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CLASSROOM CONTACT PROGRAMME
(Academic Session : 2019-2020)

MHT-CET: ENTHUSE COURSE

Test Type : ONLINE TEST – 05   **Test Pattern : MHT-CET**

TEST DATE : 26-09-2020

PCB GROUP Paper code: CET2012FSPCB926   **Roll No-**

FULL SYLLABUS:

Important Instructions

Do not open this Test Booklet until you are asked to do so.

1. Immediately fill in the form number on this page of the Test Booklet with *Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.*

2. The candidates should not write their Form Number anywhere else (except in the specified space)on the Test Booklet/Answer Sheet.

3. The test is of **3 hours** duration.

4. The Test Booklet consists of **200** questions. The maximum marks are **200.** Duration 180 minutes

5. Question Paper Format :

Physics (50 Questions) Chemistry (50 Questions) carrying 1 mark each questions and BIO **(100 Questions) carrying 1 mark each**.

Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Marking scheme: Phy chem. +1 for correct answer and 0 if not Attempted. **No** negative marking.

Bio +1 for correct answer and 0 if not Attempted. **No** negative marking.

6. Use **Blue/Black Ball Point Pen only** for writting particulars/marking responses on **Side–1** and **Side–2** of the Answer Sheet. **Use of pencil is strictly prohibited.**

7. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electronic device etc, except the Identity Card inside the examination hall/room.

8. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

9. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Room/Hall. **However, the candidate are allowed to take away this Test Booklet with them.**

**10. Do not fold or make any stray marks on the Answer Sheet.**

Your Hard Work Leads to Strong Foundation

1. If the errors involved in the measurements of a side and mass of a cube are 3% and 4% respectively. What is the maximum error in the density of the material?

   a) 12%   b) 13%   c) 14%   d) 15%

2. What vector must be added to the sum of two vectors $2\hat{i} - \hat{j} + 3\hat{k}$ and $3\hat{i} - 2\hat{j} - 2\hat{k}$ so that the resultant is a unit vector along z axis?

   a) $5\hat{i} + \hat{k}$ b) $-5\hat{i} + 3\hat{j}$ c) $3\hat{j} + 5\hat{k}$ d) $-3\hat{j} + 2\hat{k}$

3. A particle moves under the effect of a force F = cx form x = 0 to x = x_1. The work done in the process is,

   a) cx_1^{2} b) $\dfrac{1}{2}cx_1^{2}$ c) cx_1^{3} d) Zero

4. On doubling the speed of an object it's

   a) K.E. is doubled   b) PE is doubled

   c) Momentum is doubled   d) Acceleration is doubled

5. In a streamline flow,

   a) The speed of a particle always remain same

   b) The velocity of a particle always remain same.

   c) The kinetic energies of all particles arriving at a given point are the same

   d) The potential energies of all the particle arriving at a given point are the same.

6. The angle of minimum deviation of a prism of refractive index $\sqrt{3}$ is equal to its refracting angle. Then the refracting angle of that prism is

   a) 30^{0} b) 45^{0} c) 60^{0} d) 90^{0}

7. Monochromatic light of wavelength 589 nm is incident from air on a water surface. The refractive index of water is 1.33. The wavelength of the refracted light is

   a) 589 nm   b) 443 nm   c) 333 nm   d) 221 nm

8. A convex glass lens $\left(\mu_g = 1.5\right)$ has focal length of 10 cm when placed in air. What is the focal length of the lens when it is immersed in water $\left(\mu_w = \dfrac{4}{3}\right)$

   a) 8 cm   b) 20 cm   c) 30 cm   d) 40 cm

9. A screen is placed 90 cm from an object. The image of the object on the screen is formed by a convex lens at two different locations separated by 20 cm. The focal length of the lens is

   a) 20.4 cm   b) 21.4 cm   c) 22.5 cm   d) 28.5 cm

10. The strength of the magnetic field in a long solenoid having 5000 turns per metre is 3.14×10^{-2}T. The current flowing through the solenoid is

    a) 2A   b) 3A   c) 4A   d) 5A

11. A current of ampere flows along the inner conductor of a co-axial cable and returns through the outer conductor of the cable. If r_1 and r_2 are the inner and outer radii of the cable, then the magnetic induction at a distance x metre from the cable will be

    a) $\dfrac{\mu_0 I}{2r}$ b) $\dfrac{\mu_0 I}{\dfrac{(r_1 + r_2)}{2}}$ c) zero   d) infinity

12. A long straight wire carries a current of 50A. An electron moving at 10^7 m/s is 5 cm away from the wire. The force acting on electron if its velocity is directed towards the wire will be

a) 1.6 x 10^{-6} N 　　　**b)** 3.2 x 10^{-16} N 　　　**c)** 4.8 x 10^{-16} N 　　　**d)** 1.8 x 10^{-16} N

13. The magnetic induction at a point P which is at a distance of 4 cm from a long current carrying wire is 10^{-8} T. The induction at a distance 12 cm from same current carrying wire is

a) 1.11 x 10^{-7} T 　　　**b)** 3.33 x 10^{-9} T 　　　**c)** 3 x 10^{-3} T 　　　**d)** 3.3 x 10^{-7} T

14. A closely wound solenoid of 2000 turns and area of cross-section 1.5 x 10^{-4}m^2 carries a current of 2.0 A. It is suspended through its centre of 2.0 A. It is suspended through its centre and perpendicular to its length, allowing it to turn in a horizontal plane in a uniform magnetic field 5 x 10^{-2} Tesla making an angle of 30^0 with the axis of the solenoid. The torque on the solenoid will be.

a) 3 x 10^{-3} Nm 　　　**b)** 1.5 x 10^{-3} Nm 　　　**c)** 1.5 x 10^{-2} Nm 　　　**d)** 3 x 10^{-2} Nm

15. A bar magnet of magnetic moment 200 A-m^2 is suspended in a magnetic field of intensity 0.25 N/A-m. The couple required to deflect it through 30^0 is

a) 50 N-m 　　　**b)** 25 N-m 　　　**c)** 20 N-m 　　　**d)** 15 N-m

16. A 12 cm long bar magnet has a magnetic moment 10Am^2. The magnet has a magnetic induction at a point in air on the perpendicular bisector of the magnet 8 cm from its centre is

a) 10^{-5} T 　　　**b)** 10^{-4} T 　　　**c)** 10^{-3} T 　　　**d)** 10^{-2} T

17. The difference between angular speed of minute hand and second hand of a clock is

a) $\dfrac{59\pi}{900}$ rad/s 　　　**b)** $\dfrac{59\pi}{1800}$ rad/s 　　　**c)** $\dfrac{59\pi}{2400}$ rad/s 　　　**d)** $\dfrac{59\pi}{3600}$ rad/s

18. A particle moves along a circle of radius r with constant tangential acceleration. If the velocity of the particle is V at the end of second revolution after the revolution has started then the acceleration is

a) $\dfrac{v^2}{8\pi r}$ 　　　**b)** $\dfrac{v^2}{6\pi r}$ 　　　**c)** $\dfrac{v^2}{4\pi r}$ 　　　**d)** $\dfrac{v^2}{2\pi r}$

19. The orbital velocity of a satellite revolving near planet is

a) Directly proportional to density of planet

b) Directly proportional to square root of density of planet

c) Directly proportional to cube of density of planet

d) Directly proportional to square density of planet

20. If the spinning speed of the earth is increased then the weight of the body at the equator

a) does not change 　　　**b)** doubles 　　　**c)** decreases 　　　**d)** increases

21. The moment inertia of sphere of mass M and radius R about an axis passing through its centre is $\dfrac{2}{5}MR^2$.The radius of gyration of the sphere about a parallel axis to the above and tangent to the sphere is:

a) $\dfrac{7}{5}R$ 　　　**b)** $\dfrac{3}{5}R$ 　　　**c)** $\left(\sqrt{\dfrac{7}{5}}\right)R$ 　　　**d)** $\left(\sqrt{\dfrac{3}{5}}\right)R$

22. Three rings each of mass P and radius Q are arranged as shown in fig. The moment of inertia of the arrangement about YY' will be
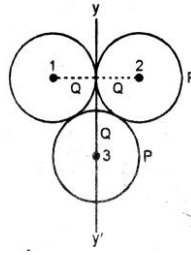
a) $\dfrac{7}{2}PQ^2$ b) $\dfrac{2}{5}PQ^2$ c) $\dfrac{5}{2}PQ^2$ d) $\dfrac{2}{7}PQ^2$

23. Two particles are executing SHM of same amplitude and frequency along the same straight line path. They pass each other when going in opposite directions, each time their displacement is half of their amplitude. What is the phase difference between them?

a) $5\pi/6$ b) $2\pi/3$ c) $\pi/3$ d) $\pi/6$

24. A particle is acted simultaneously by two mutually perpendicular S.H.Ms;

$x = a\cos\omega t \ and \ y = a\sin\omega t$. The trajectory of motion of the particle will be

a) an ellipse   b) a parabola   c) a circle   d) a hyperbola

25. One litre of a gas is maintained at pressure 72cm of mercury. It is compressed isothermally so that its volume becomes 900 cm³. The values of stress and strain will be respectively

a) 0.106 Nm^{-2} & 0.1   b) 1.06 Nm^{-2} & 0.1   c) 106.62 Nm^{-2} & 0.1   d) 10662.4 Nm^{-2} & 0.1

26. If the ratio of lengths, radii and Young's modulii of

steel and brass wires in the Fig. are *a, b, c* respectively.

Then the corresponding ratio of increase in their lengths would be

a) $\dfrac{2ac}{b^2}$ b) $\dfrac{3a}{2b^2c}$ c) $\dfrac{3c}{2ab^2}$ d) $\dfrac{2a^2c}{b}$

27. A water drop of 0.05 cm³ is squeezed between two glass plates and spreads into area of 40cm². If the surface tension of water is 70 dyne/cm then the normal force required to separate the glass plates from each other will be

a) 22.5 N   b) 45N   c) 90 N   d) 450N

28. The work done is increasing the size of a soap film from 10cm x 6cm to 10cm x 11cm is

3×10^{-4} joule. The surface tension of the film is

a) 1.5 x 10^{-2} N/m b) 3.5 x 10^{-2} N/m c) 6.0 x 10^{-2} N/m d) 11.0 x 10^{-2} N/m

29. From a point source, if amplitude of waves at a distance r is A, it's amplitude at a distance 2r will be

a) A   b) 2A   c) A/2   d) A/4

30. Two simple harmonic motions are represented by $y_1 = 4\sin\left(4\pi t + \dfrac{\pi}{2}\right)$, $y_2 = 3\cos(4\pi t)$. The resultant amplitude is

a) 7   b) 1   c) 5   d) $2+\sqrt{3}$

31. When a gas filled in a closed vessel is heated through 1°C, its pressure increases by 0.4%. The initial temperature of the gas was

a) 250 K   **b)** 2500 K   **c)** 250°C   **d)** 25°C

32. Two vessels having equal volumes contain molecular hydrogen at one atmosphere and helium at two atmospheres respectively. If both samples are at the same temperature, the r.m.s. velocity of hydrogen molecules is

a) equal to that of helium   **b)** twice that of helium

c) half that of helium   **d)** $\sqrt{2}$ times that of helium.

33. An analyzing nicol examines two adjacent plane polarised beams A and B whose planes of polarisation are mutually perpendicular. In one position of the analyser, beam B shows zero intensity. From this position, a rotation of 30° shows the beams as matched. The intensity ratio of two beams will be

a) 1/2   **b)** 1/3   **c)** 1/4   **d)** 1/5

34. The diamond has refractive index of 2.4 for sodium light of wavelength 5893 $\overset{o}{A}$ in air The speed and wavelength of this light in diamond are

a) 2.25×10^8 m/s, 2455 $\overset{o}{A}$ **b)** $1.25 \times 10^8 m/s, 1455 \overset{o}{A}$ **c)** 1.25×10^8 m/s, 2455 $\overset{o}{A}$ **d)** $2.25 \times 10^8 m/s, 2355 \overset{o}{A}$

35. The distance of a interference point on screen from two slits are 1.8 x 10⁻⁵m and 1.23 x10⁻⁵m. If wavelength of light used is 6000 $\overset{o}{A}$ then the number of bright or dark fringe formed at that point will be

a) 8th dark   **b)** 9th dark   **c)** 10th dark   **d)** 11th dark

36. A coherent light is incident on two parallel slits S_1 and S_2. At a point P_1 the fringes will be dark if the phase difference between the rays coming from S_1 and S_2 is

a) n π radians   **b)** (n +0.5)π radians   **c)** (2n +0.5)π radians   **d)** (2n + 1)π radians

37. If two open organ pipes of length 50 cm and 51 cm sounded together produce 7 beats per second, the speed of sound is.

a) 307 m/s   **b)** 327 m/s   **c)** 350 m/s   **d)** 357 m/s

38. An isolated conducting sphere of diameter 20 cm placed in air carries a charge of 9 μC. The electric intensity at a point at a distance of 10 cm from the surface of the charged sphere is

a) $10.25 \times 10^5 N/C$ **b)** $15.25 \times 10^5 N/C$ **c)** $25.25 \times 15^5 N/C$ **d)** $20.25 \times 10^5 N/C$

39. A potentiometer wire is 100 cm long and constant potential difference is maintained across it. Two cells A and B are connected in series first and then in opposition. The balance points were obtained at 60 cm and 12 cm. The ratio of the e.m.f.'s of the cell is

a) 1:2   **b)** 3:2   **c)** 4:3   **d)** 3:5

40. Figure given below shows a balance wheatstone's network. now it is disturbed by changing P to 15 Ω which of the following steps will not bring the bridge to balance again?
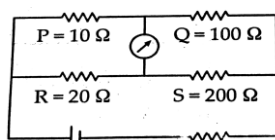
a) increasing R by 2Ω   **b)** increasing Q by 10 Ω   **c)** increasing S by 20 Ω   **d)** all of these

41. A straight line conductor of length 0.4 m is moved with a speed of 7 m/s perpendicular to a magnetic field of intensity 0.9 Wb/m² . The induced e.m.f. across the conductor will be

a) 1.26 V   **b)** 2.52 V   **c)** 5.04 V   **d)** 7.2 V

42. An e.m.f. of 20 mV is induced in a solenoid by a rate of change of current 4 A/s. The self inductance of the solenoid is

a) 3 mH **b)** 4 mH **c)** 5 mH **d)** 6 mH

43. Which of the following pairs have linear relationships between themselves when photoelectrons are emitted from a surface?

a) Intensity of incident radiation and stopping potential

b) Photoelectric current and frequency of incident radiation

c) Photoelectric current and the potential difference between the emitter (cathode) and collector (anode)

d) Frequency of incident radiation and the stopping potential

44. The number of photoelectrons emitted by light of a frequency v (higher than the threshold frequency v_0) is proportional to

a) Threshold frequency (v_0) **b)** Frequency of incident light (v)

c) $v - v_0$ **d)** intensity of the incident light

45. The energy of an excited hydrogen atom is – 3.4 eV. The principal quantum number of the orbit is

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

46. A hydrogen atom in its ground state absorbs 10.2 eV of energy. What is the increase in its orbital angular momentum?

a) 2.11×10^{-34} J.S **b)** 3.16×10^{-34} J.S **c)** 1.05×10^{-34} J.S **d)** 4.22×10^{-34} J.S

47. Carbon, silicon and germanium atoms have four valence electrons each. Their valence and conduction bands are separated by energy band gaps represented by $(E_g)_C$, $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationships is true in their case?

a) $(E_g)_C = (E_g)_{Si}$ **b)** $(E_g)_C < (E_g)_{Ge}$ **c)** $(E_g)_C > (E_g)_{Si}$ **d)** $(E_g)_C < (E_g)_{Si}$

48. A conductor, an insulator, a semiconductor and an alloy are heated by 20⁰C above the room temperature. Then there is an increase in the conductivity of the

a) Conductor **b)** Semiconductor **c)** Insulator **d)** Alloy

49. What is the modulation index of an over modulated wave

a) 1 **b)** zero **c)** <1 **d)** >1

50. When an electromagnetic wave enters an ionised layer of earth's atmosphere present in ionosphere

a) The electron cloud will not oscillate in the electric field of the wave

b) The electron could will oscillate in the electric field of wave in the opposite phase of sinusoidal electromagnetic wave

c) The electron cloud will oscillate in the electric field of wave in the phase of sinusoidal electromagnetic wave

d) The electron cloud will oscillate in the electric field of wave with a phase retardation of 90⁰ for a sinusoidal electromagnetic wave.

SECTION – B- CHEMISTRY

51. The number of atoms in 4.25 g of NH_3 is approximately

a) 1×10^{23} **b)** 2×10^{23} **c)** 4×10^{23} **d)** 6×10^{23}

52. The numbers of moles of $BaCO_3$ which contain 1.5 moles of oxygen atoms is

a) 0.5 **b)** 1 **c)** 3 **d)** 6.02×10^{23}

53. For an ideal gas, number of moles per litre in terms of its pressure P, gas constant R and temperature T is _____.

    a) PT/R   **b)** PRT   **c)** P/RT   **d)** RT/P

54. The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 are _____ respectively .

    a) +3, +3, +7   **b)** +7, +7, +3

    c) +7, +7, +7   **d)** +7, +5, +3

55. For a linear plot of $\log \dfrac{x}{m}$ versus log P in a Freundich adsorption isotherm, which of the following statements is CORRECT? (k and n are constants)

    a) Both k and $\dfrac{1}{n}$ appear in the slope term   **b)** $\dfrac{1}{n}$ appears as the intercept.

    c) Only $\dfrac{1}{n}$ appears as the slope.   **d)** $\log\left(\dfrac{1}{n}\right)$ appears as the intercept.

56. The dipole moment of BF_3 is zero because _____.

    a) it is covalent molecule

    b) it is a tetraatomic molecule

    c) it is having trigonal planar geometry

    d) the electronegativity difference between boron and fluorine is more

57. The composition of tritium is _____.

    a) 1 electron, 1 proton, 1 neutron   **b)** 1 electron, 2 protons, 1 neutrons

    c) 1 electron, 1 proton, 2 neutrons   **d)** 1 electron, 1 proton, 3 neutrons

58. Plaster of paris is

    a) $CaSO_4 . 2H_2O$ **b)** $CaSO_4 . 3H_2O$ **c)** $CaSO_4 . H_2O$ **d)** $CaSO_4 . ½ H_2O$

59. The substance which can be used as an adsorbent in column chromatography is

    a) Na_2O **b)**   NaCl   **c)** Al_2O_3 **d)**   Alum

60. What is the correct IUPAC name of the alkyl group shown ?

$$\begin{array}{l}\text{CH}_2\text{CH}_3 \\ | \\ -\text{CHCH}_2\text{CH(CH}_3)_2\end{array}$$

    a)   1-ethyl-3-methylbutyl   **b)**   1-ethyl-3, 3-dimethyl propyl

    c)   4-ethyl-2-methylbutyl   **d)**   5-methylhexyl

61. Xenon crystallizes in face centre cubic lattice and the edge of the unit cell is 620 pm, then the radius of Xenon atom is _____

    a)   219.20 pm   **b)** 438.5 pm   **c)** 265.5 pm   **d)** 536.94 pm

62. In the crystal of CsCl, the nearest neighbours of each Cs ion are_____.

    a) six chloride ions   **b)** eight chloride ions   **c)** six cs⁺ ions   **d)** eight cs⁺ ions

63. What is the molarity of a 450 mL solution containing 5 g of NaOH?

    a) 0.125 M   **b)** 0.278 M   **c)** 2M   **d)** 3.2 M

64. The percent weight of NaOH in 1.25 molar sodium hydroxide solution is

    a) 5   **b)** 12.5   **c)** 4.76   **d)** 1.25

65. Which of the following is a colligative property?

    a) Viscosity   **b)** Surface tension   **c)** Refractive index   **d)** Osmotic pressure

66. The enthalpy of combustion of C_6H_6 is $-3250 kJ\,mol^{-1}$ When 0.39 g of benzene is burnt in excess of oxygen in an open vessel, the amount of heat liberated is

    a) − 16.25 J   **b)** -16.25 kJ   **c)** -32.5 J   **d)** -32.5 kJ

67. Bond energies of H–H and Cl–Cl bonds are 430 kJ mol^{-1} and 242 kJ mol^{-1} respectively. If heat of formation of HCl is − 91 kJ mol^{-1}, the bond energy of HCl (in kJ mol^{-1}) is

    a) 430 + 242 - 91   **b)** 430 + 242 + 91   **c)** 215+121-91   **d)** 215 + 121 + 91

68. When equilibrium is attained

    a) Q = 1   **b)** $\Delta G = 0$ **c)** $\Delta G^0 = 0$ **d)** $\Delta G = -2.303\ RT \log K$

69. Given l/a = 0.5cm^{-1}, R = 50 ohm, M = 1.0. The molar conductance of the electrolytic cell is _____.

    a) 10 ohm^{-1} cm^2 mol^{-1} **b)** 20 ohm^{-1} cm^2 mol^{-1}

    c) 300 ohm^{-1} cm^2 mol^{-1} **d)** 100 ohm^{-1} cm^2 mol^{-1}

70. The resistance of 0.01N NaCl solution at 25^{0}C is 200Ω. Cell constant of conductivity cell is 1cm^{-1}. The molar conductance is ____.

    a) 5 x 10^2 Ω^{-1} cm^2 mol^{-1} **b)** 6 x 10^3 Ω^{-1} cm^2 mol^{-1}

    c) 7 x 10^4 Ω^{-1} cm^2 mol^{-1} **d)** 8 x 10^5 Ω^{-1} cm^2 mol^{-1}

71. When one coulomb of charge is passed the quantity of silver deposited is _____.

    a) 1 g of silver   **b)** 0.1 gram atom of silver

    c) 1 electrochemical equivalent of silver   **d)** 1 chemical equivalent of silver

72. Consider the reaction, 2A + B →Products

When concentration of B alone was doubled, the half-life did not change. When the concentration of A alone was doubled, the rate increased by two times. The unit of rate constant for this reaction is _____

    a)   L mol^{-1}s^{-1} **b)** no unit   **c)** mol L^{-1} s^{-1} **d)** s^{-1}

73. The unit of rate constant for certain reaction is time^{-1}. The order of the reaction is _____

    a) 0   **b)** 1   **c)** 2   **d)** 3

74. The naturally occurring material from which metal can be economically extracted

    a) Ore   **b)** Meneral   **c)** Gangue   **d)** Flux

75. Main objective of roasting is

    a) To remove volatile compounds   **b)** Oxidation

    c) Reduction   **d)** Slag formation

76. What are the products obtained when ammonia is reacted with excess of chlorine?

    a) N$_2$ and NCl$_3$ **b)** N$_2$ and HCl   **c)** N$_2$ and NH$_4$Cl   **d)** NCl$_3$ and HCl

77. Which of the following are peroxoacids of sulphur

    a) H$_2$SO$_5$ and H$_2$S$_2$O$_8$ **b)** H$_2$SO$_5$ and H$_2$S$_2$O$_7$

    c) H$_2$S$_2$O$_7$ and H$_2$S$_2$O$_8$ **d)** H$_2$S$_2$O$_6$ and H$_2$S$_2$O$_7$

78. Which reaction is not feasible?

a) $2KI + Br_2 \rightarrow 3KBr + I_2$

b) $2KBr + I_2 \rightarrow 2KI + Br_2$

c) $2KBr + Cl_2 \rightarrow 2KCl + Br_2$

d) $2H_2O + 2F_2 \rightarrow 4HF + O_2$

79. The transition elements have general electronic configuration

a) $ns^2 np^6$ b) $(n-1)d^{1-10}, ns^{0-2}, np^6$ c) $(n-1)d^{1-10} ns^{1-2}$ d) $nd^{10} ns^2$

80. Which of the following is incorrect about transition metal element

a) They have variable oxidation state

b) Their compounds are generally paramagnetic

c) They do not have tendency to form complexes.

d) Their compounds are coloured

81. Which of the following complex species is not expected to exhibit optical isomerism?

a) $[Co(en)_3]^{3+}$ b) $[Co(en)_2Cl_2]^+$ c) $[Co(NH_3)_3Cl_3]$ d) $[Co(en)(NH_3)Cl_2]^+$

82. The IUPAC name of the coordination Compound $K_2[Zn(OH)_4]$ is

a) potassium tetrahydroxyzinc (II)   b) dipotassium tetrahydroxyzinc (II)

c) potassium tetrahydroxy zincate (II)   d) potassium tetrahydroxy zincate (III)

83. Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because of

a) steric hindrance   b) inductive effect   c) instability   d) insolubility

84. Chlorobenzene on treatment with sodium in dry ether gives diphenyl. The name of the reaction is

a) Fittig reaction   b) Wurtz-Fittig reaction   c) Sandmeyer reaction   d) Gattermann reaction

85. In the following sequence of reactions,

$C_2H_5Br \xrightarrow{AgCN} X \xrightarrow{Reduction} Y ; Y$ is

a) n-propylamine   b) isopropylamine   c) ethylamine   d) ethylmethylamine

86. Consider the following reaction,

$A \xrightarrow[H_2SO_4]{K_2Cr_2O_7} acetone$

Identify A in the above reaction .

a) propan-1-ol   b) propan-2-ol   c) butan-2-ol   d) ethanol

87. Which one of the following alcohols undergoes dehydration most easily ?

a) $CH_3CH_2CH_2CH_2OH$

b)
$$CH_3CH_2 - CH - CH_2 - CH_2OH$$
$$|$$
$$CH_3$$

c)
$$CH_3 - CH_2 - CH_2 - CH - CH_3$$
$$|$$
$$OH$$

d)
$$CH_3$$
$$|$$
$$CH_3 - CH_2 - C - CH_2CH_3$$
$$|$$
$$OH$$

88. The decreasing order for the acidic strength of $1^0, 2^0, 3^0$ alcohols, H_2O and $RC \equiv CH$ is

a) $RC \equiv CH > 3^0 > 2^0 > 1^0 > H_2O$

b) $1^0 > 2^0 > 3^0 > H_2O > RC \equiv CH$

c) $H_2O > 1^0 > 2^0 > 3^0 > RC \equiv CH$

d) $3^0 > 2^0 > 1^0 > H_2O > RC \equiv CH$

89. How will you convert butan-2-one to propanoic acid?

   a) Tolllen's reagent   b) Fehling solution   c) $NaOH/I_2/H^+$ d) $NaOH/NaI/H^+$

90. Which reaction is used for the preparation of acetophenone?

   a) Reimer-Tiemann reaction   b) Wurtz-Fitting reaction

   c) Friedel-Craft reaction   d) Cannizaro's reaction

91. In the following reaction, $RCH_2COOH \xrightarrow{Br_2/P} X \xrightarrow{Excess\, NH_3} Y$ The major amounts of X and Y are

   a) R $CHBrCONH_2$, R $CH(NH_2)COOH$ b) R $CHBrCOOH$, R $CH(NH_2)COOH$

   c) R CH_2COBr, R CH_2COONH_4 d) R $CHBrCOOH$, R CH_2CONH_2

92. An organic amino compound reacts with aqueous nitrous acid at low temperature to produce an oily nitrosoamine. The compound is

   a) CH_3NH_2 b) $CH_3CH_2NH_2$ c) $CH_3CH_2NHCH_2CH_3$ d) $(CH_3CH_2)_3N$

93. During Gabriel phthalimide synthesis of amines the source of nitrogen is

   a) Potassium phthalimide $C_6H_4(CO)_2N^-K^+$

   b) Potassium cyanide, KCN

   c) Sodium azide, NaN_3

   d) Sodium nitrite, $NaNO_2$

94. Consider the following sequence of reaction $CH_3CN + H_2O \xrightarrow{H^+} A \xrightarrow[Red\, P]{Excess\, Cl_2} B$

   In the above reaction , A and B respectively are

   a) CH_3COOH, CCl_3COOH b) CH_3CH_2OH, CH_3CH_2Cl

   c) CH_3CHo, CCl_3CHO d) CH_3COCH_3, CCl_3COCH_3

95. A certain compound gives negative test with ninhydrin and positive test with Benedic't solution, it is

   a) an amino acid   b) a monosaccharide   c) a lipid   d) a protein

96. The tripeptide hormone present in most living cells is

   a) glutathione   b) glutamine   c) oxytocin   d) ptyalin

97. Buna-N is

   a) Fibres   b) Elastomer   c) Thermosetting polymer   d) Thermoplastic polymer

98. Which of the following is artificial silk?

   a) Viscose rayon   b) Nylon-6   c) Terylene   d) Nylon-66

99. Platelet aggregation is inhibited by

   a) Boric acid   b) aspirin   c) Bithional   d) Sodium carbonate

100. Which of the following is not aromatic compound

   a) Valium   b) Ibuproten   c) Equanil   d) Naproxen

101. Taxinomy is the study of

a) evolution

b) the classification of life forms by their similarities and differences

c) genetics

d) the history of the field of biology

102. In nomenclature

a) both genus and species are prited in italics

b) genus and species may be of same name

c) both in genus and species the first letter is capital

d) genus is written after the species

103. Prokaryotic cells lack

a) Nuclear membrane   **b)** DNA   **c)** chlorophyll   **d)** Membranous vesicles

104. Which of the following is found in animal cell only ?

a) mitochondria   **b)** DNA   **c)** Golgi complex   **d)** Microbodies

105. Heterochromatin

a) Is involved in protein synthesis   **b)** Is compactly coiled region

c) Have less DNA   **d)** Both (a) and (c)

106. The components of cane sugar are

a) glucose and fructose   **b)** fructose and galactose

c) fructose and ribose   **d)** glucose and glucose

107. Which of the following are water soluble protein?

a) Globulins   **b)** Albumins   **c)** Albuminoids   **d)** Prolamins

108. The function of microvilli is

a) Extensive movement of substances over cell surfaces

b) Increase in surface area for absorption

c) Cellular movement

d) Specialised uptake of macromolecules

109. Squamous epithelium is also called

a) Germinal epithelium   **b)** Columnar epithelium

c) Pavement epithelium   **d)** Sensory epithelium

110. Active transport involves

a) expenditure of energy   **b)** uphill transport

c) downhill transport   **d)** Both a) and b)

111. A cell becomes turgid when placed in

a) isotonic solution   **b)** hypertonic solution

c) hypotonic solution   **d)** None of these

112. The process of absorption of water by the solid particles is known as

a) plasmolysis   **b)** imbibition   **c)** deplasmolysis   **d)** endosmosis

113. Feces are temporarily stored in

a) anus   **b)** colon   **c)** rectum   **d)** caecum

114. Enzyme produced by salivary glands is
a) Salivary amylase   b) ptylin   c) Both (a) and (b)   d) None of these

115. The phase of growth where cell wall starts accumulating new material is known as

a) phase of cell formation   b) phase of elongation

c) phase of differentiation   d) primary growth

116. Read the following statements given below.

I. Permanent localised qualitative changes.

II. Regaining division ability.

III. Modification of development by plant.

IV. Loosing the ability to divide.

The above statements relates to

a) I—Plasticity, II—Differentiation, III—Differentiation, IV—Redifferentiation

b) I—Differentiation, II—Differentiation Ill—Plasticity, IV—Redifferentiation

c) I—Redifferentiation, II—Differentiation, III—Plasticity, IV—Development

d) I— Lag phase, II—Log phase, III—Plasticity, IV—Exponential phase

117. Match the following columns.

Column 1		Column II
A	IAA	1	Herring sperm DNA
B	ABA	2	Bolting
C	Ethylene	3	Stomatal closure
D	GA	4	Weed-free lawns
E	Cytokinins	5	Ripening of fruits

Codes

	A	B	C	D	E		A	B	C	D	E
a)	4	3	5	2	1	**b)**	5	3	4	2	1
c)	4	1	5	3	2	**d)**	5	3	1	1	4

118. Adam's apple corresponds to
a) epiglottis   b) trachea   c) larynx   d) thyroid

119. Which features distinguish bronchioles from bronchi ?
a) Bronchioles are less in diameter than bronchi
b) Bronchioles do not have cartilage in their walls
c) Larger bronchioles are supported by connective tissue along, which extend from the interlobular sepata
d) Both (a) and (b)

120. Which one of the following has the smallest diameter ?
a) Right primary brounchus   b) Left primary brounchus
c) Trachea   d) Respiratory bronchiole

121. The major reason for the success of Mendelian experiments was
a) Garden pea was true breeding   b) Garden pea was cross-breeding
c) Garden pea was heterozygous   d) Garden pea was not easily available

122. If heterozygous dominant (tT) crossed with homozygous dwarf plant, then the percentage of progeny having dwarf character is

a) 60%   **b)** 40%   **c)** 50%   **d)** 70%

123. Mendel's law were true for situation in which

a) Alleles are affected by their environment

b) Alleles show complete dominance

c) Alleles of a gene alter the effect of a different gene

d) A give character is determined by more than one gene

124. Some of the dominant traits studied by Mendel were

a) Round seed shape, constricted pod-shape and axial flower position

b) Green pod colour, inflated pod shape and axial flower position

c) Yellow seed colour, violet flower colour and yellow pod colour

d) Axial flower position, green pod colour and green seed colour

125. Test cross is a cross between

e) Hybrid X dominant parent   **f)** Hybrid X recessive parent

g) Hybrid X hybrid parent   **h)** Two distantly related species

126. Which theory arguments that life on earth came from outer space ?

a) Theory of panspermia   **b)** Cosmozoic theory   **c)** Spore theory   **d)** All of these

127. Proteinoids are

a) Carbohydrate structure consisting of branched sugars

b) Fatty acid structure consisting of branched fatt molecules

c) Protein structure consisting of branched amin acids

d) Protein structure consisting of unbranched amino acids

128. Information molecule to get evolved first on the primitive Earth was

e) Protein   **f)** DNA   **g)** RNA   **h)** All of these

129. According to abiogenesis, life originated from

a) Non-living   **b)** Pre-existing life   **c)** Chemicals   **d)** Extra-terrestrial matter

130. Width of the DNA molecule is

a) 15 A   **b)** 20A   **c)** 25A   **d)** 34A

131. The main enzyme which use a DNA template to catalyse the polymerisation of deoxynucleotides is

a) DNA ligase   **b)** DNA polymerase   **c)** DNA helicase   **d)** DNA Gyrase

132. Lightly stained part of chromatin which remains loosely packed is

a) euchromatin   **b)** heterochromatin   **c)** chromatosome   **d)** chromonemata

133. A nucleosome is a portion of the chromonema containing

a) only histones   **b)** both DNA and histones   **c)** only DNA   **d)** Both DNA and RNA

134. In a hair pin model of RNA, which nitrogen base is present at the short end ?

a) Adenine   **b)** Guanine   **c)** Thymine   **d)** Cytosine

135. Linked gene are present on

a) same chromosome   **b)** different chromosome

c) heterologous chromosome   **d)** paired chromosome

136. Linkage and crossing over are

a) same phenomena   **b)** different phenomena

**c)** opposite phenomena   **d)** identical phenomena

137. The genes located in the same chromosome do not separate and are inherited together over its generations due to the phenomenon of

a)   complete linkage

b)   incomplete linkage

c)   incomplete recombination

d)   complete recombination

138. Linkage groups are always present on the

a) homologous chromosomes

b) analogous chromosomes

c) sex chromosomes

d) heterologous chromosomes

139. Polyploidy means occurrence of

a) haploid sets of chromosomes

b) diploid sets of chromosomes

c) more than diploid sets of chromosomes

d) All of the above

140. Recombinant DNA have integrated fragment of

a) salinity resistant gene

b) disease resistant gene

c) allergy resistant gene

d) All of the above

141. The …A… are the DNA molecules that can carry a foreign …B… segment into the host cell. Here A and b refers to

	A	B
a)	Vectors	RNA
b)	Vectors	DNA
c)	Genes	RNA
d)	Genes	DNA

142. Which of the following steps are involved in the process of recombinant biotechnology? Arrange correct order.

I. Extraction of the desired gene product.

II. Amplification of the gene of interest.

III. Isolation of a desired DNA fragment.

IV. Ligation of the DNA fragment into a vector.

V. Insertion of recombinant DNA into the host.

Correct order is

a) I, II, III, IV and V

b) III, II, IV, V and I

c) II, IV, V, III and I

d) I, IV, V, III AND II

143. There is a restriction endonuclease called Eco Ri. What does 'co' part in it stand for?

a) Coelom   b) Coenzyme   c) Coli   d) Colon

144. Which one is regarded as a molecular scissor in biotechnology?

a) Reverse transcriptase

b) Restriction endonuclease

c) Taq polymerase

d) Topoisomerase

145. The sensitivity of DNA fingerprinting can be increased by

a) Using intron sequences

b) Using exon sequences

c) Using polymerase chain reactions

d) All of the above

146. Polymorphism occurs at

a) Genetic level

b) Individual level

c) Both (a) and (b)

d) None of these

147. Southern blotting technique involves the transfer of DNA from

a) gel of membrane

b) membrane to gel

c) solution to gel

d) gel to solution

148. VNTR varies in size from

a) 0.1 – 20 kb   b) 0.2 – 10 kb   c) 0.3 – 30 kb   d) 0.4 – 15 kb

149. Science of altering genetic pattern of plants in order to increase their value and utility for human welfare is called

a) plant breeding **b)** agriculture **c)** plant genetics **d)** All of these

150. Following are the steps of plant breeding. Fill up the blanks and choose appropriate option for A and B

I. Collection of germplasm.

II. ..A..

III. Cross-breeding /hybridisation

IV. ..B..

V. Testing, release and commercialisation of new cultivar.

a) A—Selection of parents; B—Testing of superior recombinants

b) A—Evaluation of parents; B—Selection of superior recombinants

c) A—Testing of parents; B—Selection of superior recombinants

d) A—Evaluation and selection of parents; B—Selection and testing of superior recombinants

151. Improved varieties of wheat suitable for Indian environment have been developed by

a) euploidy and cloning   **b)** hybridisation and mutation

c) polyploidy and hybridisation **d)** cloning and polyploidy

152. High-yelding and disease-resistant wheat varieties are

I. Sonalika

II. Kalyan Sona

III. Jaya

IV. Ratna

Choose the corred option.

a) I and II **b)** I and III **c)** II and III 0 **d)** III and IV

153. Among the following a non-communicable disease is

a) measles **b)** rabies **c)** diphtheria **d)** diabetes

154. Health is affected by

a) Genetic disorders **b)** infections **c)** lifestyle **d)** all of these

155. Fever in malaria is due to

a) Release of merozoites from RBCs **b)** Entry of sporozoites into blood capillaries

c) Entry of cryptomerozoites into RBCs **d)** Entry of merozoites into liver cells

156. Infective stage of Plasmodium for men is

a) merozoites **b)** ookinetes **c)** sporozoites **d)** None of these

157. Which of the following organisms ¡s used in the production of beverages like wine, beer, whisky brandy or rum?

a) Clostridium butylicum   **b)** Aspergillus niger

c) Saccharomyces cerovislee **d)** Penicillium notatum

158. The chemical substances produced by some microbes, which can kill or retard the growth of other microbes are called

a) ethanol **b)** citric acid **c)** antibiotics **d)** opiates

159. Which one of the following Is a wrong matching of a microbe and its Industrial product?

    a) Yeast   — Statins

    b) Acetobacter aceti   — Acetic add

    c) Clostridium acedobuyIicum   — Lactic acid

    d) Aspergillus niger   — Citric acid

160. The most common egg-type variety used for commercial production through out the world is

    a) leghorn   **b)** plymoth rock   **c)** cornish   **d)** new hampshire

161. Pick the wrong statement regarding bird flu.

    a) It is an avian influenza

    b) It is caused by H_1N_1 virus

    c) It is a fatal disease in birds

    d) Humans are affected by bird flu as a result of direct or close contact with infected poultry

162. In MOET procedure to induce follicular maturation and super-ovulation which of the following hormones are administered to the cow?

    a) Follicle stimulating hormone   **b)** Progesterone

    c) Androgen   **d)** Oxytocin

163. Which one of the following is the American poultry breed?

    a) Australop   **b)** Minorica   **c)** Assel   **d)** Rhod island Red

164. Which of the following is a simplified equation of photosynthesis ?

    a) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} C_5H_{10}O_4 + H_2O + O_2$

    b) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} (CH_2O)_n + O_2$

    c) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} C_3H_6O_3 + CO_2 + O_2$

    d) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} (CH_2O)_n + H_2O + O_2$

165. The main photosynthetic pigments in the plants are

    a) chlorophyll-a and chlorophyll-c   **b)** chlorophyll-a and chlorophyll-d

    c) chlorophyll-b and chlorophyll-a   **d)** chlorophyll-b and chlorophyll-c

166. At which wavelength PS-I becomes inactive?

    a) 780 nm   **b)** 680 nm   **c)** 690 nm   **d)** 550 nm

167. The Photosynthetic unit haying 250 Chlorophyll molecules is Called

    a) Photon   **b)** quantamsome   **c)** Peroxysome   **d)** Oxysome

168. Major proteins in the human blood are

    a) fibrinogen   **b)** globulins   **c)** albumins   **d)** All of these

169. The chief function of the serum albumen is the blood is to

    a) produce antibodies   **b)** form fibrinogen

    c) maintain colloidal asmotic pressure   **d)** remove work products

170. When thromboplastn is released in humans?

    a) Dunng hypertension

    b) By the traumatised cell at the place of injury

    c) In the condition of erythroblastosis foetalis

    d) During anaemia

171. The intermediate compound common for aerobic and anaerobic respiration is

a) Critic acid   **b)** Pyruvic acid   **c)** Acetyl compound A   **d)** Succinic acid

172. In oxidative decarboxylation only a carbon molecule of pyruvic acid gets oxidised other two carbon molecule goes to form

a) Acetyl Co-A

b) CO_2

c) Citric acid

d) Both (a) and (b)

173. Which one is not correct about Kreb's cycle ?

a) It is also called citric acid cycle

b) The intermediate compound which links glycolysis with Kreb's cycle is malic acid

c) It occurs in mitochondria

d) It starts with six carbon compound

174. How many ATP are released respectively when NADH and $FADH_2$ molecules get oxidised ?

b) 3 ATP, 2 ATP   **b)** 2 ATP, 3 ATP   **c)** 5 ATP, 4 ATP   **d)** 3 ATP, 5 ATP

175. Bony fishes are

a) ammonotelic organisms   **b)** ureotelic organisms

c) uricotelic organisms   **d)** Both (a) and (b)

176. Urea cycle is also called

a) Krebs' cycle   **b)** Henselet cycle

c) KrebHenselet cycle   **d)** Dark reaction

177. Ammonia or urea are the waste products, which are derived from

a) proteins   **b)** carbohydrates   **c)** lipids   **d)** fats

178. Stem cuttings are commonly used for the propagation of

a) banana   **b)** rose   **c)** mango   **d)** cotton

179. Match the following columns and choose the correct option:

	Column I		Column II
A)	Zoophily	1.	Pollination of birds
B)	Ornithophily	2.	Pollination of insects
C)	Entomophily	3.	Pollination of bats
D)	Cheiropterophilly	4.	Pollination by animals

Codes

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

180. In ginger, vegetative propagation occurs through

a) rhizome   **b)** offsets   **c)** bulbils   **d)** runners

181. The following is the diagram TS of anther. Identify the parts labelled as A, B and C.
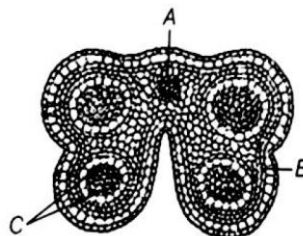
Codes

a) A—Connective tissue: B—Endothecjum ; C—Pollen grain

b) A—Endothecium; B—Connective tissue ; C—Pollen grain

c) A—Pollen grain; B—Connective tissue ; C-Endothecjum

d) A—Endothecium ; B—poglen grain; C—Connective tissue

182. Egg apparatus consists of

a) 2 synergids + 2 eggs　　　　　　b) 2 synergids + 2 eggs

c) 2 synergds + 1 egg　　　　　　　d) 2 synergids + 4 eggs

183. Hermaphrodite flower have

a) male and female on same plant　　b) male and female on same flower

c) male and female on different flower　d) male and female on difference plant

184. Read the following statements carefully and select the incorrect option.
I. The medulla is connected to the spinal cord.
II. Medulla contains controlling centres for respiration, cardiovascular reflexes and gastric secretion.
III. Cerebellum has very convoluted surface in order to provide the additional space for more neurons.

a) Only I　　　b) I and III　　　c) Only III　　　　　d) I, II and III

185. Thalamus is a structure wrapped by cerebrum, is
a) a major centre for motor signalling
b) a major coordinating centre for sensory and motor signalling
c) a major coordinating centre for sensory signal only
d) not a nervous part of a brain

186. Which of the following is the smallest cranial nerve?
a) Abducent　　　b) Optic　　　　　　c) Trochlear　　　d) Facial

187. The process of accumulation of a dark coloured amorphous substance that is highly resistant to microbial action and undergoes decomposition at an extremely slow rate is called

a) mineralisation　b) humification　　　c) organisation　　　d) transformation

188. What is true about the phosphorus cycle?
I. Rocks are the natural reservoirs of phosphorus.
II. Weathering of sedimentary rocks makes phosphate available to the soil.
III. Herbivores and carnivores obtain phosphorus from plant directly or indirectly.
Choose the correct option.
a) I and II　　　b) I and III　　　c) II and III　　　d) I, II and III

189. Peacock eats a snake and snake eats frog and frog eats insect while insect eats green plant, then position of peacock is
a) primary producer　　　　　b) secondary producer
c) decomposer　　　　　　　d) top at the apex of food pyramid

190. Match the following columns.

Column I		Column II
A)	Food chain	1. An organism that eats meat.
B)	Food web	2. An organism that eats plant.
C)	Heterotroph	3. An organism that makes food from light or chemical energy without eating
D)	Autotroph	4. An organism that gets its energy by eating other organisms.
E)	Carnivore	5. The sequence of organisms as who eats whom in a biological community.
F)	Herbivore	6. The network of all the inter-related food chains in a biological community.

Codes

	A	B	C	D	E	F
a)	5	6	4	3	1	2
b)	6	4	3	1	2	5
c)	3	1	2	5	6	4
d)	2	5	6	4	3	1

191. In all method of asexual reproduction in animals the offsprings
  a) differ genetically form parents
  b) produced are genetically from parents
  c) are completely differ from their parents and many of offsprings
  d) produced are with haploid number of chromosomes

192. Primary sex organ in man is
  a) Scrotum **b)** accessory gland **c)** testis **d)** urinary bladder

193. Temperature of human testis is
  a) 2-2.5 below body temperature **b)** 38°C
  c) 33°C **d)** 2.25 above body temperature

194. Glands of male reproductive system are
  a) prostate and seminal vesicles
  b) prostate, Bartholin's glands and seminals
  c) seminal vesicals and Bartholin's glands
  d) prostate, Cowper's glands and seminals (seminal vesiciles)

195. Enlarged end of penis (called the glans penis) is covered by the skin called
  a) foreskin **b)** prepuce **c)** both (a) and (c) **d)** none of these

196. Scrotal sac remains absent in
  a) whale **b)** elephant **c)** Echidna **d)** all of these

197. Phenotypic variants formed in a population due to change in environment are called
  a) Ecophenes **b)** Ecotypes **c)** Sciophytes **d)** Heliophytes

198. Which one of the following is a population?
  a) A spider and some trapped flies in its web
  b) Earthworm that lives in a grassland along with other arthropods
  c) All the plants in a forest
  d) All the oak trees in a forest

199. How many types of age pyramid are there?
  a) Two types **b)** Three types **c)** Four types **d)** Five types

200. Interspecific interaction could be
  a) beneficial **b)** detrimental **c)** neutral **d)** All of these

Together, we will make a difference.