UG- 2012

Test Admission Ticket No.	Question Booklet Version Code	Question Booklet Sr. No.
	C (Write this Code on your OMR Answer Sheet)	3234 (Write this number on your Answer Sheet)

OMR Serial Number

## Candidates Kindly Note

➢ There are totally 180 questions in this booklet.

➢ The question paper and OMR (Optical Mark Reader) Answer Sheet are issued separately at the start of the examination.

➢ **Please ensure to fill in the following on your OMR answer sheet in the relevant boxes :**
  o Name
  o Question Booklet Version Code
  o Question Booklet Serial Number
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➢ Kindly sign on your OMR answer sheet, only in the presence of the invigilator.

➢ Candidate should carefully read the instructions printed on the Question Booklet and OMR Answer Sheet and make correct entries on the Answer Sheet. As Answer Sheets are designed for OPTICAL MARK READER (OMR) SYSTEM, special care should be taken to mark the entries accurately.

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➢ Mark your responses only as indicated on the OMR Answer Sheet.

➢ Choice and sequence for attempting questions will be as per the convenience of the candidate.

➢ Kindly **DO NOT** use whitener or scribble, make stray marks on this question booklet as well as on the OMR answer sheet.

➢ Fill the appropriate circle completely like this ● for answering the particular question with **BLACK/BLUE BALL POINT PEN** only. **USE OF PENCIL FOR MARKING IS PROHIBITED.**

➢ Before commencing the examination, please verify all the pages are printed correctly, if not please draw the attention of your room invigilator for further assistance.

➢ Each correct answer is awarded one mark.

➢ **There will be no Negative Marking.**

➢ No Mark/s will be awarded for multiple marking (marking multiple responses) of any question.

➢ **On the OMR answer sheet, use of whitener or any other material to erase/hide the circle once filled is not permitted.**

➢ Avoid overwriting and/or striking of answer once marked. THINK BEFORE YOU INK.

➢ Immediately after the prescribed examination time is over, the OMR sheet is to be returned to the invigilator.

PHYSICS

1. In terms of ε_0, μ_0 , the absolute permittivity and permeability of free space respectively, the velocity of light in vaccum is:

    a) $C = (\mu_0 \varepsilon_0)^{1/2}$
    b) $C = (\mu_0 / \varepsilon_0)^{1/2}$
    c) $C = (\mu_0 / \varepsilon_0)^{-1/2}$
    d) $C = (\mu_0 \varepsilon_0)^{-1/2}$

2. 5 gm of impure sugar dissolved in 20cc of water produces optical rotation of 1^0 when contained in a 20 cm tube. If the specific rotation of pure sugar is 0.011 rad m^2 kg^{-1}, the percentage purity of impure solution is,
    a) 30.4 %
    b) 94.2 %
    c) 96.8 %
    d) None of the above

3. When battery and galvanometer are interchanged in the case of wheat stone bridge, then
    a) If the bridge was in adjustment before interchange it will not be in adjustment after interchange
    b) If the bridge was in adjustment before interchange, it will be in adjustment after interchange
    c) If the bridge was in adjustment before interchange, it may or may not be in a adjustment after interchange
    d) All of the above

4. A source emitting sound of frequency 180 Hz is placed in-front of a wall at a distance of 2m from it. A detector is also placed in-front of the wall at the same distance from it. The minimum distance between the source and the detector for which detector detects maximum sound is (velocity of sound in air = 360ms $^{-1}$)

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

5. A particle executes a SHM (Simple Harmonic Motion) of period T. The time taken by the particle to go directly from its mean position to half the amplitude is

    a) $\frac{T}{6}$
    b) $\frac{T}{3}$
    c) $\frac{T}{8}$
    d) $\frac{T}{12}$

6. An open and a closed organ pipe are of same length. The ratio of the frequency of the nth mode of vibration of the two pipes is

    a) 1
    b) (n /2n +1)
    c) (2n / 2n-1)
    d) 2n

7. If the tension of a string be increased by 2%. What would be % change in its frequency?

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

8. The diameter of the core of an optical fiber is of the order of

   a) 10 nanometers
   b) 10 micrometers
   c) 1 millimeter
   d) 10 millimeters

9. The half-life of radioactive substance is 50 days. Its mean life and decay constant will respectively be

   a) 72.15 days ; 0.01386 per day
   b) 7 days ; 1386 per day
   c) 72 days ; 13.86 per day
   d) 72 days ; 138.6 per day

10. The charge on an oil drop of 10^{-16} kg suspended in air by an electric field 4.9 x 10^4 V/m is

    a) 4.9 X 10^{-20}C
    b) 9.8 X 10^{-20}C
    c) 0.5 X 10^{-20}C
    d) 2 X 10^{-20}C

11. In a laser tube, all the photons

    a) Have same wavelength
    b) Have same energy
    c) Move in same direction
    d) Move with same speed

12. When an impurity is doped into an intrinsic semiconductor, the conductivity of the semiconductor

    a) Increases
    b) Decreases
    c) Remains the same
    d) Becomes zero

13. Two identical p-n junctions may be connected in series with a battery in three ways as shown in the figure below. The potential difference across the two p-n junctions are equal in

Circuit-1   Circuit-2   Circuit-3
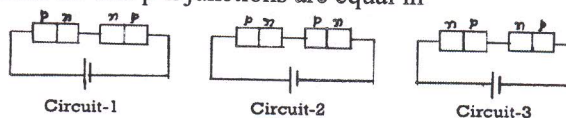
    a) Circuit 1 and circuit 2
    b) Circuit 2 and circuit 3
    c) Circuit 3 and circuit 1
    d) Circuit 1 only

14. Two protons are kept at a separation of 10nm. Let F_n and F_e be the nuclear force and the electromagnetic force between them:

    a) $F_e = F_n$.
    b) $F_e >> F_n$.
    c) $F_e << F_n$.
    d) F_e and F_n differ only slightly

15. An experimenter measures the length of a rod. Initially the experimenter and the rod are at rest with respect to the lab. Consider the following statements.

    (A) If the rod starts moving parallel to its length but the observer stays at rest, the measured length will be reduced.
    (B) If the rod stays at rest but the observer starts moving parallel to the measured length of the rod, the length will be reduced.

    a) A is true but B is false
    b) B is true but A is false
    c) Both A and B are true
    d) Both A and B are false

16. A charged particle is projected at a very high speed perpendicular to a uniform magnetic field. The particle will

    a) Move along a circle
    b) Move along a curve with increasing radius of curvature
    c) Move along a curve with decreasing radius of curvature
    d) Move along a straight line

17. Two lithium nuclei in a lithium vapour at room temperature do not combine to form a carbon nucleus because

    a) A lithium nucleus is more tightly bound than a carbon nucleus
    b) Carbon nucleus is a unstable particle
    c) It is not energetically favourable
    d) Coulomb repulsion does not allow the nuclei to come very close

18. X-ray incident on a material

    a) Exerts a force on it
    b) Transfers energy to it
    c) Transfers momentum to it
    d) All the above

19. In young's double slit experiment 60 fringes are visible in the field of view with sodium lamp having wave length 5880 Å. If sodium lamp is replaced by source having wavelength of 4200 Å, the number of fringes visible in the field of view is

    a) 60
    b) 72
    c) 84
    d) 56

20. Fraunhoffer diffraction pattern is obtained using light of wavelength 6000 Å and slit of width 0.5×10^{-3} m on a screen placed 1m from the slit. The separation of first dark fringe on either side of central maxima is

   a) mm
   b) mm
   c) 3 mm
   d) 4 mm

21. When the distance between the charged plates of a parallel plate capacitor is increased, the

   a) Capacitance is increased
   b) Potential difference is increased
   c) Total charge is increased
   d) Potential difference is decreased

22. Frequencies in the UHF range normally propagate by means of

   a) Ground waves
   b) Sky waves
   c) Surface waves
   d) Space waves

23. A carrier is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4; the total modulation index

   a) is 1
   b) Cannot be calculated unless the phase relations are known
   c) is 0.5
   d) is 0.7

24. If the kinetic energy of one mole of oxygen is 8.3×10^3 J, then its temperature is

   a) 127^0 C
   b) 300^0 C
   c) 400^0 C
   d) 666^0 C

25. The specific heats of a gas at constant volume and constant pressure are 1.03×10^4 J $Kg^{-1} K^{-1}$ and 1.44×10^4 J $Kg^{-1} K^{-1}$ respectively. The gas is:

   a) Monoatomic
   b) Diatomic
   c) Triatomic
   d) Polyatomic

26. Helium and Nitrogen gases are filled in a big rubber bulb so that the mixture contains equal number of molecules of the two gases. Now if a fine hole is made in the bulb, the gas which escapes more rapidly is:

   a) Helium
   b) Nitrogen
   c) Both equally
   d) None of the above

27. A proton, a neutron, an electron and an α-particle have same momentum. The two particles which move slower than the fastest and faster than the slowest are:

    a) electron and α-particle
    b) proton and neutron
    c) proton and electron
    d) neutron and α-particle

28. A camera in a satellite at a height R from the earth's surface in the equatorial plane takes a photograph of earth (assumed to be a sphere of radius R). The length of the equator covered by the camera is:

    a) $\pi R/2$
    b) $\pi R/3$
    c) πR
    d) $\pi 2 R/3$

29. The pressure of water in a water pipe when tap is open and closed are respectively 2×10^5 Nm^{-2}, 02.5×10^5 Nm^{-2} with open tap, the velocity of water flowing is:

    a) 10 ms^{-1}
    b) 5 ms^{-1}
    c) 20 ms^{-1}
    d) 30 ms^{-1}

30. Refractive Index of paraffin is $\sqrt{2}$. Which of the following represents the critical angle between paraffin and air:

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

31. A body weighs 98N on a spring balance at the North Pole. What will be its weight recorded on the same scale if it is shifted to the equator. Use g= GM/R^2= 9.8 m/s^2 and the radius of the earth R= 6400 km.

    a) 94.66 N
    b) 97.66 N
    c) 98.66 N
    d) 98.00 N

32. One end of a uniform rod of mass m and length l is clamped. The rod lies on a smooth horizontal surface and rotates on it about the clamped end at a uniform angular velocity ω. The force exerted by the clamp on the rod has a horizontal component

    a) $m\omega^2 l$
    b) zero
    c) mg
    d) $\frac{1}{2}m\omega^2 l$

33. A body having its centre of mass at the origin has three of its particles at $(a,0,0)$, $(0,a,0)$, $(0,0,a)$. The moments of inertia of the body about the X and Y axes are 0.20 kg-m²each. The moment of inertia about the Z-axis

    a) is 0.20 kg-m²
    b) is 0.40 kg-m²
    c) is 0.20 √2 kg-m²
    d) Cannot be deduced with this information

34. Two equal positive charges are kept at points A and B. The electric potential at the points between A and B (excluding these points) is studied while moving from A to B. The potential

    a) Continuously increases
    b) Continuously decreases
    c) Increases then decreases
    d) Decreases then increases

35. The electric field in a region is directed outward and is proportional to the distance r from the origin. Taking the electric potential at the origin to be zero,

    a) it is uniform in the region
    b) it is proportional to r
    c) it is proportional to r^2
    d) it increases as one goes away from the origin

36. A solid at temperature T_1 is kept in an evacuated chamber at temperature $T_2 > T_1$. The rate of increase of temperature of the body is proportional to

    a) $T_2 - T_1$
    b) $T_2^2 - T_1^2$
    c) $T_2^3 - T_1^3$
    d) $T_2^4 - T_1^4$

37. Laser diode is

    a) Forward biased pn junction LED in which the energy of emitted photons is equal to the energy gap.
    b) Reverse biased pn junction LED in which the energy of emitted photons is equal to the energy gap.
    c) Forward biased pn junction LED in which the energy of emitted photons is more than the energy gap.
    d) Reverse biased pn junction LED in which the energy of emitted photons is more than the energy gap.

38. When the diode shows saturated current, dynamic plate resistance is

    a) Zero
    b) Infinity
    c) Indeterminate
    d) Different for different diodes

39. The plate current in a triode valve is maximum when the potential of the grid is

    a) Positive
    b) Zero
    c) Negative
    d) Neutral

40. A hydrogen atom in ground state absorbs 10.2 eV of energy. The orbital angular momentum of the electron is increased by

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

41. Focal length of a plano-convex lens is equal to its radius of curvature of the spherical surface. The value of the refractive index of the lens is:

    a) 1.5
    b) 1.4
    c) 1.6
    d) 2

42. Convex lens can produce images of the nature:

    a) Real, inverted
    b) Virtual erect
    c) Both A and B
    d) Only A

43. What is the shape when a non-wetting liquid is placed in a capillary tube?

    a) Concave upwards
    b) Convex upwards
    c) Concave downwards
    d) Convex downwards

44. Above Curie temperature

    a) A ferromagnetic substance becomes paramagnetic
    b) A paramagnetic substance becomes diamagnetic
    c) A diamagnetic substance becomes paramagnetic
    d) A paramagnetic substance becomes ferromagnetic

45. A convex lens of focal length 80 cm and a concave lens of focal length 50 cm are combined together. What will be their resulting power?

    a) + 6.5 D
    b) − 6.5 D
    c) + 7.5 D
    d) − 0.75 D

46. The focal lengths of a lens for red and violet colors are 16.4 cm and 16 cm. What is its dispersive power?

    a) 0.050
    b) 0.025
    c) 0.012
    d) 0.006

47. Depletion layer consists of

    a) Electrons
    b) Protons
    c) Mobile charge carriers
    d) Immobile ions

48. What is the length of antenna required to transmit a radio signal of frequency 20 MHz?

    a) 7.5 m
    b) 3.75 m
    c) 5.0 m
    d) 2.0 m

49. Two similar heater coils separately take 10 min to boil a certain amount of water. If both coils are connected in series, time taken to boil the same amount of water will be

    a) 15 min
    b) 20 min
    c) 7.5 min
    d) 25 min

50. To explain his theory, Bohr used

    a) Conservation of linear momentum
    b) Conservation of angular momentum
    c) Conservation of quantum frequency
    d) Conservation of energy

51. A Yottameter (Ym) is equal to

    a) 10^{12} metres
    b) 10^{24} metres
    c) 10^{36} metres
    d) 10^{48} metres

52. Very low radio frequency is in the range of

    a) $3 \times 10^2 - 0.3 \times 10^4$ Hz
    b) $3 \times 10^4 - 0.3 \times 10^4$ Hz
    c) $3 \times 10^6 - 0.3 \times 10^8$ Hz
    d) $3 \times 10^8 - 0.3 \times 10^8$ Hz

53. All are **TRUE** about a Tunnel diode Except:

    a) A semiconductor diode and works based on "Tunnel effect"
    b) Consists of a highly doped p-n semiconductor junction
    c) Its slow speed of operation makes it a useful devise in electronic fields
    d) Discovered by Esaki in 1957

54. Transverse waves are generated in two uniform wires A and B of same material by attaching their free ends to a vibrating source of frequency 200Hz. Cross – sectional area of A is half that of B, while the tension is twice that on B. The ratio of wave lengths of transverse waves in A and B is

a) $1 : \sqrt{2}$
b) $1 : 2$
c) $\sqrt{2} : 1$
d) $2 : 1$

55. Two parallel plate capacitors of capacitances C and 2C are connected in parallel and charged to a potential difference V. The battery is then disconnected and the region between the plates of the capacitor of capacitance C is completely filled with a material of di-electric constant K. The new potential difference across the combination is

a) $\dfrac{3V}{K+2}$

b) $\dfrac{V}{K+2}$

c) $\dfrac{3V}{K}$

d) $\dfrac{V}{K}$

56. An electric current of 5A is passed through a circuit containing 3 wires arranged in parallel. If the lengths and radii of the wires are in the ratio 2: 3 : 4 and 3: 4 : 5, then the ratio of current passing through the wires would be

a) $54 : 64 : 75$
b) $9 : 16 : 25$
c) $4 : 9 : 16$
d) $3 : 6 : 10$

57. A coil of N turns is wound tightly in the form of a spiral with inner and outer radii 'a' and 'b' respectively. When a current passes through the coil the magnetic field at its centre is

a) $\dfrac{\mu_0 NI}{b}$

b) $\dfrac{2\mu_0 NI}{a}$

c) $\dfrac{\mu_0 NI}{2(b-a)} \log b/a$

d) $\dfrac{\mu_0 NI}{2(b-a)} \log a/b$

58. A motor car is going due north at a speed of 50 km/h. It makes a 90^0 left turn without changing the speed. The change in the velocity of the car is about

a) 50 km/h towards west
b) 70 km/h towards south-west
c) 70 km/h towards north-west
d) Zero

59. Suppose a quantity x can be dimensionally represented in terms of M, L and T, that is, $[x] = M^a L^b T^c$. The quantity mass

   a) Can always be dimensionally represented in terms of L, T and x,
   b) Can never be dimensionally represented in terms of L, T and x,
   c) May be represented in terms of L, T and x if $a = 0$,
   d) May be represented in terms of L, T and x if $a \neq 0$,

60. Let the angle between two nonzero vectors $\vec{A}$ and $\vec{B}$ be 120^0 and its resultant be $\vec{C}$.

   a) C must be equal to $| A - B |$
   b) C must be less than $| A - B |$
   c) C must be greater than $| A - B |$
   d) C may be equal to $| A - B |$

CHEMISTRY

61. The amino acid cystine is

a) Formed by oxidative union of 2 cysteine molecules
b) Contain a disulphide bond in the molecule
c) Involved in maintaining protein structure
d) All the statements are correct

62. A precipitate of 0.110gm of calcium oxalate ($CaC_2O_4H_2O$) was obtained from 250 ml of water sample. Express the content of calcium in ppm

a) 60 ppm
b) 120 ppm
c) 180 ppm
d) 240 ppm

63. Psuedouridine is usually seen in

a) m RNA
b) r RNA
c) t RNA
d) sn RNA

64. All are true about animal charcoal **EXCEPT**

a) It is prepared by destructive distillation of bones
b) It contains $\leq 10\%$ amorphous carbon
c) It contains $> 30\%$ amorphous carbon
d) It is used in sugar industry for removing colouring matter

65. A synthetic base useful in organ transplantation as a suppresser of events involved in immunological rejection is

a) Azathioprine
b) Allopurinol
c) Azauridine
d) Azaguanine

66. Combustion of 8.23 mg sample of a compound gave 9.62 mg of carbondioxide 3.94 mg of water. Analysis of a 5.32 mg sample of the same compound by Carius method gave 13.49 mg of silver chloride. The empirical formula of the compound is

a) $C_3H_6Cl_2$
b) $C_4H_4Cl_2$
c) $C_3H_4Cl_2$
d) None of the above

67. The chemical structure of cis - 9 – dodecenoic acid is

a) $CH_3CH_2CH=CH(CH_2)_7COOH$
b) $CH_3(CH_2)_2CH=(CH_2)_7COOH$
c) $CH_3-CH=CH-(CH_2)_7COOH$
d) $CH_3-(CH_2)_3CH=(CH_2)_7COOH$

68. Liposomes are

a) Purified phospholipids and cholesterol
b) Nontoxic and biodegradable particles
c) Used as carriers of drugs enzymes to target tissues
d) All the above

69. The half life of radioactive ^{32}P is

a) 28.4 days
b) 14.2 days
c) 7.1 days
d) None of the above

70. If the mean free path of gaseous molecules is 60 cm at a pressure of 1×10^{-4} mm Hg. What will be its mean free path when the pressure is increased by 100 times?

a) 6.0×10^{-1} cm
b) 6.0 cm
c) 6.0×10^{1} cm
d) 6.0×10^{2} cm

71. Water gas produced by passing steam over hot carbon (coke),

a) Is a mixture of carbon monoxide and H_2
b) Is a mixture of carbon monoxide, CO_2 and H_2
c) Is a mixture of H_2, CO and O_2
d) Is a mixture of CO_2, CO, H_2 and O_2

72. An example of vitamin which contains sulphur atom in its structure is

a) Riboflavin
b) Biotin
c) Pyridoxine
d) Niacin

73. Gun cotton, which is used in making smokeless powder is chemically

a) Cellulose nitrate
b) Cellulose acetate
c) Cellulose xanthate
d) Cellulose ether

74. The mineral turquoise consist of

a) Hydrated phosphate of aluminium and copper
b) Non-hydrated phosphate of aluminium and copper
c) Hydrated phosphate of nickel and copper
d) Non hydrated phosphate of nickel and copper

75. The weak acid HA is 2%ionized (disassociated) in a 0.20 M solution. What is Ka of this acid and pH of this solution?

a) K_a =8.16 X 10^{-5} and pH = 2.39
b) K_a =4.08 X 10^{-5} and pH = 2.78
c) K_a =8.16 X 10^{-5} and pH = 4.78
d) K_a =2.04 X 10^{-5} and pH = 2.39

76. Carbon dioxide is dissolved in blood (pH 7.4) to form a mixture of carbonic acid and bicarbonate. Neglecting free CO_2, what fraction will be present as carbonic acid?

a) 4.25 % as H_2CO_3
b) 8.5% as H_2CO_3
c) 17% as H_2CO_3
d) 34% as H_2CO_3

77. A cell exists in a glucose solution of 0.01 M. The concentration of glucose inside the cell is 0.1 M. What would be the free energy change involved in transporting 10^{-6} more of glucose from the medium into the cell? Assume T =37^0C

a) 5.93 X 10^{-6}kJ
b) - 5.93 X 10^{-6}kJ
c) 11.86 X 10^{-6}kJ
d) -11.86 X 10^{-6}kJ

78. The phospholipid Lecithin is also called as

a) Phosphatidylethanolamine
b) Phosphatidylcholine
c) Phosphatidylinositol
d) Phosphatidylserine

79. Caffeine is

a) 1,3,7 trimethyl xanthine
b) 1,3,9 trimethyl xanthine
c) 1,3 dimethyl xanthine
d) 3,7 dimethyl xanthine

80. Heparin sulphate is repeating units of

a) Sulphated glucosamine + sulphatediduronic acid
b) Glucuronic acid + sulphated N – acetyl galactosamine
c) Glucoronic acid + sulphated N – acetyl glucosamine
d) N – acetyl glucuronic acid + sulphated glucose

81. Potassium fluoride has NaCl type structure. What is the distance between K^+ and F^- ions if cell edge is 'a' cm?

a) $\frac{a}{2}$ cm

b) $\frac{a}{4}$ cm

c) 2a cm

d) 4a cm

82. Isotonic solutions have

a) Same vapour pressure

b) Same osmotic pressure

c) Same boiling point

d) Same temperature

83. When a catalyst used in the powdered state

a) The activity of catalyst decreases

b) The number of active centres are reduced

c) The number of active centres are increased

d) The specific nature of the catalyst is destroyed

84. Which of the following is soluble in alcohol?

a) NaCl

b) KCl

c) CsCl

d) LiCl

85. Arrange the elements of carbon family according to their increasing tendency of catenation.

a) Sn>Ge>Si>C

b) Ge>Si>C>Sn

c) C>Si>Ge>Sn

d) Si>Ge>Sn>C

86. 30 gms. of urea is dissolved in 171 gms. of water. (Molecular mass of urea is 60)
The mol fraction of urea is

a) 0.5

b) 0.05

c) 5

d) 0.005

87. The pK_b values of the amines are as follows. Which value corresponds to the strongest base?

a) 3.346

b) 3.260

c) 8.939

d) 4.744

88. The number of isomeric amines possible with the molecular formula $C_4H_{11}N$

a) Eight
b) Seven
c) Six
d) Five

89. Which of the following equations represent the calcination process?

a) $2 ZnS + 3O_2 \xrightarrow{\Delta} 2 ZnO + 2SO_2$

b) $Al_2O_3 . 2H_2O \xrightarrow{\Delta} Al_2O_3 + 2H_2O$

c) $PbS + 2O_2 \xrightarrow{\Delta} 2PbSO_4$

d) $2 PbS + 3O_2 \xrightarrow{\Delta} 2PbO + 2SO_2$

90. $(EDTA)^{3-}$ is an example of

a) Hexadentate ligand
b) Tetradentate ligand
c) Pentadentate ligand
d) Tridentate ligand

91. High purity hydrogen is produced by the reaction

a) $H_2O(g) + C(s) \xrightarrow{1270K} CO(g) + H_2(g)$

b) $3 Fe(s) + 4H_2O(g) \longrightarrow Fe_3O_4(s) + 4H_2(g)$

c) $2H_2O(l) \xrightarrow[acid/base]{electrolysis} 2H_2(g) + O_2(g)$

d) $CH_4(g) + 2H_2O(g) \xrightarrow[catalyst]{1170K} CO(g) + 4H_2(g)$

92. Acetaminophen is

a) Analgesic
b) Both antipyretic and analgesic
c) Antimalarial
d) Antipyretic

93. When 0.5g of sulphur is burnt to SO_2 4.6kJ of heat is liberated. What is the enthalpy of formation of sulphur dioxide? (S=32 and O =16)

a) -147.2kJ
b) +147.2kJ
c) +294.4kJ
d) -294.4kJ

94. Man dies in an atmosphere of carbon monoxide because

a) It combines with oxygen present in the body to form carbon dioxide
b) It increases the blood pressure
c) It reduces the organic manner of tissues
d) It combines with the haemoglobin to form carboxyhaemoglobin making it incapable of binding oxygen

95. The Nitride ion in lithium nitride is composed of

a) 7 protons + 10 electrons
b) 10 protons + 10 electrons
c) 7 protons + 7 electrons
d) 10 protons + 7 electrons

96. A certain compound gives negative test with ninhydrin and positive test with Benedict's solutions; it is

a) An amino acid
b) A monosaccharide
c) A lipid
d) A protein

97. Zeisel reaction is a method of determining

a) The number of methoxy groups in an organic compound
b) The number of methyl groups in an organic compound
c) The number of carboxyl groups in an organic compound
d) The number of hydroxyl groups in an organic compound

98. Zeolite is

a) Hydrated zinc silicate
b) Hydrated aluminosilicate
c) Hydrated borosilicate
d) None of the above

99. Wood's metal is a low melting alloy of

a) Bismuth 25%, Lead 50%, Tin 12.5% and Cadmium 12.5%
b) Bismuth 50%, Lead 25%, Tin 12.5% and Cadmium 12.5%
c) Bismuth 12.5%, Lead 12.5%, Tin 25% and Cadmium 12.5%
d) Bismuth 50%, Lead 12.5%, Tin 25% and Cadmium 12.5%

100. White spirit is a liquid mixture of

a) Petroleum hydrocarbons
b) Used in paint industry
c) Used as substitute for turpentine
d) All the above

101. The burette used to fill sodium hydroxide should be washed immediately to prevent freezing of stopcock due to the formation of:

a) Sodium Silicate
b) Sodium Carbonate
c) Silicic acid
d) Sodium bicarbonate

102. The solution in which the dispersed phase exhibits a definite affinity for the medium or the solvent is called

a) Lyophilic solution
b) Lyophobic solution
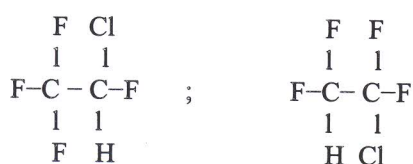c) Emulsions
d) Hydrosols

103. The order of entropy of states of matters

a) Solid < liquid < gaseous
b) Solid > liquid > gaseous
c) Solid > gas > liquid
d) Solid = liquid = gas

104. The functional isomer of acetic acid is

a) Ethyl alcohol
b) Dimethyl ether
c) Methyl formate
d) Acetaldehyde

105. Which of the statements fits well for the following two compounds

```
     F  Cl                F  F
     |  |                 |  |
  F—C – C–F    ;       F—C– C–F
     |  |                 |  |
     F  H                 H  Cl
```

a) The two compounds are same
b) The two compounds are different
c) The two compounds are same but have different geometry
d) The two compounds are same but have different structure

106. Aromatic hydro carbons undergo substitution reactions rather than addition reactions, because

a) They are delocalized cyclic and planar molecules
b) They are delocalized cyclic and non planar molecules
c) They are localized alicyclic and planar molecules
d) They are delocalized alicyclic and non planar molecules

107. The reaction given by carbonyl compounds containing polar $\setminus C = O$ group

a) Nucleophilic addition reaction
b) Nucleophilic substitution reaction
c) Electrophilic addition reaction
d) Electrophilic substitution reaction

108. From the list pairs of liquids, an ideal solution is that of

a) Phenol – water
b) Water – HCl
c) Benzene – Toluene
d) Water – Ethanol

109. The amount of current required to deposit 10.8 g of silver from a solution of $AgNO_3$ is

a) 1 C
b) 10.8 C
c) 9650 C
d) 96500 C

110. The Co-product of Nelson's process is

a) Sodium hydroxide
b) Sodium hypochloride
c) Hydrogen chloride
d) Chlorine

111. The half-life for the reaction $N_2O_5 \rightleftharpoons 2NO_2 + \frac{1}{2} O_2$ is 24 hours at 30^0 C. Starting with 10 gm of N_2O_5, how many grams of N_2O_5 will remain after a period of 96 hours?

a) 1.25 g
b) 0.63 g
c) 1.77 g
d) 0.5 g

112. Which of the following electronic configurations corresponds to an element having lowest ionization energy?

a) $Is^2 2s^2 2p^6$
b) $Is^2 2s^2 2p^6 3s^1$
c) $Is^2 2s^2 2p^5$
d) $Is^2 2s^2 2p^3$

113. A radioactive isotope decays at such a rate that after 96 minutes, only 1/8 of the original amount remains. The half – life of the nuclide in minutes is

a) 12.0
b) 24.0
c) 32.0
d) 48.0

114. The catalyst used in the manufacture of polyethene by Zeigler method is

a) Titanium tetrachloride and triphenylaluminium
b) Titanium tetrachloride and trimethylaluminium
c) Titanium dioxide
d) Titanium isoperoxide

115. In a flask colourless N_2O_4 is in equilibrium with brown coloured NO_2. At equilibrium, when the flask is heated at 100^0 C the brown colour deepens and on cooling it becomes less coloured. The change in enthalpy, $\triangle$ H, for this system is

a) Negative
b) Positive
c) Zero
d) Undefined

116. Among the following, the compound that decolourises alkaline $KMnO_4$ is

a) C_3H_8
b) C_2H_4
c) CH_4
d) CCl_4

117. An example of zwitterion is

a) Ammonium acetate
b) Glycine hydrochloride
c) Leucine
d) Urea

118. Aspirin is obtained by the reaction of salicylic acid which

a) Methanol
b) Acetic anhydride
c) Acetaldehyde
d) Acetyl chloride

119. Prussian blue is

a) $Fe_4[Fe^{II}(CN)_6]_3$
b) $K_4[Fe(CN)_6]$
c) $Cu_2[Fe(CN)_6]$
d) $Fe_3[Fe^{III}(CN)_6]_2$

120. Nitrogen atom has three unpaired electrons because of

a) Aufbau principle
b) Pauli's Exclusion principle
c) Uncertainty principle
d) Hund's rule

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121. The number of different types of histones in a nucleosome is

    a) Two of H2A and four of H2B
    b) Four of H2A and four of H2B
    c) Two each of H2A, H2B,H3 and H4
    d) Four each of H2A, H2B, H3,H4

122. Gynaecomastism is a symptom of

    a) Klinefelter's syndrome
    b) Turner's syndrome
    c) SARS
    d) Down syndrome

123. Spindle fibers are composed of

    a) Actin
    b) Collagen
    c) Tubulin
    d) Elastin

124. Terminalization of chiasmata occurs during

    a) Zygotene
    b) Diakinesis
    c) Diplotene
    d) Pachytene

125. Proto oncogenes are

    a) Cancer causing genes
    b) Genes stimulating cell division
    c) Normal genes which can cause cancer when wrongly activated
    d) DNA repair genes

126. A flying animal is described as

    a) Fossorial
    b) Arboreal
    c) Cursorial
    d) Volant

127. DNA finger printing technique was developed by

    a) Milstein and Kohler
    b) Boyer and Cohen
    c) Edwards and Steptoe
    d) Jeffreys, Wilson and Thien

128. ATP production within the mitochondria is brought about by

   a) Oxidative phosphorylation
   b) Substrate level phosphorylation
   c) Photosynthetic phosphorylation
   d) All the above

129. Which of the following is **NOT TRUE** about anaerobic glycolysis

   a) Of the 4 ATP produced, 2 are used up
   b) Molecules of NADH are produced
   c) ATP are produced by substrate level phosphorylation
   d) Two molecules of pyruvate are end products in anaerobic state

130. 'B' Complex Vitamin pantothenic acid is a component of

   a) NAD^+
   b) $NADP^+$
   c) Coenzyme A
   d) Coenzyme Q

131. Hydroponics is a technique of growing

   a) Submerged plants
   b) Free floating aquatic plants
   c) Terrestrial plants in sand
   d) Plants in aqueous balanced nutrient medium

132. Production of NADPH in a chloroplast takes place during

   a) Cyclic photophosphorylation
   b) Non cyclic photophosphorylation
   c) Series photophosphorylation
   d) Substrate level photophosphorylation

133. Munch's hypothesis is proposed to explain the process of

   a) Ascent of sap
   b) Absorption of water
   c) Conduction of organic solutes
   d) All the above

134. Monothecous and basifixed anthers occur in

   a) Tomato
   b) Onion
   c) Cotton
   d) Pea

135. When an electron has been excited to a higher energy state, it can then drop back to the original level, re-emitting the light as fluorescence. When chlorophyll is extracted in solution, and a bright red or blue light is shown on it, the chlorophyll fluoresces brightly. However, when the chlorophyll is packaged inside chloroplasts and the red or blue light is turned on, there is no fluorescence. This most likely indicates that

   a) The red and blue light waves are reflected by the chlorophyll membrane
   b) Chlorophyll in solution is a different molecule than chlorophyll in a chloroplast
   c) Excited electrons are transferred to electron acceptors in the chloroplast
   d) Green light must be used to make living cells fluoresce

136. Meiotic divisions in an ovule take place in

   a) Nucleolus
   b) Megaspore
   c) Megaspore mother cells
   d) Archesporium

137. Response of plant growth to mechanical stimulus is called

   a) Thigmotropism
   b) Geotropism
   c) Gravitropism
   d) Memmotropism

138. The law of independent assortment proposed by Mendel is applicable to

   a) Linked genes
   b) All genes
   c) Genes located in different chromosomes
   d) Supplementary genes

139. Alleles are different forms of the same gene; they are produced by

   a) Recombination
   b) Mutation
   c) Selection
   d) Inversion

140. If you are provided with antiserum A and given blood shows agglutination with it, then the blood may belong to

   a) O' group
   b) A' group
   c) B' group
   d) A' or AB' group

141. "World Health day" is observed on

   a) 7th April
   b) 8th May
   c) 7th March
   d) 7th September

142. In between meals blood glucose comes from

    a) Glycogenesis
    b) Glycolysis
    c) Glycogenolysis
    d) All of the above

143. Insulin is chemically a

    a) Glycoprotein
    b) Polypeptide
    c) Fattyacid
    d) Glycolipid

144. The antibody associated with allergic condition is

    a) IgA
    b) IgE
    c) IgD
    d) IgM

145. In an inflammatory response chemicals are released by

    a) Injured tissue cells
    b) Mast cells
    c) Phagocytes
    d) All the above

146. What is the body's first line of defense against a decreased blood pH

    a) The buffer systems of the body
    b) The respiratory system
    c) The elimination of acid by Kidney
    d) All the above

147. The fasting blood sugar / glucose level in an adult human being is in the range of

    a) 2.3 to 3.2 mmol/L
    b) 4.6 to 6.4 mmol/L
    c) 8.0 to 9.0 mmol/L
    d) None of the above

148. Trachea of respiratory system is a hollow tube that is strengthened and held open by

    a) Vertically arranged muscles
    b) Horizontally arranged bands of bones
    c) Horizontally arranged bands of cartilage
    d) Vertically arranged ligaments

149. In Cryopreservation the semen is stored in

a) Dry ice temperature
b) Liquid nitrogen temperature
c) Saline water
d) Refrigerator temperature of 0^0 C

150. Ectoparasitic forms are found in

a) Phylum: Platyhelminthes
b) Phylum: Nematoda
c) Phylum: Annelida
d) Phylum: Echinodermata

151. The Z – DNA helix

a) Has fewer base pairs per turn than B - DNA
b) Is favoured by an alternating GC sequence
c) Tends to be found at the 3' end of the genes
d) Is a permanent conformation of DNA

152. Ultraviolet radiation in the range of 320 – 400nm (UV-A)

a) Is not harmful in normal doses
b) Is used in the treatment of psoriasis
c) Is useful in the formation of vitamin D
d) All of the above

153. Tullgren funnel is a

a) Device used to remove and collect small animals such as insects from a sample of soil or leaf litter
b) A device used in the separation of bacteria and viruses from soil
c) Device used to remove and collect bacteria from samples of soil
d) None of the above

154. Unlike primary growth, secondary growth in both roots and stems

a) Is indeterminate
b) Produces xylem and phloem
c) Involves vascular and cork cambiums
d) Results in a rapid increase in root or stem length

155. Wood is classified as porous if it contains

a) Vessels
b) Tracheids
c) Companions cells
d) Sclereids

156. The hormone that controls closure of stomata in response to water stress is

    a) Auxins
    b) Gibberellins
    c) Cytokinins
    d) Abscisic acid

157. The pigment, other than chlorophyll which might be involved in opening of stomata by light is

    a) Phytochrome
    b) Carotenes
    c) Phycobilins
    d) Plastocyanin

158. Trypsinogen gets converted to Trypsin by

    a) Chymotrypsin
    b) Enterokinase
    c) Aminopeptidase
    d) Carboxypeptidase

159. Which of the following elements is required for the activity of nitrate reductase?

    a) Molybdenum
    b) Zinc
    c) Iron
    d) Copper

160. The yellowing of leaves, called chlorosis, is usually caused by the deficiency of

    a) Sodium
    b) Phosphorus
    c) Magnesium
    d) Calcium

161. According to Dutch Botanist, "Hugo De Vries" new species evolve from earlier species by

    a) Natural selection under the influence of environment
    b) Mutational changes in chromosomal DNA
    c) Reproductive isolation
    d) None of the above

162. Gray crescent is an important marker of the polarity of the amphibian egg. It is formed at

    a) The point of sperm entry
    b) On the side opposite the point of sperm entry
    c) Animal pole
    d) Vegetal pole

163. Which blood corpuscle is largest in diameter

   a) Erythrocyte
   b) Monocyte
   c) Neutrophil
   d) Lymphocyte

164. Which one of the following characters is a diagnostic feature of Musaceae?

   a) Presence of gynostegium
   b) Presence of latex
   c) Large perennial herbs with pseudostem
   d) Corolla has corollary corona

165. Which part of the "King of Spices" belonging to the family piperaceae is used mainly as spice

   a) Bark
   b) Perisperm of the seed
   c) Dried flower Bud
   d) Dried leaves

166. Anaerobic phase of aerobic respiration is

   a) Anaerobic respiration
   b) Electron transport chain
   c) EMP pathway
   d) Fermentation

167. The megaspore mother cell and the microspore mother cell

   a) Both produce pollen grains
   b) Both divide meiotically
   c) Both divide mitotically
   d) Produce pollen grains and embryo sacs respectively

168. The unique chemical compound found only in endospore of bacteria is

   a) Polyhydroxy butyrate
   b) Mucopolysaccharide
   c) Peptidoglycan
   d) Dipicolinic acid

169. J shaped population growth curve should be associated with

   a) Exponential growth
   b) Biotic potential
   c) No environmental resistance
   d) All of the above

170. Cyclin Dependent Kinase (CDK) is a protein associated with

    a) Cell division
    b) Cyclosis
    c) Urea cycle
    d) Krebs cycle

171. The term xenobiotic refers to

    a) Any substance not harmful to the living systems
    b) A kind of antibiotic
    c) Any substances foreign to living systems
    d) None of the above

172. Western blotting is an

    a) Immunoassay for determining very small amounts of protein
    b) Immunoassay for determining very small amounts of nucleic acid
    c) Immunoassay for determining very small amounts of carbohydrates
    d) Immunoassay for determining very small amounts of nucleo protein

173. The compound warfarin is

    a) 3-(Alpha acetonyl benzyl) - 4-hydroxy coumarin
    b) Vitamin K antagonist
    c) Rodenticide
    d) All the above

174. The total amount of air that can be exhaled after a maximum inspiration is known as

    a) Tidal volume
    b) Vital capacity
    c) Residual volume
    d) Lung capacity

175. Any of the various small naked single stranded RNA molecule that infects plant cells and cause diseases are called

    a) Virion
    b) Viroid
    c) Virus
    d) Virial

176. Vibrio cholerae, the causal agent of cholera is

    a) Gram negative, motile and aerobic
    b) Gram negative, non-motile anaerobic
    c) Gram positive, motile and aerobic
    d) Gram positive, non-motile anaerobic

177. Vasomotor nerves are

   a) The nerves of autonomic nervous system
   b) The nerves helps in vaso constriction and dilation
   c) Both a and b are correct statements
   d) a is incorrect and b is correct statement

178. Vitamin D$_3$ is also known as

   a) Cholecalciferol
   b) Ergocalciferol
   c) Ergosterol
   d) Calciferol

179. The amino acid selenocysteine is coded by

   a) UGA
   b) AUU
   c) GGG
   d) AUG

180. Lysosomal enzymes

   a) Are all hydrolases
   b) Usually operate at acid pH
   c) Can cleave proteins
   d) All the above are correct