Sky Tutorials
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IIT-JEE | NEET | Foundation

NEET

Time: 200 Minute   **M.M. 720**

ALL INDIA SKY TEST SERIES

Pulse Batch – Neet

Date : 11/09/2023

SYLLABUS

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
Previous + W.P.E.	Mole + Redox + Atomic + Equilibrium	Biological classification	Human Reproduction

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

INSTRUCTIONS:

1. This Question paper is divided in to four parts physics, chemistry, botany, zoology and each part is further divided into two sections.

    Section –A contains 35 Questions Section B contains 15 questions. Please ensure that the Questions paper you have received contains **ALL THE QUESTIONS** in each Part.

2. **In Section A all the 35 Questions are compulsory and in Section B Contain 15 Question, out of these**

    15 Questions, candidates can choose to attempt any 10 Questions.

    Each Question has four choices (a), (b), (c), (d) out of which **only one is correct & Carry 4 marks each 1 mark** will be deducted for each wrong answer.

GENERAL INSTRUCTION

1. Use only **blue/black pen (avoid gel pen)** for darkening the bubble.
2. Indicate the correct answer for each question by filling appropriate bubble in your **OMR** answer sheet.
3. The answer sheet will be checked through computer hence; the answer of the question must be marked by –shading the circles against the question by dark **blue/black pen**
4. Blank papers, Clipboards, Log tables, Slide Rule, Calculator, Cellular Phones Papers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.

Name of the candidate: _____

Signature of the candidate: _____**Signature of the invigilator:** _____

PHYSICS

SECTION - A

1. A force acts on a 2 kg object so that its position is given as a function of time as $x = 3t^2 + 5$. What is the work done by this force in first 5 seconds :
   (a) 850 J   (b) 900 J   (c) 950 J   (d) 875 J

2. A block of mass m is kept on a platform which starts from rest with a constant acceleration g/2 upwards, as shown in the figure.

   m $\boxed{\ }$ ///////////// $a = \dfrac{g}{2}$
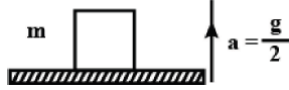
   Work done by normal reaction on block in time t is:
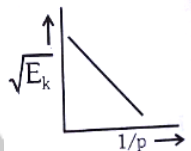
   (a) zero   (b) $\dfrac{3mg^2t^2}{8}$ (c) $-\dfrac{mg^2t^2}{8}$ (d) $\dfrac{mg^2t^2}{8}$

3. A particle which is experiencing a force, given by $\vec{F} = 3\hat{i} - 12\hat{j}$, undergoes a displacement of $\vec{d} = 4\hat{i}$. If the particle had a kinetic energy of 3J at the beginning of the displacement, what is its kinetic energy at the end of the displacement:
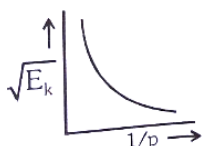   (a) 15 J   (b) 10 J   (c) 12 J   (d) 9 J

4. The graph between $\sqrt{E_k}$ and $\dfrac{1}{p}$ is

   (E_k = kinetic energy and p = momentum)
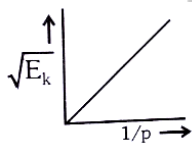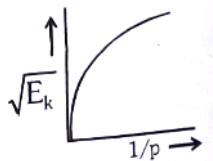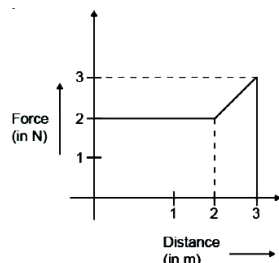
   (a)   (b)

   (c)   (d)

5. A particle moves in one dimension from rest under the influence of a force that varies with the distance travelled by the particle as shown in the figure. The kinetic energy of the particle after it has travelled 3m is :

   (a) 6.5 J   (b) 2.5 J   (c) 4 J   (d) 5 J

6. A uniform cable of mass M and length L is placed on a horizontal surface such that its $\left(\dfrac{1}{n}\right)^{th}$ part is hanging below the edge of the surface. To lift the hanging part of the cable upto the surface, the work done should be:
   (a) $\dfrac{MgL}{n^2}$ (b) $\dfrac{MgL}{2n^2}$ (c) $\dfrac{2MgL}{n^2}$ (d) nMgL

7. Two men with weights in the ratio 5 : 3 run up a staircase in times in the ratio 11 : 9. The ratio of power of first to that of second is : -

   (a) $\dfrac{15}{11}$ (b) $\dfrac{11}{15}$ (c) $\dfrac{11}{9}$ (d) $\dfrac{9}{11}$

8. A force $F = 20 + 10y$ acts on a particle in y-direction where F is in newton and y in meter. Work done by the force to move the particle from $y = 0$ to $y = 1$ m is :
   (a) 30 J   (b) 5 J   (c) 25 J   (d) 20 J

9. A 60HP electric motor lifts an elevator having a maximum total load capacity of 2000kg. If the frictional force on the elevator is 4000N, the speed of the elevator at full load is close to :
   (1 HP = 746W, g = 10ms^{-2})
   (a) 1.7 ms^{-1} (b) 2.0 ms^{-1}
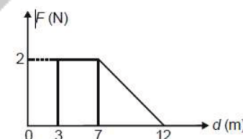   (c) 1.9 ms^{-1} (d) 1.5 ms^{-1}

10. Consider a force vector $\vec{F} = -x\hat{i} + y\hat{j}$. The work done by this force in moving a particle from point A(1, 0) to B(0, 1) along the line segment is:
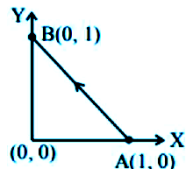
    (a) 3/2   (b) 1   (c) 2   (d) ½

11. Force F on a particle moving in a straight line varies with distance d as shown in figure. The work done on the particle during its displacement of 12m is:

    (a) 13 J   (b) 18 J   (c) 21 J   (d) 26 J

12. A particle is acted upon by a force F which varies with position x as shown in figure. If the particle at x = 0 has kinetic energy of 25 J, then the kinetic energy of the particle at x = 16 m is :
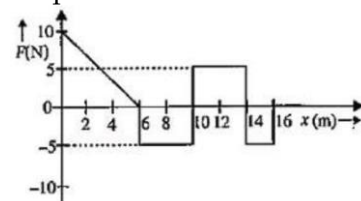
    (a) 45 J   (b) 30 J   (c) 70 J   (d) 20 J

13. A 10 kg mass moves along x-axis. Its acceleration as function of its position is shown in the figure. What is the total work done on the mass moves from x = 0 to x = 8 cm :

(a) 8×10^{-2} joules   (b) 16×10^{-2} joules
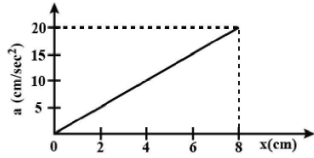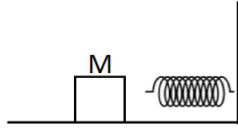(c) 4×10^{-4} joules   (d) 1.6×10^{-3} joules

14. The block of mass M moving on the frictionless horizontal surface collides with the spring of spring constant K and compresses it by length L. The maximum momentum of the block after collision is:

(a) zero   (b) $\dfrac{ML^2}{K}$ (c) $\sqrt{MK}\,L$ (d) $\dfrac{KL^2}{2M}$

15. Water falls from a height of 60 m at the rate of 15 kg/ s to operate a turbine. The losses due to frictional forces are 10% of energy. How much power is generated by the turbine: (g = 10/s²)
(a) 12.3 kW   (b) 7.0 kW   (c) 8.1 kW   (d) 10.2 kw

16. A body of mass m accelerates uniformly from rest to v_1 in time t_1. As a function of t, the instantaneous power delivered to the body is:

(a) $\dfrac{mv_1 t}{t_1}$ (b) $\dfrac{mv_1^2 t}{t_1}$ (c) $\dfrac{mvt^2}{t_1}$ (d) $\dfrac{mv_1^2 t}{t_1^2}$

17. A body of mass M is moving with a uniform speed of 10 m/s on a frictionless surface under the influence of two forces F_1 and F_2. The net power of the system is :


(a) $10\,F_1 F_2 M$ (b) $10\,(F_1 + F_2)\,M$
(c) $(F_1 + F_2)\,M$ (d) Zero

18. A particle of mass m is driven by a machine that delivers a constant power k watts. If the particle starts from rest the force on the particle at time t is:

(a) $\sqrt{\dfrac{mk}{2}}\,t^{-1/2}$ (b) $\sqrt{mk}\,t^{-1/2}$

(c) $\sqrt{2mk}\,t^{-1/2}$ (d) $\dfrac{1}{2}\sqrt{mk}\,t^{-1/2}$

19. An engine pumps water through a hose pipe. Water passes through the pipe and leave with a velocity 2m/s. The mass per unit length of water in pipe is 100 kg/m . What is the power of the engine :
(a) 800 W   (b) 400 W   (c) 200 W   (d) 100 W

20. A man does a given amount of work in 10 sec. Another man does the same amount of work in 20 sec. The ratio of the output power of first man to the second man is :
(a) 1   (b) 1/2   (c) 2/1   (d) None

21. Figure show the vertical section of frictionless surface. A block of mass 2 kg is released from the position A; its KE as it reaches the position C its KE is :
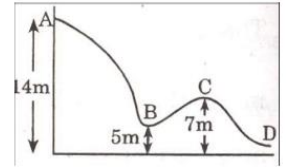
(a) 180 J   (b) 140 J   (c) 40 J   (d) 280 J

22. A string is used to pull a block of mass m vertically up by a distance h at a constant acceleration g/2. The work done by tension in the string is :
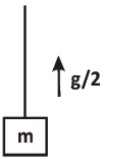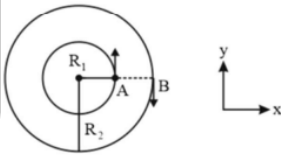

(a) $\dfrac{+3mgh}{2}$ (b) $\dfrac{-mgh}{4}$

(c) $+\dfrac{5}{4}mgh$ (d) $+ mgh$

23. Power supplied to a body of mass 2 kg varies with time as $P = \dfrac{3t^2}{2}$ watt. Here t is in seconds. If velocity of particle at t = 0 is v = 0 , the velocity of particle at time t = 2 s will be :
(a) 1 m/s   (b) 4 m/s   (c) 2 m/s   (d) $2\sqrt{3}$ m/s

24. If the momentum of a body increases by 20 %, the percentage increase in its K.E. is equal to :
(a) 44   (b) 66   (c) 20   (d) 88

25. A car is negotiating a curved road of radius R. The road is banked at an angle θ. The coefficient of friction between the tyres of the car and the road is μ_s . The maximum safe velocity on this road is:

(a) $\sqrt{gR^2\left(\dfrac{\mu_s + \tan}{1 - \mu_s \tan\theta}\right)}$ (b) $\sqrt{gR\left(\dfrac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}\right)}$

(c) $\sqrt{\dfrac{g}{R}\left(\dfrac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}\right)}$ (d) $\sqrt{\dfrac{g}{R^2}\left(\dfrac{\mu_s + \tan}{1 - \mu_s \tan\theta}\right)}$

26. A stone is tied to one end of a string and is rotated in a horizontal circle with a uniform angular velocity. Let T be the tension in the string. If the length of the string is halved and the angular velocity of the stone is doubled, the tension in the string will be
(a) 2T   (b) 4T   (c) T   (d) 8T

27. The magnitude of displacement vector of a particle which is moving in a circle of radius a with constant angular velocity ω as a function of time is

(a) $2a\sin\omega t$ (b) $2a\sin\dfrac{\omega t}{2}$

(c) $2a\cos\omega t$ (d) $2a\cos\dfrac{\omega t}{2}$

28. A particle is moving along a circular path with a constant speed. The acceleration of the particle is constant in
(a) magnitude
(b) direction
(c) both magnitude and direction
(d) neither magnitude nor direction

29. What will be the maximum speed of a car on a road turn of radius 30 m, if the coefficient of friction between the tyres and the road is 0.4?
(a) 10.84 m/s   (b) 9.84 m/s
(c) 8.84 m/s   (d) 6.84 m/s

30. A small coin is placed at a distance r from the centre of a gramophone record. The rotational speed of the record is gradually increased. If the coefficient of friction between the coin and the record is μ, the minimum angular frequency of the record, for which the coin will fly off, is given by

(a) $\sqrt{\dfrac{2\mu g}{r}}$ (b) $\sqrt{\dfrac{\mu g}{2r}}$ (c) $\sqrt{\dfrac{\mu g}{r}}$ (d) $2\sqrt{\dfrac{\mu g}{r}}$

31. In the figure given, A and B are two particle having same magnitude of angular velocity in opposite sense, Then $\vec{V}_A - \vec{V}_B$ at $t = \pi/2\omega$ sec is.

(a) $-\omega R_1\hat{i} + \omega R_2\hat{i}$ (b) $\omega R_1\hat{i} - \omega R_2\hat{i}$
(c) $\omega R_1\hat{j} - \omega R_2\hat{i}$ (d) $\omega R_1\hat{j} + \omega R_2\hat{j}$

32. A car is moving with speed 20 m/s on a circular path of radius 100 m. Its speed is increasing at the rate of 3 m/s² . The magnitude of acceleration of the car at that moment is.
(a) 1 m/s²   (b) 3 m/s²   (c) 4 m/s²   (d) 5 m/s²

33. The kinetic energy K of a particle moving along a circle of radius R depends on the distance covered s as K = a s² . The centripetal force acting on the particle is

(a) 2asR   (b) 2as²   (c) 2as   (d) $\dfrac{2as^2}{R}$

34. A car round on unbanked curve of radius 92 m without skidding at a speed of 26 m/s. The smallest possible coefficient of static friction between the tyres and the road is
(a) 0.75   (b) 0.60   (c) 0.45   (d) 0.30

35. A particle travels along the arc of a circle of radius r. Its speed depends on the distance travelled 1 as $v = a\sqrt{l}$ where a is constant. The angle α between the vectors of total acceleration and the velocity of the particle is.

(a) $\alpha = \tan^{-1}\left(\dfrac{2l}{r}\right)$ (b) $\alpha = \cos^{-1}\left(\dfrac{2l}{r}\right)$

(c) $\alpha = \sin^{-1}\left(\dfrac{2l}{r}\right)$ (d) $\alpha = \cot^{-1}\left(\dfrac{2l}{r}\right)$

SECTION -B

36. The speed of a particle moving in a circle of radius r = 2 m varies with time t is v = t², where t is in second and v in ms⁻¹. Value of radial, tangential and net acceleration at t = 2s are A, B and C respectively then value of $\dfrac{2C^2}{AB}$ will be :
(a) 80   (b) 10   (c) 5   (d) 160

37. The coefficient of friction between the tyres and the road is 0.25. The maximum speed with which a car can be driven round a curve of radius 40 m without skidding is (assume g = 10 ms⁻²) :
(a) 40 ms⁻¹   (b) 20 ms⁻¹
(c) 15 ms⁻¹   (d) 10 ms⁻¹

38. If a cyclist moving with a speed of 4.9 m/s on a level road can take a sharp circular turn of radius 4m, then coefficient of friction between the cycle tyres and road is : (g = 9.8 m/s²)
(a) 0.41   (b) 0.51   (c) 0.61   (d) 0.71

39. Find the maximum velocity for skidding for a car moved on a circular track of radius 100 m. The coefficient of friction between the road and tyre is 0.2.
(a) 0.14 m/s   (b) 140 m/s
(c) 1.4 km/s   (d) 14 m/s

40. A road is banked at an angle of 30⁰ to the horizontal for negotiating a curve of radius $10\sqrt{3}$ m. At what velocity will a car experience no friction while negotiating the curve?
(a) 54 km/hr   (b) 72 km/hr
(c) 36 km/hr   (d) 18 km/hr

41. A 2kg stone attached to a string is whirled in a horizontal circle of radius 0.5 m. The string makes an angle of 30^0 with the vertical. The resultant force on the stone due to tension and weight is : ($g = 9.8 \ m/s^2$)
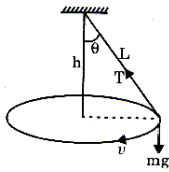

    (a) 7.4 N   (b) 11.3 N   (c) 15.6 N   (d) 20.2 N

42. A cyclist goes round a circular path of circumference 34.3 m in $\sqrt{22}$ sec. The angle made by him, with the vertical, will be :
   (a) 45^0 (b) 40^0 (c) 42^0 (d) 48^0

43. The forces acting on an object of mass 2 kg are shown in the fig. If the body moves horizontally then find acceleration if force P is 400 N.

    (a) 50 m/s²   (b) 10 m/s²
    (c) 350 m/s²   (d) 60 m/s²
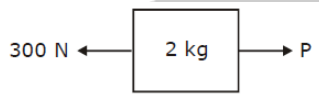
44. A body of mass 5 kg is suspended by the strings making angles $60°$ and $30°$ with the horizontal -
    (A) $T_1 = 25$ N
    (B) $T_2 = 25$ N
    (C) $T_1 = 25 \sqrt{3}$ N
    (D) $T_2 = 25 \sqrt{3}$ N

    (a) A, B   (b) A, D   (c) C, D   (d) B, C
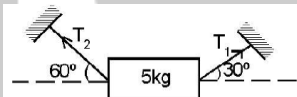
45. A mass M is suspended by a rope from a rigid support at A as shown in figure. Another rope is tied at the end B, and it is pulled horizontally with a force F. If the rope AB makes an angle θ with the vertical in equilibrium, then the tension in the string AB is :

    (a) F sin θ   (b) F/sin θ
    (c) F cos θ   (d) F/cos θ
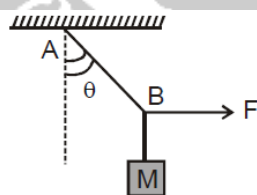
46. A net force of 200 N gives a body of mass m_1 an acceleration of 80 ms⁻² and a body of mass m_2, an acceleration of 240 ms⁻². The acceleration that this force causes when the masses combine together is -
    (a) 50 ms⁻²   (b) 60 ms⁻²   (c) 120 ms⁻²   (d) 100 ms⁻²

47. A car travelling at a speed of 30 kilometer per hour is brought to a halt in 8 metres by applying brakes. If the same car is travelling at 60 km per hour, it can be brought to halt with same braking power in-
    (a) 8 metres   (b) 16 metres
    (c) 24 metres   (d) 32 metres

48. A spring toy weighting 1 kg on a spring balance suddenly jumps upward. A boy standing near the toy notices that the scale of the balance reads 1.05 kg. In this process the maximum acceleration of the toy is – (g = 10 m sec⁻²)
    (a) 0.05 m sec⁻²   (b) 0.5 m sec⁻²
    (c) 1.05 m sec⁻²   (d) 1 m sec⁻²

49. A girl, of weight W, is sitting on an electric swing rotating in a vertical plane. She feels her weight to have increased by 25% as the swing goes up. What weight she would experience when the swing comes down?
    (a) 3/2 W   (b) 5/4 W   (c) 3/4 W   (d) W/2

50. The acceleration with which an object of mass 100 kg be lowered from a roof using a cord with a breaking strength of 60 kg weight without breaking the rope is- (assume g = 10 m/sec²)
    (a) 2 m/sec²   (b) 4 m/sec²
    (c) 6 m/sec²   (d) 10 m/sec²

CHEMISTRY

SECTION - A

51. The largest number of molecules is in
    (a) 36 g of water
    (b) 28 g of carbon monoxide
    (c) 46 g of ethyl alcohol
    (d) 54 g of nitrogen pentoxide

52. A given sample of pure compound contains 9.81 g of Zn, 1.8×10^{23} atoms of chromium, and 0.60 mol of oxygen atoms. What is the simplest formula ?
    (a) $ZnCr_2O_7$ (b) $ZnCr_2O_4$
    (c) $ZnCrO_4$ (d) $ZnCrO_6$

53. Ratio of C_p to C_v of gas X is 1.4, the number of atom of the gas 'X' present in 11.2 litres of it at NTP will be
    (a) 6.02×10^{23} (b) 1.2×10^{23}
    (c) 3.01×10^{23} (d) 2.01×10^{23}

54. If 0.50 mole of $BaCl_2$ is mixed with 0.20 mol of Na_3PO_4, the maximum number of moles of $Ba_3(PO_4)_2$ that can be formed is
    (a) 0.70   (b) 0.50   (c) 0.20   (d) 0.10

55. 25 mL of a sodium of barium hydroxide on titration with 0.1 molar solution of hydrochloric acid gave a titre value of 35 mL. The molarity of barium hydroxide is :
    (a) 0.28   (b) 0.35   (c) 0.07   (d) 0.14

56. The equivalent weight of $MnSO_4$ is half its molecular weight when it is converted to :
    (a) Mn_2O_3 (b) MnO_2
    (c) MnO_4^- (d) MnO_4^{2-}

57. The specific charge of a proton is $9.6 \times 10^7 \, C\,kg^{-1}$, then for an α – particles it will be
    (a) $2.4 \times 10^7 C\,kg^{-1}$ (b) $4.8 \times 10^7 C\,kg^{-1}$
    (c) $19.2 \times 10^7 C\,kg^{-1}$ (d) $38.4 \times 10^7 C\,kg^{-1}$

58. The photons of light having a wavelength 4000 Å are necessary to provide 1.00 J of energy are
    (a) 6.023×10^{23} (b) 6.023×10^{18}
    (c) 2.01×10^{18} (d) 2.01×10^{23}

59. Which one of the following is not the characteristic of Planck's quantum theory of radiation ?
    (a) The energy is not absorbed or emitted in whole number or multiple of quantum
    (b) Radiation is associated with energy
    (c) Radiation energy is not emitted or absorbed continuously but in the form of small packets called quanta
    (d) This magnitude of energy associated with a quantum is proportional to the frequency

60. Which one of the following is considered as the main postulate of Bohr's model of atom?
    (a) Protons are present in the nucleus
    (b) Electrons are revolving around the nucleus
    (c) Centrifugal force produces due to the revolving electrons balances the force of attraction between the electron and the protons
    (d) Angular momentum of electron is an integral multiple of $\dfrac{h}{2\pi}$.

61. Correct order of radius of the first orbit of H, He^+, Li^{2+}, Be^{3+} is :
    (a) $H > He^+ > Li^{2+} > Be^{3+}$
    (b) $Be^{3+} > Li^{2+} > He^+ > H$
    (c) $He^+ > Be^{3+} > Li^{2+} > H$
    (d) $He^+ > H > Li^{2+} > Be^{3+}$

62. The momentum of a particle which has a de Broglie wavelength of $2.5 \times 10^{-10}\,m$ is
    (a) 2.64×10^{-24} kg m sec^{-1}
    (b) 3.62×10^{-24} kg m sec^{-1}
    (c) 4.64×10^{-24} kg m sec^{-1}
    (d) $3.62 \times 10^{-26} kg\,m\sec^{-1}$

63. Which of the following sets of quantum numbers is not allowed ?
    (a) $n = 3, l = 1, m = +2$
    (b) $n = 3, l = 1, m = +1$
    (c) $n = 3, l = 0, m = 0$
    (d) $n = 3, l = 2, m = \pm 2$

64. Which set is correct for an electron in $4f – orbital$?
    (a) $n = 3 \; l = 2$ $m_l = -2$ $m_s = +\frac{1}{2}$
    (b) $n = 4 \; l = 4$ $m_l = -4$ $m_s = -\frac{1}{2}$
    (c) $n = 4 \; l = 3$ $m_l = +1$ $m_s = +\frac{1}{2}$
    (d) $n = 4 \; l = 3$ $m_l = +4$ $m_s = +\frac{1}{2}$

65. Which is the correct order of probability of being found close to the nucleus?
    (a) $s > p > d > f$ (b) $f > d > p > s$
    (c) $p > d > f > s$ (d) $d > f > p > s$

66. Which of the following statements is not correct ?
    (a) Special stability of half-filled and fully-filled atomic configurations amongst s- and p-block elements is reflected in ionization potential trends along a period
    (b) Special stability of half-filled and fully filed atomic configurations amongst s- and p-block elements is reflected in electron affinity trends along a period
    (c) Aufbau order is not obeyed in cases where energy difference between ns and (n-1)d subshell is large.
    (d) Special stability of half filled subshell is attributed to higher exchange energy of stabilization

67. The configuration $1s^2, 2s^2 2p^5, 3s^1$ shows
    (a) Excited stated of O_2^-
    (b) Excited state of neon
    (c) Excited state of fluorine
    (d) Ground state of fluorine atom

68. For which of the following K_p is less than K$_c$?
    (a) $N_2O_4 \rightleftharpoons 2NO_2$
    (b) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
    (c) $H_2 + I_2 \rightleftharpoons 2HI$
    (d) $CO + H_2O \rightleftharpoons CO_2 + H_2$

69. For the reaction $C(s) + CO_2(g) \rightleftharpoons 2CO(g)$, the partial pressure of CO_2 and CO are 2.0 and 4.0 atm respectively at equilibrium. The K_p for the reaction is
(a) 0.5   (b) 4.0   (c) 8.0   (d) 32.0

70. For the reaction,

$SO_2(g) + \dfrac{1}{2}O_2(g) \rightleftharpoons SO_3(g)$,

If $K_p = K_c(RT)^x$ where the symbols have equal meanings then, the value of x is (assuming ideality).

(a) -1   (b) $-\dfrac{1}{2}$ (c) $\dfrac{1}{2}$ (d) 1

71. $A + B \rightleftharpoons C + D$. If finally the concentration of A and B are both equal but at equilibrium concentration of D will be twice of that of A then what will be the equilibrium constant of reaction.
(a) 4-9   (b) 9/4   (c) 1/9   (d) 4

72. At a temperature T, a compound $AB_4(g)$ dissociates as $2AB_4(g) \rightleftharpoons A_2(g) + 4B_2(g)$ with a degree of dissociation x, which is small compared with unity. The expression of K_p in terms x and total pressure P is :
(a) $8P^3 x^5$ (b) $256P^3 x^5$
(c) $4Px^2$ (d) None of these

73. Phosphorus pentachloride dissociates as follows, in a closed reaction vessel,
$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
If total pressure at equilibrium of the reaction mixture is P and degree of dissociation of PCl_5 is x, the partial pressure of PCl_3 will be :

(a) $\left(\dfrac{x}{1-x}\right)P$ (b) $\left(\dfrac{x}{x+1}\right)P$

(c) $\left(\dfrac{2x}{1-x}\right)P$ (d) $\left(\dfrac{x}{x-1}\right)P$

74. The exothermic formation of ClF_3 is represented by the equation
$Cl_{2(g)} + 3F_{2(g)} \rightleftharpoons 2ClF_{3(g)}; \Delta H = 329kJ$
Which of the following will increase the quantity of ClF_3 in an equilibrium mixture of Cl_2, F_2 and ClF_3
(a) Increasing the temperature
(b) Removing Cl_2
(c) Increasing the volume of container
(d) Adding F_2

75. The standard state Gibbs free energy change for the given isomerization reaction cis-2pentene $\rightleftharpoons$ trans -2 –pentene is -3.67 kJ/mol at 400 K. If more trans-2-pentene is added to the reaction vessel, then
(a) More cis-2-pentene is formed
(b) Equilibrium is shifted in the forward direction
(c) Equilibrium remains unaffected
(d) Additional trans-2 pentene is formed

76. Which of the following equilibrium is not shifted by increase in the pressure ?
(a) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
(b) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
(c) $2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$
(d) $2C_{(s)} + O_{2(g)} \rightleftharpoons 2CO_{(g)}$

77. If dissociation for reaction, $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ is 20% at 1 atm pressure. Calculate K_c.
(a) 0.04   (b) 0.05   (c) 0.07   (d) 0.06

78. Which of the following molecules acts as a Lewis acid ?
(a) $(CH_3)_3 N$ (b) $(CH_3)_3 B$
(c) $(CH_3)_2 O$ (d) $(CH_3)_3 P$

79. Solubility of AgCl in water, 0.01 M $CaCl_2$, 0.01 M NaCl and 0.05 M $AgNO_3$ are S_1, S_2, S_3 and S_4 respectively, then
(a) $S_1 > S_2 > S_3 > S_4$ (b) $S_1 > S_3 > S_2 > S_4$
(c) $S_1 > S_2 = S_3 > S_4$ (d) $S_1 > S_3 > S_4 < S_2$

80. pH of $Ba(OH)_2$ solutions is 12. Solubility product is
(a) $10^{-6} M^3$ (b) $4 \times 10^{-6} M^3$
(c) $0.5 \times 10^{-7} M^3$ (d) $5 \times 10^{-7} M^3$

81. The pH of 0.1 M solution of the following salts increases in the order
(a) $NaCl < NH_4Cl < NaCN < HCl$
(b) $HCl < NH_4Cl < NaCl < NaCN$
(c) $NaCN < NH_4Cl < NaCl < HCl$
(d) $HCl < NaCl < NaCN < NH_4Cl$

82. A monoprotic acid in 0.1 M solution has $K_a = 1.0 \times 10^{-5}$. The degree of dissociation for acid is
(a) 1.0%   (b) 99.9%   (c) 0.1%   (d) 99%

83. Which of the following pairs constitutes buffer ?
(a) HNO_3 and NH_4NO_3
(b) HCl and KCl
(c) HNO_2 and $NaNO_2$
(d) NaOH and NaCl

84. Match List-I (Compounds) with List-II (Oxidation states of nitrogen) and select answer using the codes given below the lists :

List-I		List –II	
(A) NaN_3		(1)	+5
(B) N_2H_2		(2)	+2
(C) NO		(3)	-1/3
(D) N_2O_5		(4)	-1

Code :

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

85. In the following reaction,

$$3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3$$

(a) Bromine is oxidized and carbonate is reduced
(b) Bromine is reduced and water is oxidized
(c) Bromine is neither reduced nor oxidized
(d) Bromine is both reduced and oxidised

SECTION – B

86. Which of the following statements is not correct about the reaction given below ?

$$K_4[Fe(CN)_6] \xrightarrow{Oxidation} Fe^{3+} + CO_2 + NO_3\Theta$$
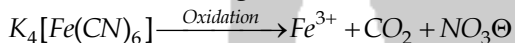
(a) Fe is oxidized from $Fe^{2+}\ to\ Fe^{3+}$
(b) Carbon is oxidized from $C^{2+}\ to\ C^{4+}$
(c) N is oxidized from $N^{3-}\ to\ N^{5+}$.
(d) Carbon is not oxidized.

87. A 400 mg iron capsule contains 100 mg of ferrous fumarate, $(CHCOO)_2$ Fe. The percentage of iron present in it is approximately
(a) 33%   (b) 25%   (c) 14%   (d) 8%

88. What will be the volume of CO_2 at NTP obtained on heating 10 grams of (90% pure) limestone?
(a) 22.4 litres   (b) 2.016 litres
(c) 2.24 litres   (d) 20.16 litres

89. The molarity of the solution containing 2.8% (mass/volume) solution of KOH is : (Given atomic mass of K = 39) is :
(a) 0.1 M   (b) 0.5 M
(c) 0.2 M   (d) 1 M

90. What is the concentration of nitrate ions if equal volumes of 0.1 M $AgNO_3$ and 0.1 M NaCl are mixed together ?
(a) 0.1 N   (b) 0.2 M
(c) 0.05 M   (d) 0.25 M

91. Light of wavelength λ shines on a metal surface with intensity x and the metal emits y electrons per second of average energy, z. What will happen to y and z if x is doubled ?
(a) y will be doubled and z will become half
(b) y will remain same and z will be doubled
(c) both y and z will be doubled.
(d) y will be doubled but z will remain same

92. The kinetic energy of the electron emitted when light of frequency $3.5 \times 10^{15}\,Hz$ falls on a metal surface having threshold frequency $1.5 \times 10^{15}\,Hz$ is (h = 6.6×10^{-34} Js
(a) $1.32 \times 10^{-18}\,J$ (b) $3.3 \times 10^{-18}\,J$
(c) $6.6 \times 10^{-19}\,J$ (d) $1.98 \times 10^{-19}\,J$

93. Which transition in the hydrogen spectrum have the same wavelength as Balmer transition, n = 4 to n = 2, of He$^+$ spectrum ?
(a) $n_1 = 1, n_2 = 2$ (b) $n_1 = 1,\ n_2 = 3$
(c) $n_1 = 3,\ n_2 = 4$ (d) $n_1 = 2,\ n_2 = 4$

94. A 200 g cricket ball is thrown with a speed of 3.0×10^3 cm sec^{-1} . What will be its de Broglie's wavelength ?
[h = $6.6 \times 10^{-27}\,g\,cm^2\,sec^{-1}$]
(a) $1.1 \times 10^{-32}\,cm$ (b) $2.2 \times 10^{-32}\,cm$
(c) $0.55 \times 10^{-32}\,cm$ (d) $11.0 \times 10^{-32}\,cm$
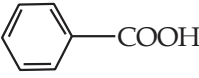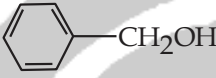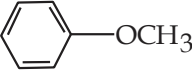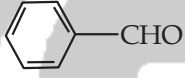
95. In a reaction $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ degree of dissociation is 30%. If initial of PCl$_5$ is one then total moles at equilibrium is
(a) 1.3   (b) 0.7   (c) 1.6   (d) 1.0

96. $CH_3COOH_{(l)} + C_2H_5OH_{(l)} \rightleftharpoons CH_3COOC_2H_{5(l)} + H_2O_{(l)}$
in the above reaction, one mole of each of acetic acid and alcohol are heated in the presence of little conc. H$_2$SO$_4$. On equilibrium being attained
(a) 1 mole of ethyl acetate is formed
(b) 2 mole of ethyl acetate are formed
(c) 1/2 moles of ethyl acetate is formed
(d) 2/3 moles of ethyl acetate is formed

97. Variation of log$_{10}$ K with $\frac{1}{T}$ is shown by the following graph in which straight line is at 45° , hence ΔH^o is
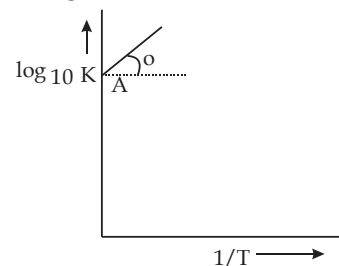
(a) +4.606 cal   (b) -4.606 cal
(c) 2 cal   (d) -2 cal

98. In the balanced chemical reaction,

$$IO_3^- + aI^- + bH^+ \rightarrow cH_2O + dI_2$$

a, b, c and d respectively correspond to
(a) 5, 6, 5, 5   (b) 5, 3, 6, 3
(c) 3, 5, 3, 6   (d) 5, 6, 3, 3

99. How many moles of $K_2Cr_2O_7$ can be reduced by 1 mole of Sn^{2+}?
(a) 2/3   (b) 1/6   (c) 1/3   (d) 1

100. Equivalent weight of C_6H_5CHO is equal to molar mass in the following reaction.

$$2 \text{—CHO} + OH^- \longrightarrow \text{—COO}^- + (A)$$

Thus, species reaction,

(a) ⬡—COOH   (b) ⬡—CH₂OH

(c) ⬡—OCH₃   (d) ⬡—CHO

BOTANY

SECTION – A

101. *Agaricus* is considered to be a member of basidiomycetes due to the following characters:
(a) Exogenously produced basidiospores
(b) Vegetative reproduction by fragmentation
(c) Presence of fruiting bodies called basidiocarp
(d) More than one option is correct

102. Potato spindle tuber disease is caused by:
(a) Lichens   (b) Viroids
(c) Virus   (d) Bacteria

103. Which pair of the following belongs to basidiomycetes:
(a) Puffballs and *Claviceps*
(b) *Penicillium* and *Collatotrichum*
(c) Morels and mushrooms
(d) Bracket fungi and puffballs

104. Which of the following is true about basidiomycetes:
(A) Also called bracket fungi.
(B) Sex organs absent, but plasmogamy is brought about by fusion of two vegetative cells of different genotypes

(C) Karyogamy and meiosis takes place outside the basidium
(D) Basidiospores are produced exogenously
(a) A and B are correct
(b) B and C are correct
(c) A, B and D are correct
(d) A, B, C and D all are correct

105. Match the following

A.	D.J. Ivanowsky	(i)	Discovery of viroids
B.	Beijerinek	(ii)	Crystallisation of virus
C.	W.M. Stanley	(iii)	Demonstration of virus
D.	T.O. Diener	(iv)	Discovery of virus

(a) A (iv), B (iii), C (ii), D (i)
(b) A (iv), B (iii), C (i), D (ii)
(c) A (iii), B (iv), C (ii), D (i)
(d) A (ii), B (iii), C (iv), D (i)

106. Structure of TMV is shown below label A and B:
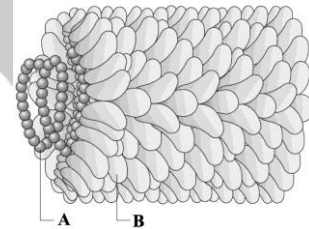
(a) A – DNA, B – capsomere
(b) A – RNA, B – capsid
(c) A – cDNA, B – capsomere
(d) A – Capsid, B – capsomere

107. Heterocyst is a specialised cell present in *Anabaena*, a cyanobacteria which is specialised for:
(a) Sulphur fixation
(b) Atmospheric nitrogen fixation
(c) Osmoregulation
(d) All of these

108. Multicellular eukaryotic organisms which decomposes dead and decaying organic matter have been placed in the kingdom:
(a) Monera   (b) Protista
(c) Fungi   (d) Plantae

109. Which one of the following belongs in kingdom Protista:
(a) *Chlamydomonas* + *Chlorella*
(b) *Paramoecium* + *Amoeba*
(c) *Chlorella* + *Amoeba*
(d) All of the above

110. What do you mean by phylogenetic relationship:
(a) Morphological relationship
(b) Taxonomical relationship
(c) Evolutionary relationship
(d) Molecular relationship

111. Blue green algae are photosynthetic due to the presence of:
    (a) Chlorophyll – b   (b) Chlorophyll – a
    (c) Chlorophyll – c   (d) r – phycocyanin

112. Which is incorrect?
    (a) Bacteria are sole members of the kingdom monera
    (b) Comma shaped bacteria are called bacillus
    (c) Methanogens are present in gut of ruminant animals
    (d) Polluted water bodies formed by cyanobacteria

113. Which of the following is related with accumulation of 'diatomaceous earth':
    (a) Chrysophytes   (b) Dinoflagellate
    (c) Euglenoids   (d) Slime mould

114. Which of the following is incorrectly matched:

A.	Heterotrophic bacteria	-	Production of antibiotics and fixing nitrogen in
B.	*Mycoplasma*	-	Pathogenic to animal and plant but can survive without oxygen
C.	Chrysophyta	-	Include golden algae and diatom
D.	Phycomycetes	-	*Mucor, Rhizopus, Albugo, Aspergillus*

    (a) A, B, C   (b) B and C
    (c) Only B   (d) Only D

115. Following are some characters of a group of organisms. Identify the correct group:
    I.   Saprophytic protist
    II. Under favourable conditions they form aggregates called plasmodium
    III. During unfavourable conditions aggregate differentiate and forms fruiting bodies bearing spores at their tip
    (a) Dinoflagellates   (b) Euglenoids
    (c) Slime moulds   (d) Chrysophytes

116. Which is incorrect statement among the following:
    (a) Fusion of protoplasms between two motile or non-motile gamete called plasmogamy
    (b) Yeast and *Penicillium* belong to ascomycetes
    (c) *Rhizopus* is also known as bread mould
    (d) *Albugo* a parasitic fungi belong to basidiomycetes

117. Kingdom fungi is divided into various classes on the basis of:
    (a) Mode of spore formation
    (b) Morphology of mycelium
    (c) Fruiting body
    (d) More than one options are correct

118. Which of the following belongs to ascomycetes:
    (a) *Aspergillus*   (b) *Claviceps*
    (c) *Neurospora*   (d) All of these

119. Following are given characters of class of fungus, identify to which class it belongs:
    (A) Reproduction only by asexual spores known as conidia
    (B) Mycelium is septate and branched
    (C) Large members are decomposers of litter and help in mineral cycling
    (a) Deuteromycetes   (b) Basidiomycetes
    (c) Phycomycetes   (d) Ascomycetes

120. Characteristic features of virus are:
    A. Obligate endoparasite
    B. Nucleoproteinaceous
    C. Contagium vivum fluidum – Beijerinek
    D. DNA and RNA both are present
    (a) A, B and C are correct
    (b) B and C are correct
    (c) A, B, C are incorrect
    (d) C and D are incorrect

121. Whittaker's five kingdom classification there is no mention of some acellular organisms. Which among the following is not belongs to category of acellular organisms:
    (a) Viruses   (b) Viroids
    (c) Prions   (d) Mycorrhiza

122. The group of neglected plants, showing great diversity in morphology and habitat, having various classes. Which of the following is not applicable on phycomycetes:
    (a) Obligate parasites on plants
    (b) Found in moist and damps places
    (c) Septate, Coenocytic mycelium
    (d) Endogenously produced spores

123. Released toxins of which group of Protista is the cause of death of other marine animals such as fishes?
    (a) Chrysophytes   (b) Dinoflagellates
    (c) Desmids   (d) Euglenoids

124. In deprived of sunlight which group of Protista behave like heterotrophs by predating on other smaller organisms?
    (a) Slime moulds   (b) Protozoans
    (c) Euglenoids   (d) Dinoflagellates

125. Prokaryotic cell type has
    (a) Body organisation - Tissue
    (b) Cell wall - Absent
    (c) Nuclear membrane - Present
    (d) Mode of nutrition - Autotrophic and Heterotrophic

126. Given below in the diagram of bacteriophage. In which one of the options all the four parts A, B, C and D are correct?
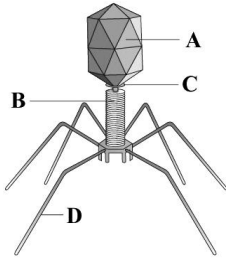
Option

	A	**B**	**C**	**D**
(a)	Sheath	Collar	Head	Tail fibres
(b)	Head	Sheath	Collar	Tail fibres
(c)	Collar	Tail fibres	Head	Sheath
(d)	Tail fibres	Head	Sheath	Collar

127. In which of the following, the kingdom, its two characters and its examples are not correctly matched, where as the remaining three are correct:

	Kingdom	**Two characters**	**Example**
(a)	Protista	a. Single cells b. Eukaryotes	*Gonyaulax Euglena*
(b)	Monera	a. Single celled b. Prokaryotes	*Nostoc Vibrio*
(c)	Mycota	a. Multicellular b.Chitinous cell wall	*Mucor Aspergillus*
(d)	Animalia	a. Eukaryotes b. Cell wall absent	*Amoeba Plasmodium*

128. Read the following statements (A-D)
 (A) In the five kingdom classification *Chlamydomonas* and *Chlorella* have been included in Protista
 (B) *Entamoeba coli* a commonly occurring bacterium in human intestine
 (C) *Paramoecium* and *Plasmodium* belong to the same kingdom as that of *Penicillium*
 (D) Hydrogen donor in photosynthesis of purple sulphur bacteria in H_2S

 How many of the above statements are incorrect.
 (a) Four   (b) One   (c) Two   (d) Three

129. *Euglena, Nostoc, Chlorella* and *Spirogyra*.
 Choose correct option regarding above organisms:-
 (a) All are unicellular eukaryotes.
 (b) All are autotrophic multicellular
 (c) All have chlorophyll 'a' and photosynthetic ability.
 (d) All are belong to green algae

130. Red tide is caused by:-
 (a) Rapid multiplication of red algae.
 (b) Rapid multiplication of euglenoids.
 (c) Rapid multiplication of slime moulds.
 (d) Rapid multiplication of dinoflagellates.

131. **Statement I**: Fusion of protoplasms between two motile or non-motile gametes is called karyogamy.
 Statement II: When a fungus reproduces sexually, two haploid hyphae of compatible mating types come together and fuse.
 (a) Both statements I and statement II are correct
 (b) Both statement I and statement II are incorrect
 (c) Statement I is correct and statement II is incorrect
 (d) Statement I is incorrect and statement II is correct

132. **Statement I**: Kingdom Animalia directly or indirectly depend on plants for food.
 Statement II: Kingdom Plantae includes all eukaryotic chlorophyll-containing organisms.
 (a) Both statement I and statement II are correct
 (b) Both statement I and statement II are incorrect
 (c) Statement I is correct and statement II is incorrect
 (d) Statement I is incorrect and statement II is correct

133. **Assertion:** Deuteromycetes are called as imperfect fungi.
 Reason: Only asexual or vegetative phases of these fungi are known.
 (a) If both Assertion and Reason are True and Reason is correct explanation of the Assertion.
 (b) If both Assertion and Reason are True but Reason is not correct explanation of the Assertion.
 (c) If Assertion is True but Reason is False
 (d) If Assertion is False but Reason is True.

134. Which of the following is correct for euglenoids?
 (a) Majority - Marine
 (b) Cell wall - cellulosic
 (c) Flagella - 2 equal
 (d) Body flexible – pellicle

135. **Assertion:** Several ruminant animals contain methanogens within their gut.
     Reason: Methanogens helps in the production of methane from dung of ruminants.
     (a) If both Assertion and Reason are True and Reason is correct explanation of the Assertion.
     (b) If both Assertion and Reason are True but Reason is not correct explanation of the Assertion.
     (c) If Assertion is True but Reason is False
     (d) If Assertion is False but Reason is True.

SECTION - B

136. Non cellular organisms are characterised by having
     (a) An inert crystalline structure inside the living cell
     (b) Not mention in five kingdom classification of Linnaeus
     (c) Nucleoprotein
     (d) Symbiotic association with algae

137. Bacterial viruses are usually
     (a) ss DNA　　　　　　　(b) ds DNA
     (c) ss RNA　　　　　　　(d) ds RNA

138. Bacteria are special since they live in some of the most harsh habitats differ from other bacteria in having a different-
     (a) Nucleus　　　　　　(b) Cell wall structure
     (c) Cell organelles　　　(d) Cell type

139. Similarity between cyanobacteria and Mycoplasma
     (a) Can servive without oxygen
     (b) Completely lack a cell wall
     (c) Both are moneras
     (d) Pathogenic in nature

140. Which of the following protists are microscopic and float passively in water currents?
     (a) Chrysophytes　　　(b) Dinoflagellates
     (c) Euglenoids　　　　(d) Slime moulds

141. The fungi of Deuteromycetes:
     (a) Permanently remain in this class only
     (b) When their sexual forms are discovered, are moved into other classes like Ascomycetes or Basidiomycetes they rightly belong to
     (c) Temporarily remains in this class
     (d) More than one option is correct

142. Viruses which infect animals have
     (a) Single stranded RNA
     (b) Double stranded RNA
     (c) Double stranded DNA
     (d) Any of these

143. Read the following statements w.r.t. the class Ascomycetes of fungi:
     (A) These are commonly called sac fungi
     (B) These are mostly multicellular
     (C) They are saprotrophic, decomposers, parasitic or coprophilous
     (D) Their mycelium is aseptate
     (E) Conidia produced by them are endogenous
     How many of the above statements are incorrect?
     (a) Two　　(b) Three　(c) Four　(d) Five

144. Which of the following is incorrect for Kingdom Animalia.
     (a) Cell wall is absent in animal cell.
     (b) Their mode of nutrition is holozoic
     (c) They follow a definite growth pattern.
     (d) All of them are capable of locomotion.

145. Which one is not belongs to member of kingdom plantae.
     (a) Venus fly trap　　　(b) *Neurospora*
     (c) Bladderwort　　　　(d) *Cuscuta*

146. Lichens are
     (a) Pollution indicators
     (b) Symbiotic association between algae and fungus
     (c) Pioneer species in primary succession on rocks
     (d) All of these

147. The most notable diseases caused by prions are
     (a) Bovine spongiform encephalopathy (BSE)
     (b) Mad cow disease in cattle
     (c) Cr–Jacob disease (CJD) in humans.
     (d) All of these

148. Which of the following is incorrect about lichens?
     (a) Algae part is autotrophic
     (b) Fungus part absorb nutrient and minerals
     (c) Fungus provide shelter to algae
     (d) Algae provide shelter to fungus

149. Which of the following characteristic was further included after two kingdom classification
     (A) Cell Structure
     (B) Nature of cell wall
     (C) Mode of nutrition
     (D) Evolutionary relationships
     (E) Methods of reproduction
     (a) B, C, D, E　　　　(b) A, C, D, E
     (c) All of these　　　(d) A, B, D, E

150. Select the total number of disease from the following caused by bacteria:
Mumps, Smallpox, Citrus canker, Cholera, Typhoid, Tetanus, Sleeping sickness, Malaria
(a) 2   (b) 4   (c) 5   (d) 6

ZOOLOGY

SECTION - A

151. Which of the following is not properly paired?

(a)	Sertoli cells	-	Follicle cells
(b)	Vas deferens	-	Oviduct
(c)	Scrotum	-	Labia majora
(d)	Seminiferous tubule	-	Cervix

152. Read the following statements :
(i) Each testis has about 25 compartments called testicular lobules
(ii) Each testicular lobule contains one to three highly coiled seminiferous tubules in which sperms are produced
(iii) Sertoli cells acts as 'nurse cells' of testicles
(iv) Sertoli cells are activated by FSH secreted by the adenohypophysis
(v) Each testis is oval shaped with a length of about 2-3 cm and width of about 1-3 cm in adults
How many of the above statements are correct?
(a) Three   (b) Two   (c) Four   (d) Five

153. In males, excretory and reproductive system share the :
(a) Testes   (b) Vas deferens
(c) Seminal vesicle   (d) Urethra

154. Cowper's gland is :
(a) Located below prostate gland
(b) Also known as bulbourethral gland
(c) Located in between seminal vesicle and prostate gland
(d) Both (a) and (b)

155. Arrange the following structures in sequence through which the sperm moves:
(i) Vasa efferentia
(ii) Epididymis
(iii) Urethra
(iv) Seminiferous tubules
(v) Vas deferens
(vi) Rete testis
(vii) Ejaculatory duct
(a) (iv) → (vi) → (ii) → (i) → (vii) → (v) → (iii)
(b) (iv) → (vi) → (i) → (v) → (ii) → (iii) → (vii)
(c) (iv) → (i) → (vii) → (iii) → (ii) → (vi) → (v)
(d) (iv) → (vi) → (i) → (ii) → (v) → (vii) → (iii)

156. Find out which of the following statements are true (T)/False (F) and choose the correct option:
I. The head of epididymis is called caput epididymis
II. The scrotum helps in maintaining the low temperature of testes (2-2.5^{0}C) lower than the internal body temperature) for spermatogenesis
III. Prostate secretion inactivates sperm
IV. In most mammals testes is located in the scrotal sac

Options	I	II	III	IV
(a)	T	T	F	T
(b)	T	T	T	T
(c)	T	F	T	F
(d)	T	F	F	F

157. In which of the following structures sperms undergo maturation?
(a) Epididymis
(b) Seminiferous tubules
(c) Vasa efferentia
(d) Rete testes

158. Which of the following is incorrect?
(a) Each ovary is about 2 to 4 cm in length and is connected to the pelvic wall and uterus by ligaments
(b) Each ovary is covered by a thin epithelium which encloses the ovarian stroma
(c) Ovaries produce several steroid hormones but not a single protein hormone
(d) The stroma of ovary is divided into a peripheral cortex and an inner medulla

159. The vulva :
(a) Consists of the external genital organs of a woman
(b) Includes mons pubis, labia majora, labia minora, clitoris and hymen
(c) Both (a) and (b)
(d) Includes mons pubis, labia majora, labia, minora, clitoris and vegina

160. Match the columns:

	Column-I		Column-II
A.	Oviduct	(i)	Narrow lumen
B.	Isthmus	(ii)	Womb
C.	Uterus	(iii)	Fallopian tube
D.	Infundibulum	(iv)	Funnel shaped

(a) A = (i), B = (iv), C = (iii), D = (ii)
(b) A = (ii), B = (i), C = (iii), D = (iv)
(c) A = (iii), B = (i), C = (ii), D= (iv)
(d) A = (iv), B = (ii), C = (i), D = (iii)

161. The female external genetalia do not include:
    (a) Labia majora, labia minora, mons pubis and hymen
    (b) Hymen, clitoris and mons
    (c) Labia majora and labia minora only
    (d) Vagina and cervix

162. Find out the correct pathway of milk flow in the breast :
    I: Mammary duct
    II : Lactiferous duct
    III. Mammary tubules
    IV. Alveoli lumen
    V. Mammary ampula
    (a) IV → III → V → I → II
    (b) III → I → IV → II → V
    (c) IV → III → I → V → II
    (d) IV→ III→II → I → V

163. The glandular tissue of each breast is divided into _____ containing clusters of cells called alveoli:
    (a) 2-3 mammary lobes
    (b) 15-20 mammary ducts
    (c) 2-3 mammary ducts
    (d) 15-20 mammary lobes

164. Identify A, B, C and D from the diagrammatic sectional view of seminiferous tubule :
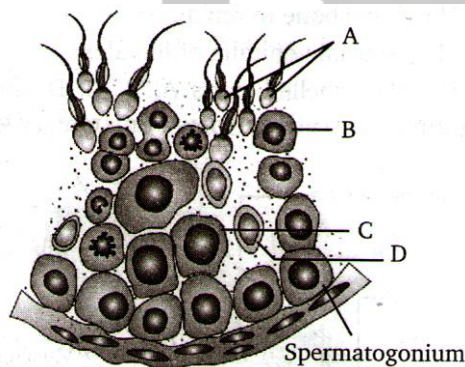
	A	B	C	D
(a)	Sperma-tozoa	Mature Sper-matid	Primary Sperma tocyte	Sertoli Cell
(b)	Sertoli cell	Sperma-tozoa	Second-ary oocyte	Primary sperma-tocyte
(c)	Sperma-tozoa	Secon-dary sperma-tocyte	Mature sper matid	Sertoli cell
(d)	Sperm-atozoa	Secondary sperma-tocyte	Primary sperma-tocyte	Sertoli cells

165. Find out which of the following statements are true (T)/false (F) and choose the correct option:
    I. Human male ejaculates about 200 to 300 million sperms during a coitus
    II. For normal fertility, atleast 60% sperms must have normal shape and size and atleast 40% of them must show vigorous motility
    III. Sperms released from the seminiferous tubules, are transported by the accessory ducts
    IV. The seminal plasma along with the sperms constitute the semen

Options	I	II	III	IV
(a)	T	T	T	F
(b)	T	T	T	T
(c)	F	F	T	T
(d)	T	F	T	F

166. Read the following statements w.r.t. oogenesis:
    (i) Oogenesis is remarkably same as spermatogenesis
    (ii) The oogonial cells starts division and center into prophase – I of meiosis and get temporarily arrested, called primary oocyte
    (iii) Each primary oocyte gets surrounded by a layer of granulosa cells and called primary follicle
    (iv) The primary follicle get surrounded by layers of granulosa cells and new theca and called secondary follicle
    (v) A large number of primary follicles degenerate from birth to puberty and at puberty only 600 to 800 primary follicles are left in each ovary
    How many of the above statements are incorrect?
    (a) Three   (b) Two   (c) One   (d) Four

167. How many ovum/ova are released during the formation of fraternal and maternal twins respectively?
    (a) Two and one   (b) One and two
    (c) Two and two   (d) One and one

168. The hormone required for ovulation and development of corpus luteum is :
    (a) TSH   (b) FSH
    (c) LH   (d) PRL

169. Lack of menstruation:
    (a) May be an indicative of pregnancy
    (b) May be caused due to stress and poor health
    (c) Either (a) or (b)
    (d) Is indicative of menopause in young women

170. Read the following statements :
    (i)   Spermatogonia and spermatids are diploid
    (ii) The extrusion of second polar body from egg nucleus occurs after the entry of sperm and before completion of fertilization
    (iii) Spermatogenesis and sperm differentiation are under the control of FSH and testosterone
    (iv) A change in ovum after penetration of sperm is the formation of second polar body
    (v)   The secondary oocyte in the Graafian follicle forms a new membrane called zona pellucida surrounding it
   Which of the above statements are correct?
    (a) (i), (ii), (iii), (iv)   (b) (i), (iii)
    (c) (iii) only   (d) (ii), (iii), (iv), (v)

171. How many of the following structures in the box contain 46 chromosomes?

Spermatozoa, secondary oocyte, spermatogonia, secondary spermatocyte, primary spermatocyte, spermatid, polar body, primary oocyte, oogonia

    (a) Six   (b) Four   (c) Nine   (d) Seven

172. Identify A, B, C and D in the schematic representation of oogenesis :
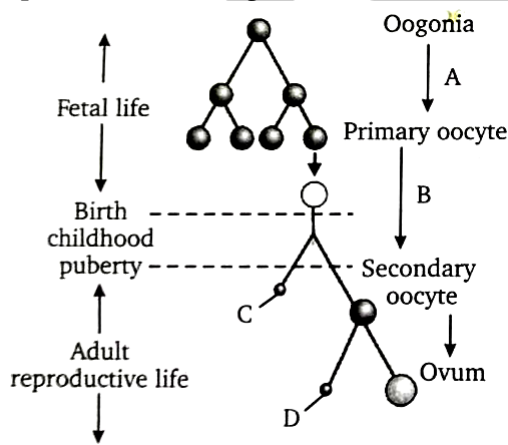
	A	B	C	D
(a)	Mitosis and differe-ntiation	Meiosis-I and Meiosis-II	First polar body	Second polar body
(b)	Mitosis	Mitosis	ovum	ovum
(c)	Mitosis and differentiation	Meiosis-I comp-leted prior to ovula-tion	First polar body	Second polar body
(d)	Meiosis-I	Meiosis-I completed prior to ovulation	First polar body	Second polar body

173. Which of the following parts of a human sperm possesses the typical '9 + 2' microtubular organization?
    (a) Middle piece   (b) Tail
    (c) Both (a) and (b)   (d) Head

174. Find out the correct sequence of spermatogenesis:
    I. Spermatid
    II. Spermatogonia
    III. Secondary spermatocyte
    IV. Primary spermatocyte
    V. Sperms
    (a) II → IV → III → I → V
    (b) II → III → IV → I → V
    (c) II → I → V → III → IV
    (d) II → IV → III → V → I

175. The first menstruation begins at puberty and is called :
    (a) Menarche   (b) Menopause
    (c) Menses   (d) Menstruation cycle

176. Identify W, X, Y and Z in the schematic representation of menstrual cycle :
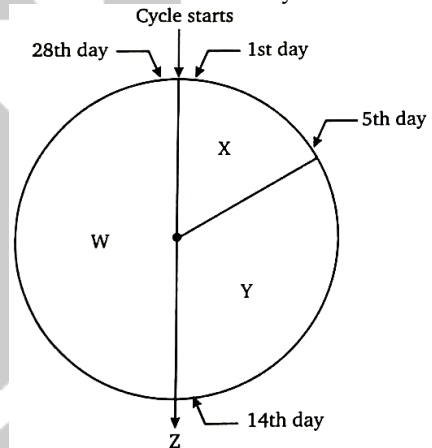
	W	X	Y	Z
(a)	Menst-rual phase	Secretory phase	Follicular phase	Ovulation
(b)	Luteal phase	Secretory phase	Ovulation	Follicular phase
(c)	Luteal phase	Manstrual phase	Follicular phase	Ovulation
(d)	Prolif-erative phase	Menstrual phase	Secre-tory phase	Ovulation

177. What is the effect of menopause on the levels of FSH, LH, estrogen and GnRH?
    (a) [FSH]↑; [LH] ↑; [Estrogen]↓; [GnRH]↑
    (b) [FSH]↓; [LH] ↓; [Estrogen]↓; [GnRH]↓
    (c) [FSH]↓; [LH] ↓; [Estrogen]↑; [GnRH]↑
    (d) [FSH]↓; [LH] ↑; [Estrogen]↓; [GnRH]↓

178. Identify A, B, X and Y in the diagram :

A   B
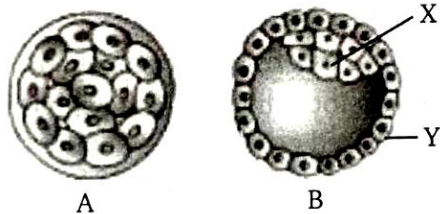
	A	B	X	Y
(a)	Morula	Ovum	Inner mass of cells	Trophoblast layer
(b)	Ovum	Morula	Inner mass of cells	Trophoblast layer
(c)	Embryo	Ovum	Blasto-mere	Trophoblast layer
(d)	Morula	Blastocyst	Inner mass of cells	Trophoblast layer

179. Arrange the events of fertilization sequentially and choose the correct option :
   I. Acrosomal reaction
   II. Karyogamy
   III. Entry of sperm into egg cytoplasm
   IV. Completion of meiosis – II in ovum
   V. Zygote formation
   (a) I → II → III → V → IV
   (b) II → I → III → V → IV
   (c) I→ III → II → IV → V
   (d) I → III → IV → II → V

180. Read the following statements :
   (i) Implantation occurs between 6 – 12 days of fertilization
   (ii) Cleavage starts while the egg is still in the fallopian tube
   (iii) The resultant daughter cells of cleavage are blastomers
   (iv) Zona pellucida remains intact throughout the cleavage divisions
   (v) Cleavage results in a solid ball of cells called morula with eight to sixteen cells
   How many of the above statements are correct?
   (a) Five   (b) Four   (c) Two   (d) Three

181. Gastrulation :
   (a) Is the early phase in the embryonic development during which the blastula is reorganised into multilayered gastrula
   (b) Forms gastrula containing only one germ layer
   (c) Both (a) and (b)
   (d) Forms blastocyst

182. How many of the hormones given below are produced in women only during pregnancy?

   Estrogen, Human chorionic gonadotropin (hCG), Human placental lactogen (hPL), Relaxin, Progesterone

   (a) Four   (b) Two   (c) Three   (d) One

183. Match the column w.r.t. to months/trimester and human embryo development:

	Column-I		Column-II
A.	End of 1st month	(i)	Limbs and genital organs becomes well developed
B.	End of 2nd month	(ii)	Body hair develops, eyelids separate and eyelashes are formed
C.	End of 1st trimester	(iii)	Heart is formed
D.	End of 2nd trimester	(iv)	Limbs and digits develops

   (a) A = (i), B = (iv), C = (ii), D = (iii)
   (b) A = (iii), B = (iv), C = (ii), D = (i)
   (c) A = (iii), B = (iv), C = (i), D = (ii)
   (d) A = (ii), B = (i), C = (iii), D = (iv)

184. Match the columns :

	Column-I		Column-II
A.	Parturition	(i)	Milk production
B.	Lactation	(ii)	Initial milk with several antibodies, healthy protein and less fat
C.	Colostrum	(iii)	Foetus delivery
D.	Oxytocin	(iv)	Uterine contraction

   (a) A = (iv), B = (i), C = (ii), D = (iii)
   (b) A = (ii), B = (iv), C = (i), D = (iii)
   (c) A = (iii), B = (ii), C = (iv), D = (i)
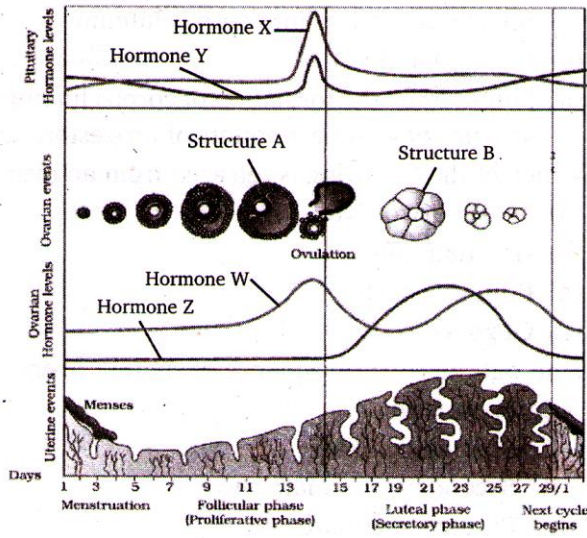   (d) A = (iii), B = (i), C = (ii), D = (iv)

185. Which of the following is incorrect for estrous cycle?
   (a) It occurs in all the primates
   (b) There is no menstruation at the end of estrous cycle
   (c) The estrogen level in blood increases, resulting in 'period of heat'
   (d) It remains suspended

SECTION - B

186. Identify the hormones (W, X, Y, Z) and the structures (A, B) labelled in the diagram :

|	Hor-mone X	Hor-mone Y	Stru-cture A	Stru-cture B	Hor-mone W	Hor-mone Z
(a)	FSH	LH	Mature follicle	Corpus luteum	Estrogen	Proge-sterone
(b)	LH	FSH	Mature follicle	Corpus luteum	Prog-esteron	Estro-gen
(c)	FSH	LH	Mature follicle	Regressing corpus luteum	Proge-sterone	Estro-gen
(d)	LH	FSH	Mature follicle	Corpus luteum	Estrogen	Proge-sterone

187. Identify B, E, G and H in the diagram showing fertilization and passage of growing embryo through the fallopian tube:
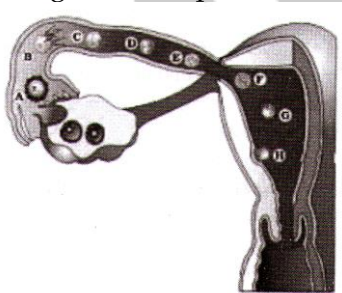
	B	E	G	H
(a)	Ovulation	Fertilization	Morula	Blastocyst
(b)	Blastocyst implantation	Fertilization	Morula	Ovulation
(c)	Fertilization	Morula	Blasto-cyst	Blastocyst implantation
(d)	Morula	Blastocyst		Blastocyst implantation

188. The placenta :
(a) Is connected to the embryo through an umbilical cord
(b) Acts as endocrine tissue which produces hCG, hPL, estrogens and progesterone
(c) Facilitates the supply of oxygen and nutrients to the embryo and also removal of carbon-di-oxide and excretory/waste materials produced by the embryo
(d) Is related to all of the above

189. Identify X, M, N, O and P for the hormonal control of male reproductive system :
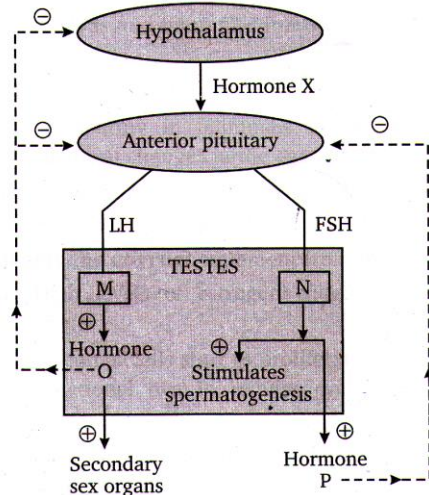
Opti-ons	X	M	N	O	P
(a)	GnRH	Leydig cells	Sertoli cells	Andro-gens (testos-terone)	Inhibin
(b)	Inhibin	Leydig cells	Sertoli cells	Andro-gens	GnRH
(c)	Andro gens	Leydig cells	Sertoli cells	GnRH	Inhibin
(d)	GnRH	Sertoli cells	Leydig cells	Andro-gens	Inhibin

190. Match the column w.r.t. germ layers:

Column-I		Column-II	
A.	Ectoderm	(i)	Muscles, skeleton, heart, kidney, gonads
B.	Mesoderm	(ii)	Nervous system, skin
C.	Endoderm	(ii)	Respiratory organs and mid-gut

(a) A = (i), B = (ii), C = (iii)
(b) A = (ii), B = (i), C = (iii)
(c) A = (iii), B = (ii), C = (i)
(d) A = (ii), B =(iii), C = (i)

191. During human embryonic development, which organ is formed first?
(a) Neutral tube   (b) Brain
(c) Skin   (d) Heart

192. Arrange the foetal membrane from outside to inside :
     I. Amnion   II. Allantois
     III. Chorion
     (a) III $\rightarrow$ II $\rightarrow$ I   (b) III $\rightarrow$ I $\rightarrow$ II
     (c) II $\rightarrow$ I $\rightarrow$ III   (d) I $\rightarrow$ II $\rightarrow$ III

193. Match between the following representing parts of the sperm and their functions and choose the correct option :

Column-I		Column-II	
A.	Head	(i)	Enzyme
B.	Middle piece	(ii)	Sperm motility
C.	Acrosome	(iii)	Energy
D.	Tail	(iv)	Genetic material

     (a) A = (ii), B = (iv), C = (i), D = (iii)
     (b) A = (iv), B = (iii), C = (i), D = (ii)
     (c) A = (iv), B = (i), C = (ii), D = (iii)
     (d) A = (ii), B = (i), C = (iii), D = (iv)

Assertion-Reason Type Questions
a. If both assertion and reason are true and the reason is the correct explanation of the assertion then mark (a)
b. If both assertion and reason are true but the reason is not the correct explanation of the assertion, then mark (b)
c. If assertion is true but reason is false, then mark (c).
d. If both assertion and reason are false statements then mark (d).

194. **Assertion :** All copulations do not lead to fertilisation and pregnancy.
     Reason : Fertilisation can occur only if the ovum and sperms are transported simultaneously to ampullary-isthmic junction.
     (a)   (b)   (c)   (d)

195. **Assertion :** Blood flowing in umbilical cord of human embryo is 100% foetal.
     Reason : Umbilical cord helps in transport of substances between foetal and maternal blood.
     (a)   (b)   (c)   (d)

196. The correct sequence of spermatogenetic stages leading to the formation of sperms in a mature human testis is:
     (a) Spermatogonia – Spermatid – Spermatocyte - Sperm
     (b) Spermatocyte – Spermatogonia – Spermatid – Sperm
     (c) Spermatogonia - Spermatocyte - Spermatid - Sperm
     (d) Sperm – Spermatocyte – Spermatogonia - Sperm

197. The part of fallopian tube closest to the ovary is :
     (a) Ampulla   (b) Isthmus
     (c) Infundibulum   (d) Cervix

198. The first movements of the foetus and appearance of hair on its head are usually observed during which month of pregnancy?
     (a) Third month   (b) Fourth month
     (c) Fifth month   (d) Sixth month

199. Signals for parturition originate from :
     (a) Placenta only
     (b) Fully developed foetus only
     (c) Both placenta as well as fully developed foetus
     (d) Oxytocin released from maternal pituitary

200. Capacitation occurs in :
     (a) Epididymis
     (b) Vas deferens
     (c) Female reproductive tract
     (d) Rete testis

TEST ASSESMENT AND ANALYSIS SHEET

Name…………….....…….……………Test topic - …………….………………………….…….Date …….…….……

Physics	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Chemistry	**Marks per question**	**Total Ques.**	**Attempted**	**Unattempted**	**Correct**	**Incorrect**	**Net score**
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Biology	**Marks per question**	**Total Ques.**	**Attempted**	**Unattempted**	**Correct**	**Incorrect**	**Net score**
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Total net score							