



DAILY MEDICOS

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PMC MDCAT PAPER 2020

**MDCAT PAST PAPERS
FROM 2018 TO 2020 UNIT-WISE**

Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time.

1. If during circular motion, tangential velocity of a body becomes double then centripetal force becomes:

- a. Double
- b. One half
- c. Four times
- d. One fourth

Sol: $F_c = mv^2/r$

$$F_c' = m(2v)^2/r$$

$$F_c' = m4v^2/r$$

$$F_c' = 4 mv^2/r$$

$$F_c' = 4F_c$$

2. Under what condition an object will have zero displacement but non zero distance? a.

Linear motion

- b. Circular motion
- c. Random motion
- d. Oscillation

Sol: when the body moves in a circular, after one complete revolution, as the body returns to its original position, so displacement becomes zero while the distance has been covered by the body.

3. Which one of the following properties is not exhibited by the longitudinal waves? a.

Interference

- b. Reflection
- c. Diffraction
- d. Polarization

Sol: polarization is the property that are only exhibited by transverse waves not the longitudinal waves. In which two plane wave is converted to one plane.

4. The speed of sound in air is 332m/s. the speed of sound at 22°C will be:

- a. 345.2 m/s
- b. 340 m/s
- c. 350 m/s
- d. 330 m/s

Sol: speed of sound at 0°C = 332 m/s speed formula for sound: $V+0.6 T$, speed of sound at 20°C = $332 + 0.6(20) = 344$

5. Astronomers calculate the speed of distant stars and galaxies using which of the following phenomena?

- a. Beats
- b. Interference
- c. Superposition principle
- d. Doppler effect

Sol: Doppler Effect is used to calculate speed of distant stars and galaxies. Because some stars are moving towards observed and others away and by Doppler effects we can calculate star speed.

6. In a ripple tank, 40 waves pass through a certain point in 1 second. If the wavelength of the wave is 5 cm, then speed of the wave is:

- a. 0.5 ms⁻¹
- b. 1 ms⁻¹
- c. 1.5 ms⁻¹
- d. 2 ms⁻¹

Sol: $f = 40 \text{ waves/s}$, $\lambda = 5 \text{ cm} = 0.05 \text{ m}$, $V = f\lambda = 40 \times 0.05 = 2 \text{ m/s}$

7. In which process the entire heat supplied to the gas is converted to the internal energy of the gas?

- a. Isochoric process
- b. Isobaric process
- c. Isothermal process
- d. Adiabatic process

Sol: in an isochoric process the volume remains constant, so the heat applied is converted to internal energy.

$$\Delta q = \Delta U + p\Delta V \text{ as } \Delta V = 0 \text{ so } \Delta q = \Delta U$$

Sol: in an isothermal process the internal energy remains constant so the temperature remains constant. In isochoric process, the volume remains constant, in isobaric process, the pressure remains constant. In adiabatic process the heat transfer is zero. In isentropic process, the entropy remains constant. In isenthalpic process, the enthalpy remains constant.

8. The internal energy of a system during an isothermal process:

- a. Decrease
- b. Increase
- c. Becomes zero
- d. Remain constant

Sol: in isothermal process the internal energy remains constant so the temperature remain constant. In isochoric process, the volume remains constant. In isobaric process, the pressure remains constant. In adiabatic process the heat transfer is zero. In isentropic process, the entropy remains constant.

9. If the potential at a point which is 1m from a charge is 1 volt, then the potential at a point which is 2m from the same charge will be:

- a. 2v
- b. 1v
- c. 0.5v
- d. 3v

Sol: electric potential is given by $V = kQ/r$ as V is inversely proportional to r so by doubling the $R(1\text{m} \rightarrow 2\text{m})$, the electric potential will become half (1 volt \rightarrow 0.5 volt)

$$V = kQ/r$$

$$V = kQ/2r$$

$$V = (1/2)kQ/r$$

$$V = \frac{1}{2} V$$

$$V = \frac{1}{2}(1)$$

$V = 0.5$ volt

10. The values of electric intensity will due to the presence of dielectric medium: a.

Increase

b. Decrease

c. Increase exponentially

d. Remain same

Sol: the strength of the electric field is reduced due to the presence of dielectric. If the total charge on the plates is kept constant. Then the potential difference is reduced across the capacitor plates.

11. The slope of distance – time graph will always be:

a. Negative

b. Positive

c. Zero

d. Maximum

Sol: the slope of distance –time graph will always be positive because distance can never be negative.

12. At what angle of projection of a projectile the range becomes half of its maximum value?

a. 14°

b. 20°

c. 30°

d. 40°

Sol: $R = v_i^2 \sin 2\theta / g$

At given condition: for maximum range $\sin 2\theta = 1$ which is possible if we put $\theta = 45$

No get single 2θ value 0.5 we will put angle 15 so $\sin 2\theta = \sin 2(15) = \sin 30 = \frac{1}{2}$ $R = v_i^2 (1/2) / g$ $R = (1/2) v_i^2 / g$ $R = \frac{1}{2} R_{max}$

13. If we drop an object, its initial velocity is zero. How far will it fall in time 't'? a.

$9.8 t^2$

b. $4.9 t^2$

c. $0.49 t^2$

d. $98 t^2$

Sol: we know that $s = v_i t + \frac{1}{2} a t^2$ if initial velocity as zero

$S = 0 + \frac{1}{2} (9.8) t^2$

$S = 0.49 t^2$

14. The newton-second is unit of:

a. Work

b. Power

c. Impulse

d. Momentum

Hint: impulse = $J = Ft$

$J =$ Newton second

15. A 1.75m heighted weight- lifter raises weight with a mass of 50kg to a height of

- 0.5m above his head, how much work is being done by him? ($g = 10\text{m}^{-2}$)**
- 2125 J
 - 2500 J
 - 50 J
 - 1225 J

Sol: none of the given option is correct

Height = 0.5m mass = 50kg $g = 10\text{ms}^{-1}$ work done = P.E = $mgh = 50 \times 10 \times 0.5 = 500 \times 0.5 = 250$

- 16. What is the speed of 2.9 kg metallic bob at the mean position of a simple pendulum, when released from its extreme position 0.5 m high? ($g = 10\text{m}^{-2}$)**

- 3.16ms^{-1}
- 10ms^{-1}
- 100ms^{-1}
- 50ms^{-1}

Sol: at extreme total energy = P.E – $mgh = 2 \times 10 \times 0.5 = 10\text{ J}$

At means position total energy = K.E = $10 = \frac{1}{2}mv^2$

$10 = \frac{1}{2}mv^2$

$Mv^2 = 20 \Rightarrow 2v^2 = 20 \Rightarrow v^2 = 10 = 3.1$

- 17. When the speed of your car is halved, by what factor does its kinetic energy decrease?**

- $\frac{1}{2}$
- $\frac{1}{4}$
- $\frac{1}{8}$
- $\frac{1}{6}$

Sol: K.E = $\frac{1}{2}mv^2$

As velocity reduced to half then K.E = $\frac{1}{2}$

$M(\frac{1}{2}v)^2 = \frac{1}{2}mv^2/4 \Rightarrow \frac{1}{4} \times \frac{1}{2}mv^2 = \frac{1}{4} \text{ k.E}$

- 18. Which one of the following forces is a non conservative force?**

- Frictional force
- Gravitational force
- Electric force
- Elastic spring force

Sol: frictional force is non conservative field while elastic string force, electric, magnetic and gravitational fields are constant

- 19. The earth rotates on its axis once a day. Suppose, by a dome process the earth contracts so that its radius is only half as large as at present, then how long will the earth take to complete its rotation?**

- 24 hours
- 18 hours
- 6 hours
- 12 hours

Sol: here we assume that the mass of the earth remains same, moment of the inertia of the earth rotating about its axis is:

$I = \frac{2}{5} M_e R_e^2$ ----- (Equation 1)

Angular velocity of the earth is

$$\omega = 2\pi/T \text{ -----(Equation 2)}$$

when the radius is reduced to half, the new moment of inertia is

$$I = 2/5M_e(R_e)^2 = 2/5M_e(R_e/2)^2 \text{-----(Equation 3)}$$

New time period is T and angular velocity is

$$\omega' = 2\pi/T' \text{-----(Equation 4)}$$

applying the law of conservation of angular momentum, we get

$$I\omega = I'\omega'$$

From equation 1,2,3 and 4 we get

2

$$5M_e R_e^2 \times 2\pi = 2/5M_e (R_e/2)^2 \times 2\pi/T'$$

$$\square T' = 4$$

But T = 24 hours

$$T' = \frac{24}{4} = 6 \text{ hours}$$

20. 1 radian is equal to:

- 57.1°
- 57.2
- 57.3"
- 57.4°

Sol: $360^\circ = 2\pi \text{ radian} \square 1 \text{ radian} = 360/2\pi = 57.3^\circ$

21. In transmission from grid station, power losses are maximized by:

- Increasing current
- Decreasing current
- Increasing resistance
- Increasing voltage

Sol: efficient transmission involves reducing the current by stepping up the voltage prior to transmission, and stepping it down at a substation at the far end. For AC power transmission the stepping up and down is done using transformers.

22. The domestic electricity supply has a frequency of:

- 150 Hz
- 100 Hz
- 50 Hz
- 25 Hz

Sol: the domestic electricity supply has a frequency of 50 Hz in Pakistan

23. PIV stands for:

- Positive inverse charge
- Power integrated voltage
- Peak inverse voltage
- Peak integrated voltage

Sol: PIV stands for Peak inverse voltage.

24. In full wave rectification, the diodes are used:

- a. 1
- b. 2
- c. 3
- d. 4

Sol: a full wave rectifier is a circuit arrangement which makes use of both half cycles of input alternating current (AC) and converts them to direct current (DC). In our tutorial on half wave rectifiers, we have seen that a half wave rectifier

makes use of only one-half cycle of the input alternating current. Thus a full wave rectifier is much more efficient (double+) than a half wave rectifier. This process of converting both half cycles of the input supply (alternating current) to direct current (DC) is termed full wave rectification

Full wave rectifier can be constructed in 2 ways.

The first method makes use of a centre tapped transformer and 2 diodes. This arrangement is known as center tapped full wave rectifier.

The second method uses a normal transformer with 4 diodes arranged as a bridge. This arrangement is known as a bridge rectifier.

25. The wavelength associated with an electron is of the order of:

- a. Visible light
- b. X-rays
- c. Radio waves
- d. Infrared

Sol: x-rays are commonly produced by accelerating (or decelerating) charged particles; examples include a beam of electrons striking a metal plate in an x-ray tube and a circulating beam of electrons in a synchrotron particle accelerator or storage ring. In addition, highly excited atoms can emit x-rays with discrete wavelengths characteristic of the energy level spacings in the atoms. The X-rays region of the electromagnetic spectrum falls far outside the range of visible wavelengths.

26. Which photon carries the most energy?

- a. Blue
- b. Violet
- c. Red
- d. Green

Sol: V > B > G > Y > O > R

Wavelength increase >>

Frequently decrease >>

Energy ($E=hf$) decrease >> so energy decrease from violet to red. Maximum energy is that of violet.

27. Which one of the following series lies in the ultraviolet region?

- a. Balmer series
- b. Pascher series
- c. Lyman series
- d. Bracaket series

Sol: lyman series lies in ultraviolet region

Balmer series lies in visible region

Paschan series lies in Near IR region

Brackett series lies in Mid IR region

Pfund series lies in region Far IR

28. The main difference between X-rays and γ rays is:

- a. Frequency
- b. Wave length
- c. Energy
- d. Origin

Sol: the key difference is the source: x-rays are emitted by the electrons outside the nucleus, and gamma rays are emitted by the excited nucleus itself, so the main difference is that of origin.

29. There are initially 400 atoms in a radioactive sample. What of atoms after 3 half-life? a.

400

- b. 200
- c. 50
- d. 25

Hint: first half life: $400 \div 2 = 200$

Second half life $200 \div 2 = 100$

Third half life $100 \div 2 = 50$

30. Using radiation therapy, cancerous thyroid is treated with radioisotope:

- a. Carbon
- b. ²³⁵uranium
- c. Thorium
- d. Iodine-131

Sol: radioactive iodine (RAI, also called I-131) can be used to treat thyroid cancer.

31. In capacitors, energy is stored in the form of:

- a. Gravitational energy
- b. Kinetic energy
- c. Electric intensity (correct)
- d. Magnetic induction

Sol: both inductor and capacitor store energy while resistor radiate or waste energy.

Energy is stored in a capacitor in form of electrical potential energy or electric intensity while in an inductor it is stored in the form of magnetic field.

32. Ohm time's farad is equivalent to:

- a. Time (correct)
- b. Charge
- c. Distance
- d. Capacitor

Sol: we know that RC is time constant so R T C is also equivalent to time.

$RTC = RC \times \text{time} = \text{time} \times \text{time} = \text{time}$

33. One kilowatt-hours is commonly termed as one commercial unit of electric energy which is

equal to:

- a. 3.6×10^5 J
- b. 3.6×10^6 J (correct)
- c. 3.6×10^4 J
- d. 3.6×10^3 J

Sol: 1 kwh = 1000 watt 1 hr = 1000 watt x 3600 sec = 3.6×10^6 Joule

34. When a wire is compressed and its radius becomes 2R then its resistance will be: a.

- 16R
- b. 4R
- c. 1/16R
- d. 1/4R

Sol: taking volume constant...

A – cross section area of wire (πr^2)

L – length of wire.

$R_2 = 2.r_1$ (As diameter is doubled)

$A_2 = 4.A_1$

This gives.... $L_2 = L_1/4$

If radius (diameter) is doubled length becomes one fourth.

Resistance is proportional to L/A

$R_2 = R_1/16$

35. One of the following is an ohmic device:

- a. Filament bulb
- b. Semiconductor diode
- c. Transistor
- d. Copper wire (correct)

Sol: filament bulb, thermistor and semiconductor diode are non-ohmic materials while metals are ohmic devices or substances.

36. The change in resistance of metallic conductors at temperature below 0°C is: a.

- Non linear
- b. Curve
- c. Linear
- d. Curvilinear

Sol: the resistance increases as the temperature of a metallic conductor increases with increase in temperature. The graph between resistance and temperature is linear for both increasing and decreasing.

37. When current are flowing through two long parallel wires in same direction electric field between them is:

- a. Strong
- b. Weak
- c. Remains constant
- d. Infinite

Sol: the electric field in the middle of both wires is the same while the magnetic field is weaker as it is opposite in direction and it cancels the effect of each other.

38. Magnetic flux is maximum when the angle between magnetic field and vector area is:

- 0°
- 90°
- 180°
- 45°

Sol: magnetic flux is the product of the magnetic induction & vector area element $\Delta\phi = B \cdot \Delta A$

$$\Delta\phi = B \Delta A \cos\theta$$

Direction of the vector area element ΔA is normal to the surface area

The total flux through the surface is given by $\phi = \sum \Delta\phi$ or $B \cdot A$ or $\phi = B A \cos \theta$ **Case 1:**

When magnetic field and area are parallel

$$\theta = 0$$

$$\phi = B A \cos \theta$$

$$\phi = B A \cdot 1$$

$\phi = B A$ \square maximum magnetic flux

Case 2:

When magnetic field and area are perpendicular

$$\theta = 90$$

$$\phi = B A \cos 90$$

$$\phi = B A \cdot 0 \square 0$$

39. Transformer is device which steps up or steps down the input:

- Current
- Voltage
- Energy
- Power

Sol: a transformer is used to step up and step down voltage. The power in transformer is constant

40. If a stationary bar magnet is placed near a coil at rest so maximum lines of force passes through the coil, the galvanometer shows:

- Maximum current
- Minimum current
- No current
- Intermediate value of current

Sol: the current is produced when there is change in flux linkage. As the bar magnet is stationary so there is no change in magnetic flux, so no current will be produced. As a result the galvanometer will show zero deflection.

Chemistry

41. Alkyl halides involving $-C-X$ bond breakage and $-C-Nu$ bond formation simultaneously would follow the mechanism

- SN_1
- SN_2
- E_1
- E_2

42. Secondary alkyl halides is:

- a.
- b.
- c.
- d. CH_3Cl

43. R-X on reaction with alcohols forms:

- a. R-OH
- b. ROR
- c. R-X-OH
- d. RH

44. IUPAC name of $\text{C}_6\text{H}_{10}\text{O}$ (CH₃)₂ is:

- a. 2-Methyl-3-Hexanone
- b. 2,6 – Dimethyl cyclohexanone
- c. 3 – Methyl cyclohexanone
- d. 4 – Methyl – 3- hexanone

45. Phenol is known as:

- a. Carboic acid
- b. Carbonylic acid
- c. Carbolic acid
- d. Carbolylic acid

46. Phenol is more acidic than alcohol because of the following reason: a.

Delocalization of negative charge in the OH group

- b. Delocalization of positive charge on the carbon atom in ring
- c. Delocalization of negative charge in the ring
- d. Delocalization of positive charge on the OH group

47. The common name of the following aldehyde is

- a. α – methyl – γ – chloropropionaldehyde
- b. β – chloro – α – methyl propionaldehyde
- c. β – chloro – α – methyl propionaldehyde
- d. β – methyl – α – chloropropionaldehyde

48. Which of the following reagents is used to separate and purify carbonyl and non- carbonyl compounds?

- a. HCN
- b. BrMgCH_3
- c. NaHSO_3
- d. H_2O

49. Secondary alcohol is the product of reduction of which carbonyl compound?

- a.

- b.
- c.
- d.

50. Which of the following is the strongest acid?

- a. Propanic acid
- b. Fluoroethanoic acid
- c. Trichloroethanoic acid
- d. Nitroethanoic acid

51. Hydrolysis of acyl chloride results in the formation of:

- a. Acid anhydride
- b. Carboxylic acid (correct)
- c. Amides
- d. Esters

52. The exact reactivity order for carboxylic acid derivatives is:

- a. Anhydride > acylchloride > ester
- b. Ester > anhydride > acylchloride
- c. Amide > acylchloride > ester
- d. Acylchloride > anhydride > Ester

53. Based on the physio – chemical properties, proteins may be classified into the following types:

- a. Simple proteins
- b. Compound proteins
- c. Derived proteins
- d. All of the above

54. Based on function, thyroxin can be classified as:

- a. Hormonal protein
- b. Structural protein
- c. Transport protein
- d. Genetic protein

55. L-Asparaginase enzyme has been used for the treatment of:

- a. Jaundice
- b. Blood cancer
- c. Rickets
- d. Heat disease

56. Potassium, Rubidium, Cesium react with oxygen to form which types of oxides? a.
Peroxide

- b. Superoxide
- c. Suboxide
- d. Normal oxide

57. Magnesium reacts with nitrogen to form:

- a. Mg_2N_2
- b. Mg_3N_2
- c. MgN_2
- d. MgN

58. Densities of alkali metals are low due to:

- a. Weak intermolecular forces
- b. Large atomic volume
- c. Smaller size
- d. $.ns^1$ configuration

59. In 3rd series of transition elements, paramagnetic behavior is maximum for Mn^{+2} and:

- a. Cr^{3+}
- b. Ti^{3+}
- c. V^{3+}
- d. Zn^{+2}

60. Electronic configuration of chromium (proton number 24) is:

- a. $[Ar] 3d^4 4s^2$
- b. $[Ar] 3d^5 4s^2$
- c. $[Ar] 3d^5 4s^1$
- d. $[Ar] 3d^6 4s^2$

61. The transition element which does not show variable valency is:

- a. Cu
- b. Sc
- c. Zn
- d. Cr

62. Select the organic compound which belongs to Arene family;

- a. $CH_2=CH_2$
- b. CH_3-O-CH_3
- c. CH_3-NH_2
- d. C_6H_6

63. The type of isomerism existing in a compound of molecular formula C_2H_6O is: a.

- Functional group
- b. Position
- c. Chain
- d. Metamerism

64. Which of the following compounds show geometric isomerism?

- a.

- b.
- c.
- d.

65. Generic formula of cycloalkane is?

- a. C_nH_{2n+2}
- b. C_nH_{2n}
- c. C_nH_{2n+1}
- d. C_nH_{2n-2}

66. Electrophile in sulphonation of benzene is:

- a. HSO_4
- b. H_2SO_4
- c. SO_3
- d. HSO_3^-

67. The following has IUPAC name of:

- a. 2,3 – tetramethyl butane
- b. 2,2,3,3 – tetramethyl pentane
- c. 3,3,4,4 – tetramethyl butane
- d. 3,4 – bis (dimethyl butane)

68. Acetophenone can be formed by which of the following reaction of benzene?

- a. Alkylation
- b. Acylation
- c. Halogenation
- d. Nitration

69. In alkanes, each carbon has hybridization:

- a. Sp^3
- b. Sp
- c. SP^2
- d. Dsp

70. When CH_3 is attached with the benzene ring, it makes the ring:

- a. Good Electrophile
- b. Good nucleophile
- c. Resonance hybrid
- d. Extraordinary stable

71. Which of the following reaction has greater K_p than K_c ($k_p > K_c$)

- a. $2NO + Cl_2 = 2NOCl$
- b. $2SO_2 + O_2 = 2SO_3$
- c. $2NOCl = 2NO + Cl_2$
- d. $N_2 + 3H_2 = 2NH_3$

72. The equation $N_2g + 3H_2g = 2NH_3$, represents:

- a. Contact process

- b. Haber's process
- c. Solvay process
- d. Avagadro's law

73. The unit of the rate constant is the same as that of the rate of reaction in:

- a. Zero order reaction
- b. First order reaction
- c. Second order reaction
- d. Third order reaction

74. The study of rates of chemical reactions and the factors that affect the rates of chemical reactions is known as:

- a. Thermodynamics
- b. Stoichiometry
- c. Electrochemistry
- d. Chemical kinetics

75. For the reaction $A(g) \rightarrow$ products, when the concentration of $A(g)$ doubles, the rate of reaction increases four fold, which means it is:

- a. Negative order reaction
- b. First order reaction
- c. Zero order reaction
- d. Second order reaction

76. For which of the following order of the reaction, rate of reaction is inversely proportional to the concentration reaction?

- a. 1st order reaction
- b. 2nd order reaction
- c. Negative order of reaction
- d. Zero order of reaction

77. The thermal energy at constant pressure is called:

- a. Enthalpy
- b. Internal energy
- c. Heat capacity
- d. Work done

78. Born-Haber cycle is used to determine the lattice energies of:

- a. Molecular solids
- b. Metallic solids
- c. Ionic solids
- d. Covalent solids

79. One calorie is equal to:

- a. 4.18 KJ
- b. 4.18
- c. 0.418 KJ mol

d. 0.418 KJ

80. The oxidation state of 'S' in the $(S_2O_3)^{2-}$ is:

- a. +4
- b. +6
- c. -2
- d. +2

81. The common oxidation number of halogens is:

- a. -1
- b. +1
- c. -2
- d. 0

82. During oxidation process, oxidation number of an element:

- a. Decreases
- b. Increases
- c. Remains constant
- d. Both A&B

83. Which of the following has the highest value of electronegativity?

- a. 1
- b. Br
- c. Cl
- d. F

84. Which of the following hybrid orbitals has maximum 's' character?>

- a. sp^3 – hybrid orbital
- b. sp^2 – hybrid orbital
- c. sp – hybrid orbital
- d. dsp^2 – hybrid orbital

85. The first ionization energy is maximum for:

- a. Na
- b. Mg
- c. Al
- d. K

86. The efficiency of chemical reaction can be expressed as:

- a. Theoretical yield
- b. Actual yield
- c. %yield
- d. Maximum yield

87. In a vessel, 10g N_2 , 10g H and 10g O_2 are present. Which one will have the least number of atoms?

- a. H_2
- b. N_2

- c. O₂
- d. Both H₂ & N₂

88. The empirical formula of Glucose C₆H₁₂O₆ is:

- a. C₆H₁₂O₁₆
- b. CHO
- c. CH₂O
- d. CH₂O₂

89. The relationship between quantum number n and l is:

- a. N = l-1
- b. l = n-2
- c. l = n-1
- d. N = l-2

90. Quantum number values for '2p' orbitals are:

- a. N=2, l=1
- b. N=1, l=2
- c. N=1, l=0
- d. N=2, l=0

91. Which pair has 1 electron in its 's' orbital?

- a. Li, Fe
- b. Na & Cr
- c. K & Mn
- d. H & He

92. Which of the following has the lowest e/m ratio?

- a. Li⁺²
- b. H⁺¹
- c. He
- d. Be

93. According to the general gas equation density of an ideal gas depends upon:

- a. Pressure
- b. Temperature
- c. Molar mass of the gas
- d. All of the above

94. The actual volume of gas molecules is considered negligible at following pressures:

- a. 2 atm
- b. 4 atm
- c. 6 atm
- d. 8 atm

95. CO₂ and SO₂ both are triatomic molecules but heat of vaporization of SO₂ is greater than that of CO₂ due to:

- a. High electronegativity of S
- b. Greater size of SO_2
- c. SO_2 is polar and CO_2 is nonpolar
- d. SO_2 is more acidic than CO_2

96. Which of the following has the lowest vapour pressure at 20°C ?

- a. Diethyl ether
- b. Chloroform
- c. Carbon tetrachloride
- d. Water

97. Which of the following is not a molecular solid?

- a. Bromine
- b. Sulphur
- c. Phosphorus
- d. Carbon dioxide

98. The lattice energy is also called as:

- a. Energy of affinity
- b. Bond energy
- c. Crystal energy
- d. Potential energy

99. For a gaseous phase reaction, when number of moles of reactants and products are equal:

- a. The values of K_p and K_c are different
- b. The values of K_p is greater than K_c
- c. The values of K_c is greater than K_p
- d. The values of K_p and K_c are the same

100. Purification of table salt (NaCl) by passing HCl gas through its saturated aqueous solution is an example of:

- a. Law of mass action
- b. Hess's law
- c. Common ion effect
- d. Henry's law

English

101. We prefer fruits _____ sweets

- a. To
- b. On
- c. Over
- d. From

102. Choose the correct spelling

- a. Exantuated
- b. Axantuated
- c. Accenchuated
- d. Accentuated

103. Choose the correct spelling

- a. Cotioned
- b. Cautioned
- c. Causchuned
- d. Coschuned

104. Choose the correct spelling

- a. Eccentric
- b. Eccentric
- c. Akcantric
- d. Accentric

105. Choose the correct spelling

- a. Definite
- b. Definite
- c. Dafanite
- d. Definite

106. The Headmaster_____ to speed to you

- a. Wants
- b. Is wanting
- c. Was wanting
- d. Want

107. Choose the correct option:

Knowledge and wisdom_____ no time for connection

- a. Has
- b. Have
- c. Had
- d. Are

108. Identify the errors and choose the correct option:

I hope this letters finds in the best of your spirits

- a. I hope this letter will find you in good of high spirits
- b. I hope this letter finds you in best of your spirit
- c. I hope letter finds you in the best of spirits
- d. I hope the letter found you in greatest of spirit

109. Identify the errors and choose the correct option:

Gulliver travel was written by swift

- a. Gulliver travels was written to swift
- b. Gulliver's travels was written by swift
- c. Gulliver's travel was written by swift

110. Fill in the blank with the appropriate article as required. Umbrella is of no avail against a thunderstorm

- a. The
- b. A
- c. An
- d. No article required

111. Choose the correct sentence

- a. I wish I have been a millionaire
- b. I wish I am being a millionaire
- c. I wish I were a millionaire
- d. I wish I was millionaire

112. Pick the correct option

- a. No start is brighter than the moon
- b. No star is more bright than the moon
- c. No start is brighter then the moon
- d. No star is brighter than moon

113. Choose the correctly structured sentence.

- a. Had he lived in England he would miss his family
- b. Had he lived in England, he would have missed his family
- c. Had he lives in England he had missed his family
- d. Had he live in England he will missed his family

114. She always carried an umbrella. The sentence indicates ___tense. a. Present tense

- b. Past simple
- c. Past perfect
- d. Present perfect

115. Ahmed ___ me for a long time

- a. Know
- b. Have known
- c. Knows
- d. Knew

116. Pick the correct option: his first inning consists of four 6s and three 4s a. His first inning's consists of four 6 and three 4

- b. His first innings consist of four 6's and three 4's
- c. His first innings consist of four 6's and three 4's

d. His first inning's consist of four 6's and three 4's

117. Choose the correctly punctuated sentence:

- a. What a fall was there, my countrymen! Long live the king!
- b. What a fall was there! My countrymen. Long live the King!
- c. What a fall was there, my countrymen, Long live the king.
- d. What a fall was there, my countrymen, Long live the king.

118. Choose the correct option:

- a. He and I was playing
- b. He and I were playing
- c. He and I were being playing
- d. He and I was being playing

119. Choose the correct option:

- a. Every one of the prisons are full
- b. Every one of the prisons had full
- c. Every one of the prisons have full
- d. Every one of the prisons is full

120. Not only the parents but also their son ___ for interview

- a. Has called
- b. Have called
- c. Have been called
- d. Has been called

Biology

121. When the temperature of the body surrounding rises, the baby responds by

- a. Vasoconstriction
- b. Vasodilation
- c. Shivering
- d. Raising body hairs

122. The excretion of hypertonic urine in humans is associated best with the

- a. Glomerular capsule
- b. Proximal convoluted tubule
- c. Loop of henle
- d. Distal convoluted tubule

123. In humans, the temperature regulation control center is located in

- a. Kidneys
- b. Brain
- c. Lungs
- d. Liver

124. As an excretory organ, liver

- a. Detoxifies many chemical poisons
- b. Produces ammonia for excretion by the kidneys
- c. Produces urine and uric nitrogen of amino acids
- d. All of the above

125. The active uptake of sodium in the ascending limb or thick loop of henle is promoted by the action of

- a. Aldosterone
- b. Thyroxine
- c. ADH
- d. Cortisone

126. Which of the following muscles are considered as 'Voluntary Muscles'?

- a. Smooth muscles
- b. Cardiac muscles
- c. Skeletal muscles
- d. Glandular muscles

127. Which one of the following 'myoenic' types of muscle?

- a. Glandular muscles
- b. Cardiac muscles
- c. Skeletal muscles
- d. Smooth muscles

128. What do we call the cell surface membrane of a muscle fiber?

- a. Sarcolemma
- b. Plasma membrane
- c. Sarcoplasm
- d. Myofibrils

129. Which of the following neurotransmitters function, both as neurotransmitter and hormones, decreasing our perception of pain?

- a. Epinephrine
- b. Serotonin
- c. Dopamine
- d. Endorphins

130. Which body function is controlled through a positive feedback mechanism?

- a. Labor contractions
- b. Body temperature
- c. Insulin production
- d. Thyroxin release

131. Which of the following is common to all neurons?

- a. A cell which contains a nucleus
- b. A thick myelin sheath

- c. Presence of node of Ranvier
- d. Presence of Schwann cells

132. Neurons are cells adapted for the rapid transmission of electrical impulses. To do this, they have long thin process called:

- a. Axons
- b. Dendrites
- c. Myelin sheath
- d. Schwann cells

133. ____ is a junction between two neurons or between a motor neuron and a muscle cell

- a. Impulse
- b. Synapse
- c. Axon
- d. Cleft

134. Which of the following represents the changes that occur in the ovary and the uterus approximately every 28 days involving evolution with the breakdown and loss of the lining of the uterus

- a. Ovulation
- b. Menstrual cycle
- c. Uterine cycle
- d. Embryo formation

135. Which of the following diseases is sexually transmitted?

- a. Tuberculosis
- b. AIDS
- c. Dengue fever
- d. Cholera

136. Which of the following hormones of the pituitary gland regulate the menstrual cycle?

- a. Follicle stimulating hormone and estrogen
- b. Luteinizing hormone and estrogen
- c. Follicle stimulating hormone and luteinizing hormone
- d. Estrogen and progesterone

137. Haemophilia A and B, color blindness and testicular feminization are example of

- a. X-linked dominant trait
- b. Y-linked recessive trait
- c. Y-linked inheritance
- d. Pseudautosomal trait

Note: none of these is correct

138. Which traits are most likely to affect men than women?

- a. X linked recessive
- b. X linked dominant

- c. Autosomal dominant
- d. Autosomal recessive

139. Alleles both have an effect on the phenotype heterozygotic organism a.

- Dominant
- b. Recessive
- c. Multiple
- d. Co-dominant

140. When both the alleles of a gene are the same, the organism is said to be: a.

- Heterozygous
- b. Genotype
- c. Homozygous
- d. Phenotype

141. In which type of cell. Cell wall is not present?

- a. Plant cells
- b. Fungal cells
- c. Bacterial cells
- d. Liver cells

142. 70S size ribosomes are found in the cells of

- a. Algae
- b. Protozoans
- c. Fungi
- d. Bacteria

143. According to the fluid mosaic model of cell membrane, which zone is embedded inside?

- a. Hydrophobic
- b. Globular
- c. Hydrophilic
- d. Filamentous

144. The membrane separating the vacuole from cytoplasm is called a. Cristae

- b. Cisternae
- c. Tonoplast
- d. Vacuolar membrane

145. Select the one which is not a function of smooth endoplasmic reticulum (SER)?

- a. Metabolism of lipids
- b. Transmission of impulses
- c. Transport of materials
- d. Processing of glycoproteins

146. Which of the following organelles are involved in the synthesis of plant cell walls?

- a. Endoplasmic reticulum

- b. Golgi complex
- c. Lysosomes
- d. Peroxisomes

147. Which property of water helps to maintain the integrity of cell membranes?

- a. Specific heat capacity
- b. Hydrogen bonding
- c. Cohesion and adhesion
- d. Hydrophobic exclusion

148. Water act as universal solvent because of

- a. Heat of vaporization
- b. Hydrogen bonding
- c. High polarity
- d. Cohesion and adhesion

149. Lipids store double amount of energy as compared to carbohydrates because of

- a. High proportion of oxygen
- b. High C-O ratio
- c. Low proportion of carbon
- d. High proportion of C-H

150. Which of the following is an unsaturated fatty acid?

- a. Oleic acid
- b. Palmitic acid
- c. Butyric acid
- d. Acetic acid

151. Monosaccharides have a general formula represented by

- a. $C_n(H_2O)_n$
- b. $C(H_2O)_n$
- c. $C_2(H_2O)_n$
- d. $C^2(H_2O)_n$

152. NAD is an example of

- a. Mononucleotide
- b. Dinucleotide
- c. Tri nucleotide
- d. Tetra nucleotide

153. Lock and key model of enzyme action proposed by Emil Fischer suggested that

- a. Enzymes are unbiased for the substrate
- b. Enzymes are restricted to one reaction type
- c. Enzymes are restricted to one reaction type
- d. An enzyme can catalyze variety of reactions

154. Most enzymes have and optimum temperature of around

- a. 30°C
- b. 40°C (close to exact range i.e 36.1 to 37.8)
- c. 50°C
- d. 20°C

155. Enzymes work by lowering the ___ of the reactions that catalyze a. Kinetic energy

- b. Activation energy
- c. Heat energy
- d. Potential energy

156. First stable compound during calvin cycle is

- a. 3-phosphoglycerate
- b. Glyceraldehyde 3-phosphate
- c. 1,3 bisphosphoglycerate
- d. Ribulose bisphosphate

157. What is the function of ribulose?

- a. Intermediate in photosynthesis
- b. Respirator fuel
- c. Intermediate in cellular respiration
- d. Component of DNA and RNA

158. Which of the following processes does not need pyruvic acid as a substrate?

- a. Alcohol dermentation
- b. Calvin cycle
- c. Aerobic respiration
- d. Lactic acid dermentation

159. Which of the following is a copper containing protein in the electron transport chain?

- a. Plastoquinone
- b. Cytochrome-C
- c. Plastocyanin
- d. Ferredoxin

160. In electron transport chain, ATP synthesis takes place when electron moves from

- a. Primary electron acceptor (PEA) to plastoquinone
- b. Plastoquinone (Pq) to cytochromes
- c. Cytochromes to plastocyanin
- d. Plastocyanin (Pc) to photosystem 1 (PS-I)

161. "law of independent assortment" states

- a. The each pair of alleles assort independently of other pairs of alleles during gamete

formation

- b. That allele for each pair of contrasting trait have unequal probability to assort with the alleles of other pairs
- c. That coexisting alleles for each trait segregate (separate) from each other at meiosis so that each gamete receives only one of the two alleles
- d. That pertain to inheritance of single trait (monohybrid cross)

162. Phenotype is

- a. The genetic complement ie the genes in an individual for a particular trait
- b. Partner of gene pair
- c. The form of appearance of a trait
- d. The position of a gene on the chromosome

163. In complete dominance

- a. Different alleles of a gene are both expressed in heterozygous condition
- b. One alleles (R) is completely dominant over the other (r) and the presence of recessive allele is functionally hidden the heterozygote (Rr) has the same sound phenotype (RR) heterozygote
- c. The phenotype of the heterozygote is intermediate between phenotypes of the homozygotes
- d. Gene mutation may produce many different alleles of a gene

164. Which one of the following is found in both messenger RNA and DNA of a mammalian cell?

- a. Double helical structure
- b. Ribose sugar
- c. Thymine
- d. Sugar- phosphate backbone

165. The cells in our body are all genetically identical apart from the

- a. Somatic cells
- b. Reproductive cells
- c. Muscle fibers
- d. White blood cells

166. Transcription is the process in which an RNA copy of the DNA sequence and coding the gene is produced with help of an enzyme called:

- a. DNA polymerases
- b. RNA polymerase
- c. DNA transcriptase
- d. RNA transcriptase

167. The particular array of chromosomes that an individual possess is called its

- a. Genotype
- b. Phenotype
- c. Karyotype
- d. Allele

168. During meiosis, the homologous chromosomes comes together and form pairs this process is called

- a. Linkage
- b. Synapsis
- c. Pairing
- d. Crossing over

169. At what phase the DNA content of a cell is doubled?

- a. Prophase
- b. Interphase
- c. Anaphase
- d. Telophase

170. Which statement correctly describes transcription of DNA?

- a. It produces amino acids
- b. It produces messenger RNA
- c. It results in increased DNA synthesis
- d. It is a semi conservative process

171. This theory says that “mitochondria and chloroplast are in effect ancient bacteria which now live inside the large cells”

- a. Darwin’s theory of evolution
- b. Lamarckism
- c. Neo-darwinism
- d. Endosymbiont theory

172. The organs which are similar but differ in structure are called a.

- a. Analogous organs
- b. Homologous organs
- c. Convergent evolution
- d. Divergent evolution

173. ____ occurs because natural selection gives some alleles a better chance of survival than others

- a. Fitness
- b. Evolution
- c. Crossing over
- d. Artificial selection

174. The DNA that has been altered and which now contains length of nucleotides from two different organisms is called a

- a. Plasmid
- b. Combined DNA
- c. Vector
- d. Recombinant DNA

175. It is a method for rapid production of a very large number of copies of a particular fragment of DNA

- a. Gel electrophoresis
- b. Polymerase chain reaction

- c. DNA extraction
- d. Recombination

176. What is the effect of DNA ligase?

- a. DNA is broken up at specific sites
- b. DNA fragments are joined together
- c. DNA replication occurs
- d. DNA transcription occurs

177. Which of the following is the components/ tools of recombinant DNA technology?

- a. Gene of interest
- b. Molecular scissors
- c. Molecular glue and expression system
- d. All of the above

178. Gel electrophoresis is a technique

- a. Employed by forensic scientists to assist in the identification of the individuals by their respective type of DNA
- b. Collect all the genes found in one complete set of chromosomes
- c. Is a technique to separate different size fragment of charge bearing polymers (proteins, RNA or DNA)
- d. Grows single cells of a group of cells in a glass ware on artificial medium under aseptic conditions

179. Transgenic organisms

- a. Have a foreign gene inserted into them
- b. Have an important role in the large scale production of medicinal products
- c. Are considered beneficial to humans
- d. All of the above

180. Which of the following is not necessary for PCR to occur?

- a. dATP
- b. primers
- c. DNA fragments
- d. Ribonucleotides

181. The end product of glycolysis in aerobic respiration is

- a. Ethanol and carbon dioxide
- b. Lactate
- c. Pyruvate
- d. Acetyl CoA

182. Which of the following is not related to the enveloped virus?

- a. They survive for a short time
- b. Their envelop is sensitive to sunlight
- c. They are tolerant to antidotes
- d. Envelop is derived from host

183. Numerous opportunistic diseases might attack a person suffering from which of the following diseases?

- a. Measles
- b. Influenza
- c. Hepatitis A
- d. AIDS

184. The complete, mature and infection virus particle is known as

- a. Venome
- b. Genome
- c. Virion
- d. Capsid

185. Which of the following is not TRUE about Human Immunodeficiency virus (HIV)?

- a. It is retrovirus
- b. It is surrounded by an envelop
- c. It does not cause AIDS
- d. It causes the deficiency of the human immune system

186. Select a method which causes the oxidation of constituent of a bacterial cell

- a. Steam
- b. Filtration
- c. Dry heat
- d. Radiation

187. Which of the following is TRUE about the structure of a typical bacterium?

- a. It has a cell wall
- b. It has cytoplasm
- c. It has genetic material
- d. All of the above

188. Red algae do not contribute towards

- a. Making coral reefs
- b. Forming limestone deposits
- c. Making fertilizers
- d. Forming chalk deposits

189. Which of the following is true about amoeba?

- a. They have flagella
- b. They are multicellular
- c. They do not cause any disease in humans
- d. They move by forming specialized cytoplasmic projections called pseudopodia

190. The directional movement toward or away from the stimulus is called

- a. Tropism
- b. Orientation
- c. Taxis

d. Non orientation

191. Photophosphorylation takes place in the _____ of the chloroplasts

a. Stroma

b. Granum

c. Inner membrane

d. Outer membrane

192. Select an amniote from the following

a. Snake

b. Frog

c. Parrot

d. Crocodile

193. In roots the apoplast pathway of water is disrupted when water reaches a.

Plasmodesmata

b. Cortex

c. Endodermis

d. Pith

194. Regarding structure of human heart chordae tendinea are present in

a. Atria

b. Pulmonary valvula

c. Ventricles

d. Aortic valve

195. The only vein in human body carrying oxygenated blood is

a. Femoral

b. Pulmonary

c. Renal

d. Iliac

196. The cells which play very important in developing immunity are

a. Monocytes

b. Neutrophils

c. Lymphocytes

d. Thrombocytes

197. Which of the following blood vessels have the highest pressure of blood?

a. Aorta

b. Pulmonary arteries

c. Pulmonary veins

d. Vena cava

198. Autoimmune disease act at the principle of

a. Self against antigens

b. Antigens against self

- c. Self against self
- d. Antigens self-destroyed

199. In human heart, the left atrium receives

- a. The superior Vena Cava
- b. The inferior Vena Cava
- c. The coronary sinus
- d. The four pulmonary veins

200. Antibodies are manufactured in

- a. T lymphocytes
- b. Red blood cells
- c. Platelets
- d. B lymphocytes