Fusion reaction takes place at high temperature because
- (A) molecules break up at high temperature.
(B) nuclei break up at high temperature.
(C) kinetic energy is high enough to overcome the coulomb repulsion between nuclei.
(D) atoms get ionized at high temperature.
54. A nucleus undergoes gamma decay due to
- (A) excess of neutrons (B) excess of protons
(C) its excited state (D) large mass
55. Which of following are not emitted by radioactive substance?
- (A) Protons (B) Electrons
(C) Gamma Rays (D) Helium Nuclei
56. Proton, Neutron, alpha-particle and beta-particle are moving with same speed, the de-Broglie wavelength will be maximum for
- (A) Proton (B) Neutron
(C) Alpha-particle (D) Beta-particle
57. According to de Broglie's hypothesis, the wavelength of electron is
- (A) directly proportional to velocity of particle.
(B) directly proportional to square of velocity of particle.
(C) inversely proportional to velocity of particle.
(D) inversely proportional to square of velocity of particle.
58. If in a photoelectric experiment, the wavelength of the incident radiation decreases from 500nm to 400nm, then
- (A) stopping potential will increase.
(B) stopping potential will decrease.
(C) work function will increase.
(D) kinetic energy of the ejected electrons will decrease.

59. Which of the following materials has the highest hardness?
- (A) Steel (B) Glass
(C) Diamond (D) Aluminum
60. Which of the following thermodynamical process is always irreversible?
- (A) Infinitesimal Isothermal expansion
(B) Adiabatic compression
(C) Both (A) and (B)
(D) None of the above

Values

c	velocity of light in vacuum	$2.997\ 924\ 58 \cdot 10^8$ m/s
h	Planck's constant	$6.626\ 069 \cdot 10^{-34}$ J/s
\hbar	($=h/2\pi$)	$1.054\ 571 \cdot 10^{-34}$ J/s
e	electronic charge	$1.602\ 176 \cdot 10^{-19}$ C
μ_e	electron magnetic moment	$-928.476\ 362 \cdot 10^{-26}$ J/T
μ_B	Bohr magneton	$927.400\ 899 \cdot 10^{-26}$ J/T
μ_N	nuclear magneton	$5.050\ 783\ 17 \cdot 10^{-27}$ J/T
m_e	electron mass	$9.109\ 381\ 88 \cdot 10^{-31}$ kg
m_p	proton mass	$1.672\ 621\ 58 \cdot 10^{-27}$ kg
m_N	neutron mass	$1.674\ 927\ 16 \cdot 10^{-27}$ kg
k_B	Boltzmann's constant	$1.380\ 650 \cdot 10^{-23}$ J/K
N_A	Avogadro's constant	$6.022\ 142 \cdot 10^{23}$
R	molar gas constant	$N_A \cdot k_B = 8.314\ 472$ J/mol · K
F	Faraday constant	96 485.3415 C/mol

CHEMISTRY-Section A

(Attempt all 20 Questions Compulsory)

61. Calculate the number of atoms in 52 g of He.
- (A) 7.8286×10^{24} (B) 208
(C) 13 (D) 78.286×10^{31}
62. Which of the following species does not show a disproportionation reaction?
- (A) ClO^- (B) ClO^{2-}
(C) ClO^{3-} (D) ClO^{4-}
63. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was:
- (A) phosgene (B) methylamine
(C) ammonia (D) methylisocyanate
64. If 10 volumes of dihydrogen gas react with five volumes of dioxygen gas, how many volumes of water vapour would be produced?
- (A) 10 (B) 15
(C) 5 (D) 25
65. Galvanization is applying a coating of
- (A) Pb (B) Cr
(C) Cu (D) Zn
66. Which one of the following is not an ore of Fe?
- (A) Haematite (B) Magnetite
(C) Siderite (D) Bauxite
67. Surface tension in SI units is expressed as;
- (A) N cm^{-1} (B) J m^{-2}
(C) N m^{-1} (D) J m^{-1}
68. The conductivity of 0.20 M solution of KCl at 298 K is 0.0248 S cm^{-1} . Calculate its molar conductivity:
- (A) $124 \text{ S cm}^2 \text{ mol}^{-1}$ (B) $248 \text{ S cm}^2 \text{ mol}^{-1}$
(C) $12.4 \text{ S cm}^2 \text{ mol}^{-1}$ (D) $0.124 \text{ S cm}^2 \text{ mol}^{-1}$

69. Which of the following will have the most negative electron gain enthalpy?
- (A) P (B) S
(C) Cl (D) F
70. Root mean square speed, average speed and the most probable speed have the following relationship:
- (A) $u_{\text{rms}} > u_{\text{av}} > u_{\text{mp}}$ (B) $u_{\text{rms}} < u_{\text{av}} > u_{\text{mp}}$
(C) $u_{\text{rms}} < u_{\text{av}} < u_{\text{mp}}$ (D) $u_{\text{rms}} > u_{\text{av}} < u_{\text{mp}}$
71. For the reaction $A + 3B \rightarrow C$, the rate is given by $R = [A] [B]^3$ then the order of the reaction is
- (A) 1 (B) 2
(C) 3 (D) 4
72. Which of the following hydrides are also called saline hydrides:
- (A) Ionic (B) Covalent
(C) Metallic (D) None of the above
73. What is Boyle's Law?
- (A) At constant T and n; $V \propto 1/p$
(B) At constant p and n; $V \propto T$
(C) At constant p and T; $V \propto n$
(D) At constant T and n; $V \propto p$
74. Rate of physisorption increases with:
- (A) decrease in temperature (B) increase in temperature
(C) decrease in pressure (D) decrease in surface area
75. Atomic number of lanthanum is
- (A) 47 (B) 57
(C) 48 (D) 58
76. The group having isoelectronic species is :
- (A) O^{2-} , F^- , Na^+ , Mg^{2+} (B) O^- , F^- , Na , Mg^+
(C) O^{2-} , F^- , Na , Mg^{2-} (D) O^- , F^- , Na^+ , Mg^{2+}

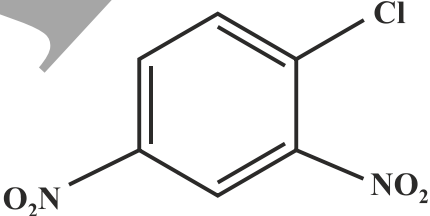
77. The number of pi bonds in Peroxydisulphuric acid are:
(A) 4 (B) 2
(C) 3 (D) 5
78. The noble gas which is most difficult to liquefy is:
(A) He (B) Ne
(C) Xe (D) Ar
79. CH_3MgI is an organometallic compound due to:
(A) C—Mg bond (B) C—H bond
(C) Mg—I bond (D) C—I bond
80. Fire extinguishers contain H_2SO_4 and which one of the following:-
(A) CaCO_3 (B) NaHCO_3 and Na_2CO_3
(C) Na_2CO_3 (D) NaHCO_3

CHEMISTRY-Section B

(Attempt any 30 Questions)

81. Give the number of electrons in the species: H_2^+ , O_2 and O_2^+ respectively :
(A) 1,16,15 (B) 0, 16, 15
(C) 0,15,16 (D) 1,15,16
82. Fluorobenzene ($\text{C}_6\text{H}_5\text{F}$) can be synthesised in the laboratory
(A) by heating phenol with HF and KF.
(B) from aniline by diazotization followed by heating the diazonium salt with HBF_4 .
(C) by direct fluorination of benzene with F_2 gas.
(D) by reacting bromobenzene with NaF solution.
83. Which of the following statements in relation to the hydrogen atom is correct?
(A) 3s orbital is lower in energy than 3p orbital.
(B) 3p orbital is lower in energy than 3d orbital.
(C) 3s and 3p orbitals are of lower energy than 3d orbital.
(D) 3s, 3p and 3d orbitals all have the same energy.

84. The maximum number of electrons in the shell with principal quantum number n is equal to
- (A) $2n^2$ (B) n^2
(C) $2n^3$ (D) $2n$
85. The gas evolved on heating CH_3MgBr in methanol is
- (A) methane (B) ethane
(C) propane (D) HBr
86. Shape of the molecule SF_4 is :
- (A) See-saw (B) Octahedral
(C) Tetrahedral (D) T-shape
87. The total number of lone pairs in the molecule ClF_3 are :
- (A) 3 (B) 9
(C) 5 (D) 2
88. Which of the following molecule is electron deficient?
- (A) PH_3 (B) B_2H_6
(C) CH_4 (D) C_2H_6
89. Hybridization in the molecule XeF_4 is:
- (A) sp^3 (B) sp^3d
(C) sp^3d^2 (D) sp^2
90. The correct sequence of increasing covalent characters is shown by :
- (A) $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$ (B) $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$
(C) $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$ (D) $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$
91. Dipole-induced dipole interactions are present in which of the following pairs?
- (A) H_2O and alcohol (B) Cl_2 and CCl_4
(C) HCl and He atoms (D) SiF_4 and He atoms
92. Choose the correct answer. A thermodynamic state function is a quantity :
- (A) used to determine heat changes.
(B) whose value is independent of the path.
(C) used to determine pressure-volume work.
(D) whose value depends on temperature only.

93. An ideal gas is allowed to expand from 1 L to 10 L against a constant external pressure of 1 bar. The work done in kJ is:
- (A) +10.0 (B) -9.0
(C) -12.0 (D) -0.9
94. The molarity of a solution containing 5 g of NaOH in 450 mL solution in mol L⁻¹
- (A) 0.278 (B) 0.248
(C) 2.78 (D) 0.5
95. According to Raoult's Law, which statement is correct about Chloroform and Acetone mixture:
- (A) It will show a negative deviation from Raoult's Law.
(B) It will show a positive deviation from Raoult's Law.
(C) There will be no deviation.
(D) Firstly it will show a negative deviation then will show a positive deviation.
96. Which of the following is not an antacid?
- (A) Histamine (B) Cimetidine
(C) Rantidine (D) Aspirin
97. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant K_c is
- (A) $\Delta G = RT \ln K_c$ (B) $-\Delta G = RT \ln K_c$
(C) $\Delta G^\circ = RT \ln K_c$ (D) $-\Delta G^\circ = RT \ln K_c$
98. Which one of the following is the correct IUPAC name of the compound?
- 
- (A) 1-Chloro-2,4-dinitrobenzene (B) 1,3-Dinitro-6-chloro-benzene
(C) 2-Chloro-1,5-dinitrobenzene (D) 4-Chloro-1,3-dinitrobenzene
99. Due to the presence of an unpaired electron, free radicals are
- (A) Chemically reactive (B) Chemically inactive
(C) Anions (D) Cations

100. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of:-
- (A) an isopropyl group (B) an acetylenic triple bond
(C) two ethylenic double bonds (D) a vinyl group
101. In the Lassaigne's test for nitrogen in an organic compound, the Prussian blue colour is obtained due to the formation of:
- (A) $\text{Na}_4[\text{Fe}(\text{CN})_6]$ (B) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
(C) $\text{Fe}_2[\text{Fe}(\text{CN})_6]$ (D) $\text{Fe}_3[\text{Fe}(\text{CN})_6]_4$
102. What is DDT among the following?
- (A) A fertilizer (B) Biodegradable pollutant
(C) Non-biodegradable pollutant (D) Greenhouse gas
103. Ingestion of even small quantities of which alcohol can cause blindness?
- (A) Methanol (B) Ethanol
(C) Propanol (D) Butan-1-ol
104. The term anomers of glucose refer to
- (A) isomers of glucose that differ in configurations at carbons one and four (C-1 and C-4).
(B) a mixture of (D)-glucose and (L)-glucose.
(C) enantiomers of glucose.
(D) isomers of glucose that differ in configuration at carbon one (C-1).
105. The total number of lone-pair of electrons in melamine is:
- (A) 2 (B) 4
(C) 6 (D) 8
106. Colour shown by the Mn^{2+} (aquated) ion is:
- (A) Pink (B) Yellow
(C) Blue (D) Green
107. The lanthanide contraction is responsible for the fact that
- (A) Zr and Y have about the same radius.
(B) Zr and Nb have a similar oxidation state.
(C) Zr and Zn have the same oxidation state.
(D) Zr and Hf have about the same radius.

108. Among the following acids which have the lowest pK_a value?
- (A) CH_3COOH (B) $HCOOH$
(C) $(CH_3)_2COOH$ (D) CH_3CH_2COOH
109. How many ions are produced from the complex $Co(NH_3)Cl_2$ in the solution?
- (A) 6 (B) 4
(C) 3 (D) 2
110. $[Co(NH_3)_5(SO_4)] Br$ and $[Co(NH_3)_5Br]SO_4$ are:
- (A) Linkage isomers (B) Coordination isomers
(C) Ionisation isomers (D) Solvate isomers
111. Which one of the following block elements is called a Representative element?
- (A) s- block (B) p- block
(C) d- block (D) f- block
112. The value of the Rydberg constant is :
- (A) $109,677\text{ cm}^{-1}$ (B) $107,799\text{ cm}^{-1}$
(C) $103,677\text{ cm}^{-1}$ (D) $103,699\text{ cm}^{-1}$
113. Which one of the following elements has the lowest first ionisation enthalpy?
- (A) Li (B) Na
(C) K (D) Cs
114. Identify the correct order of acidic strength of CO_2 , CuO , CaO , and H_2O .
- (A) $CaO < CuO < H_2O < CO_2$
(B) $H_2O < CuO < CaO < CO_2$
(C) $CaO < H_2O < CuO < CO_2$
(D) $H_2O < CO_2 < CaO < CuO$
115. Which of the following is a fully fluorinated polymer?
- (A) Neoprene (B) Teflon
(C) Thiokol (D) PVC
116. The hybridization and Magnetic behaviour of $[Co(NH_3)_6]^{3+}$ is :
- (A) d^2sp^3 and paramagnetic (B) d^2sp^3 and diamagnetic
(C) sp^3d^2 and paramagnetic (D) sp^3d^2 and diamagnetic

117. The number of unpaired electrons in the highest occupied molecular orbital of N_2 is/are:
- (A) 1 (B) 0
(C) 2 (D) 3
118. Biuret test is not given by:-
- (A) proteins (B) carbohydrates
(C) polypeptides (D) urea
119. Which one of the following is the most abundant element of the universe?
- (A) H_2 (B) O_2
(C) C (D) Fe
120. Dihedral angle in the structure of H_2O_2 (gas phase) approx. is :
- (A) $\sim 111^\circ$ (B) $\sim 120^\circ$
(C) $\sim 60^\circ$ (D) $\sim 90^\circ$

MATHEMATICS-Section A

(Attempt all 20 Questions Compulsory)

121. $0 + 0i$ is.....for complex number z .
- (A) additive inverse
(B) additive identity element
(C) multiplicative identity element
(D) multiplicative inverse
122. The relation $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)\}$ on the set $A = \{1, 2, 3\}$ is
- (A) reflexive, transitive but not symmetric.
(B) reflexive but not transitive.
(C) symmetric and transitive.
(D) neither symmetric nor transitive.
123. If $f(x) = x^2 + 2$, $x \in \mathbb{R}$ then the range of $f(x)$ is
- (A) $[2, \infty)$ (B) $(-\infty, 2]$
(C) $(2, \infty)$ (D) $(-\infty, 2) \cup (2, \infty)$
124. If ${}^{2n}C_3 : {}^nC_3 = 9 : 1$, then n is
- (A) 7 (B) 28
(C) 14 (D) 32
125. $\int_0^{\pi/2} |\cos \frac{x}{2}| dx$ is
- (A) 1 (B) -2
(C) $\sqrt{2}$ (D) 0
126. Value that divides the series into hundred equal parts is called
- (A) percentile (B) quartile
(C) decile (D) octile
127. An unbiased coin is tossed four times. The probability of getting at least one head is
- (A) $1/4$ (B) $1/8$
(C) $15/16$ (D) $1/16$

128. Which of the below conditions is incorrect for the inverse of the matrix A
- (A) The matrix A must be a square matrix.
 (B) $\text{adj } A \neq 0$.
 (C) A must be a non-singular matrix.
 (D) A must be a singular matrix.
129. If a, b and c are in arithmetic progression then
- (A) $b = a + c$ (B) $2b = a + c$
 (C) $b^2 = a + c$ (D) $2b^2 = a + c$
130. If the two lines $3x + 4y = 8$ and $lx + my = n$ are perpendicular then which of the following is true?
- (A) $3m + 4l = 0$ (B) $3m - 4l = 0$
 (C) $3l - 4m = 0$ (D) $3l + 4m = 0$
131. The coordinates of the foot of the perpendicular drawn from the point $(-2, 8, 7)$ on the XZ-plane is
- (A) $(-2, -8, 7)$ (B) $(2, 8, -7)$
 (C) $(-2, 0, 7)$ (D) $(0, 8, 0)$
132. The vector equation of XY-plane is
- (A) $\vec{r} \cdot \hat{i} = 0$ (B) $\vec{r} \cdot \hat{j} = 0$
 (C) $\vec{r} \cdot \hat{k} = 0$ (D) $\vec{r} \cdot \hat{n} = 0$
133. The sum of the deviations taken away from the mean is
- (A) always equal to 0 (B) never equals to 0
 (C) sometimes equal to 0 (D) none of the above
134. The value of a so that the function f defined by $f(x) = \begin{cases} ax, & x \leq \pi \\ \cos x, & x > \pi \end{cases}$ is continuous at $x = \pi$ is
- (A) $\frac{1}{\pi}$ (B) $-\frac{1}{\pi}$
 (C) $\frac{2}{\pi}$ (D) $-\frac{2}{\pi}$

135. If a circle pass through (2,0) and (0,4) with centre at x-axis then the radius of the circle is
- (A) 25 units
(B) 5 units
(C) 21 units
(D) 8 units
136. The value of x for which the points (1,3), (-2,9) and (x,-1) are collinear is
- (A) -3
(B) 3
(C) 1
(D) -1
137. If $\begin{vmatrix} 3 & x \\ 2 & x^2 \end{vmatrix} = \begin{vmatrix} 5 & 3 \\ 3 & 2 \end{vmatrix}$ then x is
- (A) $1, -\frac{1}{3}$
(B) $-1, -\frac{1}{3}$
(C) $-1, \frac{1}{3}$
(D) $1, \frac{1}{3}$
138. $\lim_{x \rightarrow \pi} \left(\frac{1 + \cos^2 x}{1 - \cos^2 x} \right)$ is
- (A) $3/2$
(B) 1
(C) $3/4$
(D) $3/8$
139. If the parabola $y^2 = 4ax$ passes through the point (3,2) then the length of the latus rectum is
- (A) $2/3$
(B) $4/3$
(C) $1/3$
(D) 4
140. The connective in the statement: $2 + 7 > 9$ or $2 + 7 < 9$ is
- (A) and
(B) or
(C) $>$
(D) $<$

MATHEMATICS-Section B

(Attempt any 30 Questions)

141. If R is a relation on a finite set A having n elements, then the number of relations on A is
- (A) 2^n (B) 2^{n^2}
(C) n^2 (D) n^n
142. If $[x]^2 - 5[x] + 6 = 0$, where $[\cdot]$ denotes the greatest integer function, then
- (A) $x \in [3,4]$ (B) $x \in (2,3]$
(C) $x \in [2,3]$ (D) $x \in [2,4)$
143. The domain of the function $f(x) = x/(x^2 + 3x + 2)$ is
- (A) $[-2,-1]$ (B) $\mathbb{R} - \{1, 2\}$
(C) $\mathbb{R} - \{-1, -2\}$ (D) $\mathbb{R} - \{2\}$
144. If α, β and γ are the zeros of $x^3 + px^2 + qx + r$, then $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$ is
- (A) $-\frac{q}{r}$ (B) $-\frac{p}{r}$
(C) $\frac{q}{r}$ (D) $-\frac{q}{p}$
145. The polynomial $x^3 - kx^2 + 9x$ has three real zeros if and only if k satisfies
- (A) $|k| \leq 6$ (B) $k = 0$
(C) $|k| > 6$ (D) $|k| \geq 6$
146. If $[(1+i)/(1-i)]^x = 1$, then
- (A) $x = 2n + 1$, where $n \in \mathbb{N}$
(B) $x = 4n$, where $n \in \mathbb{N}$
(C) $x = 2n$, where $n \in \mathbb{N}$
(D) $x = 4n + 1$, where $n \in \mathbb{N}$
147. If ${}^{14}C_r = 14$ and ${}^{15}C_r = 15$, then ${}^{14}C_{r-1}$ is
- (A) 14 (B) 3
(C) 15 (D) 1

148. If $x^n - 1$ is divisible by $x - k$. then the least positive integral value of k is
- (A) 1 (B) 2
(C) 3 (D) 4
149. The coefficient of the middle term in the expansion of $(2+3x)^4$ is:
- (A) 5! (B) 6
(C) 216 (D) 8!
150. The number of points of discontinuity of the function $f(x) = |x| - |x - 1|$ is
- (A) 0 (B) 1
(C) 2 (D) 3
151. The value of $\sin^{-1}\left(\cos\frac{3\pi}{5}\right)$ is
- (A) $-\frac{\pi}{10}$ (B) $\frac{\pi}{10}$
(C) $\frac{3\pi}{5}$ (D) $-\frac{3\pi}{5}$
152. The area bounded by the curve $y = \frac{1}{2}x^2$, the X-axis and the ordinate $x = 2$ is
- (A) $\frac{1}{3}$ sq units (B) $\frac{2}{3}$ sq units
(C) 1 sq units (D) $\frac{4}{3}$ sq units
153. If $\int \sec^2(7 - 4x)dx = a \tan(7 - 4x) + C$, then value of a is
- (A) -4 (B) $-\frac{1}{4}$
(C) 3 (D) 7
154. The value of b for which the function $f(x) = x + \cos x + b$ is strictly decreasing is
- (A) $b < 1$ (B) no value of b exists
(C) $b \leq 1$ (D) $b \geq 1$

155. If A and B are two independent events, then

(A) $P(A \cap B) = P(A) \times P(B)$

(B) $P(AB) = 1 - P(A')P(B')$

(C) $P(AB) = 1 + P(A')P(B')$

(D) $P(AB) = \frac{P(A')}{P(B')}$

156. A pair of dice is rolled. The probability of obtaining an even number on each die is

(A) $1/36$

(B) $1/12$

(C) 0

(D) $1/6$

157. The range of the relation $R = \{(x, x^2) \mid x \text{ is a prime number less than } 13\}$ is

(A) $\{2,3,5,7\}$

(B) $\{2,3,5,7,11\}$

(C) $\{4,9,25,49,121\}$

(D) $\{1,4,9,25,49,121\}$

158. If A is a non-singular square matrix of order 3 such that $A^2 = 3A$, then the value of $|A|$ is

(A) -3

(B) 3

(C) 9

(D) 27

159. If the equations $2x + 3y + z = 0$, $3x + y - 2z = 0$ and $ax + 2y - bz = 0$ has non-trivial solution, then

(A) $a + b = 3$

(B) $a + b + 1 = 0$

(C) $a - b - 8 = 0$

(D) $a - b = 2$

160. If A and B are two square matrices such that $AB = O$ then

(A) $\det A = 0$ or $\det B = 0$

(B) $\det B = 0$

(C) $\det A = 0$

(D) $B = A^{-1}$

161. If $f(x) = \begin{vmatrix} x+1 & x & x \\ x & x+1 & x \\ x & x & x+1 \end{vmatrix} = 0$, then x is

(A) $1/5$

(B) $-1/5$

(C) $1/3$

(D) $-1/3$

162. The coefficient of y in the expansion of $\left(y^2 + \frac{c}{y}\right)^5$ is
- (A) $10c^2$ (B) $10c$
 (C) 10 (D) $10c^3$
163. The point(s) at which the function $f(x) = \begin{cases} \frac{x}{|x|}, & x < 0 \\ -1, & x \geq 0 \end{cases}$, is continuous is/are
- (A) $x \in \mathbb{R}$ (B) $x = 0$
 (C) $x \in \mathbb{R} - \{0\}$ (D) $x = 1, -1$
164. $\lim_{x \rightarrow 0} \frac{x}{|x|}$ is
- (A) 1 (B) 0
 (C) -1 (D) does not exist
165. The value of c in Rolle's theorem for the function. $f(x) = \sin 2x$ in $[0, \pi/2]$
- (A) $\frac{\pi}{4}$ (B) $\frac{\pi}{6}$
 (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$
166. The set of points where the function $f(x) = |2x - 1| \sin x$ is differentiable is
- (A) \mathbb{R} (B) $\mathbb{R} - \{1/2\}$
 (C) $(0, \infty)$ (D) None of these
167. If $x = a \sin \theta$ and $y = b \cos \theta$, then $\frac{d^2y}{dx^2}$ is
- (A) $\frac{a}{b^2} \sec^2 \theta$ (B) $\frac{b}{a} \sec^2 \theta$
 (C) $\frac{b}{a^2} \sec^3 \theta$ (D) $-\frac{b}{a^2} \sec^3 \theta$

168. In a G.P., 5th term is 27 and 8th term is 729, then its 11th term is
 (A) 729 (B) 2187
 (C) 6561 (D) 19683
169. If the n th term of an arithmetic progression is $3n - 4$, then the 10th term of an A.P is
 (A) 10 (B) 12
 (C) 22 (D) 26
170. The order and degree of the differential equation $y = x \frac{dy}{dx} + \frac{2}{\frac{dy}{dx}}$ are
 (A) 1,2 (B) 1,3
 (C) 2,1 (D) 1,1
171. The general solution of the differential equation $\frac{dy}{dx} = e^y (e^x + e^{-x} + 2x)$ is
 (A) $e^{-y} = e^x - e^{-x} + x^2 + C$
 (B) $e^{-y} = e^{-x} - e^x - x^2 + C$
 (C) $e^{-y} = -e^{-x} - e^x - x^2 + C$
 (D) $e^y = e^x + e^{-x} + x^2 + C$
172. Integrating factor of the differential equation $\frac{dy}{dx} - \frac{3x^2 y}{1+x^3} = \frac{\sin^2 x}{1+x}$ is
 (A) e^{1+x^3} (B) $\log(1+x^3)$
 (C) $1+x^3$ (D) $\frac{1}{1+x^3}$
173. The general solution of the differential equation $ydx = (y-x)dy$ is
 (A) $x = \frac{y}{2}$ (B) $x = \frac{y}{2} + \frac{c}{y}$
 (C) $y = \frac{x}{2} + \frac{c}{x}$ (D) $y = \frac{x}{2}$

174. $y = ae^{mx} + be^{-mx}$ satisfies the differential equation

(A) $\frac{dy}{dx} + my = 0$

(B) $\frac{dy}{dx} - my = 0$

(C) $\frac{d^2y}{dx^2} - m^2y = 0$

(D) $\frac{d^2y}{dx^2} + m^2y = 0$

175. A vector in the direction of the vector $5\hat{i} - \hat{j} + 2\hat{k}$ with magnitude of 8 units is

(A) $\frac{40}{\sqrt{30}}\hat{i} + \frac{8}{\sqrt{30}}\hat{j} + \frac{16}{\sqrt{30}}\hat{k}$

(B) $\frac{40}{\sqrt{30}}\hat{i} - \frac{8}{\sqrt{30}}\hat{j} - \frac{16}{\sqrt{30}}\hat{k}$

(C) $-\frac{40}{\sqrt{30}}\hat{i} - \frac{8}{\sqrt{30}}\hat{j} + \frac{16}{\sqrt{30}}\hat{k}$

(D) $\frac{40}{\sqrt{30}}\hat{i} - \frac{8}{\sqrt{30}}\hat{j} + \frac{16}{\sqrt{30}}\hat{k}$

176. If the direction cosines of the line are $k/3, k/3, k/3$, then value of k is

(A) $k > 0$

(B) $0 < k < 1$

(C) $k = \pm\sqrt{3}$

(D) $k = 1/3$

177. If the length of the major axis of an ellipse is three times the length of the minor axis then its eccentricity is

(A) $\frac{1}{3}$

(B) $\frac{1}{\sqrt{3}}$

(C) $\frac{1}{\sqrt{2}}$

(D) $\frac{2\sqrt{2}}{3}$

178. The mode and mean are given by 5 and 6, respectively. Then the median is

(A) $17/3$

(B) $13/3$

(C) $23/3$

(D) 33

179. If the standard deviation of a, b and c is t , then the standard deviation of $a + 6, b + 6$ and $c + 6$ is

(A) t

(B) $t + 6$

(C) $a + b + c$

(D) $6t$

180. Which of the following is not a negative of the statement "A natural number is greater than zero."?

(A) A natural number is not greater than zero.

(B) It is false that a natural number is greater than zero.

(C) It is false that a natural number is not greater than zero.

(D) None of these

BIOLOGY–Section A

(Attempt all 20 Questions Compulsory)

121. Binomial nomenclature consists of
- (A) Family and genus
 - (B) Family and order
 - (C) Genus and species
 - (D) Species and variety
122. The part of cauliflower, which we consume is
- (A) Leaf
 - (B) Stem
 - (C) Flower
 - (D) Inflorescence
123. Which of the following is the most abundant tissue of the body?
- (A) Connective
 - (B) Muscular
 - (C) Epithelial
 - (D) Nervous
124. Centrosomes are present in
- (A) Animal cells
 - (B) Plant cells
 - (C) Both Animal and Plant cells
 - (D) None of these
125. Which of the following organelle is involved in detoxification of drugs and poisons?
- (A) Chloroplast
 - (B) Endoplasmic Reticulum
 - (C) Golgi apparatus
 - (D) Mitochondria
126. All enzymes are proteins, except
- (A) Lipases
 - (B) Ribozymes
 - (C) Proteases
 - (D) Amylase
127. Which of the following nitrogenous bases belong to pyrimidines?
- (A) Cytosine
 - (B) Thymine
 - (C) Uracil
 - (D) All of these

128. Dark reaction of photosynthesis in C₃ plants help in the synthesis of
- (A) ATP (B) NADPH₂
(C) O₂ (D) PGA
129. Seed dormancy is caused by
- (A) GA (B) ABA
(C) Cytokinin (D) Ethylene
130. Guttation occurs through
- (A) Lenticels (B) Epidermis
(C) Stomata (D) Hydathodes
131. Cardiac muscle is
- (A) Voluntary and Striated
(B) Involuntary and striated
(C) Multinucleate and non-striated
(D) Voluntary and non-striated
132. The main function of melanin is to
- (A) make the skin to be cooler.
(B) increase the amount of blood vessels.
(C) strengthen the skin.
(D) absorb harmful radiations.
133. Example of a Ball and Socket joint are found in the
- (A) Finger (B) Knee
(C) Hip (D) Ankle
134. Appetite centre is situated in
- (A) Stomach (B) Spinal cord
(C) Cerebrum (D) Hypothalamus

135. The rate of breathing in adult human is
- (A) 10-12/min (B) 14-18/min
(C) 20-25/min (D) 25-30/min
136. Henle's loop is found in
- (A) Liver (B) Heart
(C) Lungs (D) Kidney
137. Transcription of the following DNA sequence AATCATGGA will lead to
- (A) UUAGUACCU (B) TTAGTACCT
(C) AATCATGGA (D) GGATAUCUA
138. Typhoid is a
- (A) Bacterial disease (B) Viral disease
(C) Fungal disease (D) None of the above
139. Bt-cotton is a genetically modified cotton variety having resistance against
- (A) Insect-pest (B) Bacteria
(C) Virus (D) Draught
140. Which of the following area is a part of "Rain shadow" zone in Himachal?
- (A) Shimla (B) Hamirpur
(C) Kullu (D) Lahaul-Spitti

BIOLOGY–Section B

(Attempt any 30 Questions)

141. The word 'Systematics' was coined by
- (A) Linnaeus (B) Lamarck
(C) Cuvier (D) Aristotle
142. Phycology deals with the study of
- (A) Algae (B) Fungi
(C) Bryophytes (D) Pteridophytes

143. Reindeer moss is a
- (A) Lichen (B) Bryophyte
(C) Algae (D) Fungi
144. The following structure is present in all the chordates
- (A) Cranium (B) Vertebral column
(C) Spinal cord (D) Notochord
145. The fruit of Pineapple is
- (A) Berry (B) Sorosis
(C) Drupe (D) Pepo
146. Tunica corpus theory was proposed by
- (A) Schmidt (B) Nageli
(C) Hanstein (D) Hofmeister
147. The packaging of protein takes place in
- (A) Ribosomes
(B) Endoplasmic Reticulum
(C) Golgi apparatus
(D) Mitochondria
148. Which of the following will have high melting point?
- (A) Unsaturated fatty acids
(B) Saturated fatty acids
(C) Polyunsaturated fatty acids
(D) Both A and C
149. *Taq* DNA polymerase isolated from *Thermus aquaticus* can tolerate
- (A) Extreme acidic pH (B) Extreme alkaline pH
(C) High temperature (D) All of these
150. The number of mitotic divisions required to produce 256 cells from a single cell is
- (A) 6 (B) 8
(C) 10 (D) 12

151. The main significance of crossing over is that
- (A) it increases the chromosome number.
 - (B) it provides vigour to the plants.
 - (C) it produces variation for the natural selection.
 - (D) None of these.
152. The release of Oxygen molecule during photosynthesis is due to
- (A) Photolysis of H_2O
 - (B) Reduction of CO_2
 - (C) Oxidation of glucose
 - (D) None of these
153. The first plant hormone to be discovered was
- (A) Auxin
 - (B) GA
 - (C) CK
 - (D) ABA
154. The highest value of water potential can be
- (A) 100
 - (B) 10
 - (C) 1
 - (D) 0
155. The enzyme responsible for biological nitrogen fixation is
- (A) Amylase
 - (B) Catalase
 - (C) Urease
 - (D) Nitrogenase
156. Which of the following molecule is responsible for the germination of lettuce seeds in the presence of light only?
- (A) Xanthophyll
 - (B) Phytochrome
 - (C) Cytokinin
 - (D) ABA
157. Potometer is used to measure rate of
- (A) Transpiration
 - (B) Photosynthesis
 - (C) Respiration
 - (D) All of above

158. Seeds exhibit vivipary due to
- (A) Lack of dormancy
 - (B) Reduced ABA concentration
 - (C) High GA concentration
 - (D) All of these
159. Opening of stomata depends on
- (A) influx of K^+
 - (B) efflux of K^+
 - (C) influx of Na^+
 - (D) efflux of Na^+
160. Which of the following is a characteristics of skeletal muscle cells?
- (A) Voluntary
 - (B) Striated
 - (C) Multinucleate
 - (D) All of above
161. Which of the following are part of integumentary system?
- (A) Hair, skin, bones
 - (B) Hair, skin, nails
 - (C) Muscles, skeleton, bone marrow
 - (D) Brain, spinal cord, nerves
162. Angina pectoris is related to
- (A) Bone disease
 - (B) Heart problem
 - (C) Lung disease
 - (D) Nerve impulse
163. A progressive loss of brain function with major consequences for memory, thinking and behaviour lead to
- (A) Epilepsy
 - (B) Sclerosis
 - (C) Dementia
 - (D) Alzheimer's disease

164. Nodes of Ranvier is associated with
- (A) Circulatory system
 - (B) Immune system
 - (C) Excretory system
 - (D) Nervous system
165. Tendon connects
- (A) Muscle to bone
 - (B) Bone to bone
 - (C) Both A and B
 - (D) None of these
166. Liver store glucose in the form of
- (A) Starch
 - (B) Protein
 - (C) Lipid
 - (D) Glycogen
167. What prevents clotting of blood inside blood vessels?
- (A) Heparin
 - (B) Fibrinogen
 - (C) Serotonin
 - (D) Thrombin
168. Functional unit of kidney is
- (A) Nephron
 - (B) Neuron
 - (C) Loop of Henle
 - (D) Bowman's capsule
169. Which of the following best describes a DNA molecule?
- (A) Double helix
 - (B) Made of amino acids
 - (C) Contains uracil
 - (D) Contains ribose
170. Analogous organs are
- (A) similar in origin but different in function.
 - (B) dissimilar in origin but similar in function.
 - (C) similar in structure and function.
 - (D) dissimilar in origin and function.

171. When both dominant and recessive alleles equally express in the hybrid, the phenomenon is known as
- (A) Complete dominance
 - (B) Incomplete dominance
 - (C) Codominance
 - (D) Epistasis
172. Histone proteins are associated with
- (A) Packaging of DNA
 - (B) Packaging of RNA
 - (C) Folding of Proteins
 - (D) All of these
173. Which of the following is a start codon?
- (A) UAA
 - (B) AUG
 - (C) UGA
 - (D) All of these
174. Rickets and Kwashiorkor are
- (A) Deficiency disease
 - (B) Hereditary disease
 - (C) Infectious disease
 - (D) Communicable disease
175. Dengue is caused by and transmitted by
- (A) Plasmodium and mosquito
 - (B) Bacteria and mosquito
 - (C) Virus and mosquito
 - (D) Fungi and Tse tse fly
176. Ozone layer depletion is caused by
- (A) Chlorofluorocarbons
 - (B) Hydrochlorofluorocarbon
 - (C) Carbon tetrachloride
 - (D) All of the above

177. Which of the following is a modification of leaf petiole?
- (A) Cladode
 - (B) Phyllode
 - (C) Rhizome
 - (D) Stolon
178. Which of the following is used as biofertilizer?
- (A) Rhizobium
 - (B) Mycorrhizal fungi
 - (C) Blue Green Algae
 - (D) All of these
179. Pyramid of biomass of a grassland ecosystem will be
- (A) Upright
 - (B) Inverted
 - (C) Spindle shaped
 - (D) All of the above
180. Which of the following term used to indicate threatened population status of a species?
- (A) Critically Endangered
 - (B) Endangered
 - (C) Vulnerable
 - (D) All of the above

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