D 144477 (Pages : 14) Name.....

Reg. No.....

CALICUT UNIVERSITY COMMON ENTRANCE TEST (CU-CET), APRIL 2026

INTEGRATED M.Sc. BOTANY/INTEGRATED M.Sc. ZOOLOGY

Time : Two Hours Maximum : 400 Marks

Each question carries 4 *marks.*
One *mark will be deducted for each wrong answer.*

1. In five kingdom classification Dinoflagellates are included under :
   (a) Monera. (b) Protista.
   (c) Fungi. (d) Animalia.
2. Which among the following is not classified under Archaebacteria ?
   (a) Halophiles. (b) Methanogens.
   (c) Thermoacidophiles. (d) Mycoplasma.
3. How many of the following belongs to the Kingdom Fungi
   (*Claviceps, Penicillium, Euglena, Plasmodium, Mucor, Rhizopus, Diatoms, Ustilago, Trichoderma, Nostoc).*
   (a) 6. (b) 5.
   (c) 4. (d) 3.
4. Identify the wrong statement :
   (a) Reserve food material in red algae is floridean starch.
   (b) Motile reproductive structures are absent in red algae.
   (c) Chlorophyll pigments in red algae are Chlorophyll a and Chlorophyll c.
   (d) *Gelidium* belongs to red algae.
5. The main plant body of Bryophytes is :
   (a) Diploid and gametophytic. (b) Diploid and sporophytic.
   (c) Haploid and Gametophytic. (d) Haploid and Sporophytic.
6. Which among the following is homosporous :
   (a) *Pteris.* (b) *Selaginella*
   (c) *Salvinia.* (d) *Cycas.*

7. In *Dianthus* the placentation is :
   (a) Free-central. (b) Axile.
   (c) Marginal. (d) Parietal.
8. In maize seeds, the food reserves are stored in :
   (a) Cotyledons. (b) Endosperm.
   (c) Embryo. (d) Seed coat.
9. Monocot root can be distinguished from dicot root in having :
   (a) Limited number of Xylem and Phloem.
   (b) Presence of secondary growth.
   (c) Broad pith.
   (d) Polygonal xylem vessels.
10. A pair of synapsed homologous chromosomes formed during zygotene stage is known as :
   (a) Chiasmata. (b) Bivalent.
   (c) Tetravalent. (d) Monad.
11. Choose the correct statement :
   (a) The reaction centre of Photosystem II is P700.
   (b) The reaction centre of Photosystem I is P680.
   (c) Photosystem II is located in the inner surface of the appressed grana thylakoid membranes.
   (d) Photolysis occurs in photosystem I.
12. In C_4 plants Calvin cycle occurs in :
   (a) Bundle sheath cells.
   (b) Mesophyll cells.
   (c) Both Bundle sheath and Mesophyll cells.
   (d) Epidermis and mesophyll cells.
13. How many statements among the following are true about glycolysis ?
   i. It is also known as EMP pathway.
   ii. It occurs in the cytoplasm.
   iii. It occurs in both aerobic and anaerobic organisms.
   iv. The net gain of ATP in glycolysis of one glucose molecule is 4.

(a) 4. (b) 3.

(c) 2. (d) 1.

14. The oxidative decarboxylation of pyruvate into Acetyl CoA takes place in :

(a) Cytoplasm. (b) Mitochondrial matrix.

(c) Inter membrane space of Mitochondria.

(d) F_1 particles.

15. When fatty acids are the respiratory substrate, it enters the respiratory pathway as :

(a) Acetyl CoA. (b) Pyruvate.

(c) Dihydroxy Acetone Phosphate. (d) Citric acid.

16. A plant's ability to produce new plant material per unit of existing material over time is called :

(a) Growth rate. (b) Efficiency index.

(c) Growth index. (d) All the above.

17. In plants natural cytokinin are synthesized in :

(a) Young fruits. (b) Mature leaves.

(c) Developing shoot buds. (d) Both (a) and (c).

18. The female gametophyte of angiosperms is also known as :

(a) Megasporangia. (b) Nucellus.

(c) Embryosac. (d) Ovule.

19. Which among the following is an ex-albuminous seed :

(a) Castor. (b) Pea.

(c) Wheat. (d) Barley.

20. Disarmed pathogen vectors are used in :

(a) Extraction of restriction endonucleases.

(b) Transfer of recombinant DNA into the host.

(c) Isolation of the desired DNA.

(d) DNA fingerprinting.

21. Elution refers to :

(a) Isolation of DNA from cells.

(b) Isolation of DNA fragments from gels.

(c) Selection of recombinant cells.

(d) None of the above.

22. The compound that is added to tissue culture medium as a source of carbon is :

(a) Vitamins. (b) Auxin.

(c) Sucrose. (d) Amino acids.

23. RNA itechnology is used in :

(a) Production of Golden Rice.

(b) Production of nematode resistant plants.

(c) Production of Bt Cotton.

(d) Production of drought resistant crops.

24. The population interaction between barnacles and whale is an example for :

(a) Amensalism. (b) Mutualism.

(c) Predation. (d) Commensalism.

25. The mass of living material at each trophic level at a particular time is called :

(a) Secondary productivity. (b) Gross primary productivity.

(c) Net primary productivity. (d) Standing crop.

26. Human ABO blood grouping is an example of which type of inheritance ?

(a) Complete dominance. (b) Incomplete dominance.

(c) Co-dominance. (d) Partial dominance.

27. In sponges, where does water enter and exit during the water transport process ?

(a) Water enters through the osculum and exits through the ostia.

(b) Water enters through the spongocoel and exits through the ostia.

(c) Water enters through the ostia and exits through the osculum.

(d) Water enters through the choanocytes and exits through the osculum.

28. Which of the following statement is true about ringworm infections ?

(a) They are caused by helminths like *Ascaris*.

(b) Fungi like *Trichophyton* and *Microsporum* are responsible.

(c) They affect the intestine.

(d) They are transmitted by mosquito bites.

29. What is the role of the sinus venosus in the frog's heart ?

(a) To pump blood to the lungs.

(b) To join with the right atrium and receive blood.

(c) To circulate lymph throughout the body.

(d) To regulate the hartbeat.

30. What type of amino acid is tyrosine ?

(a) Acidic. (b) Basic.

(c) Neutral. (d) Aromatic.

31. Which of the following is an example of genetic diversity ?

(a) Greater amphibian species diversity in the Western Ghats than in the Eastern Ghats.

(b) The presence of deserts and coral reefs in India.

(c) Variations in the potency of reserpine in *Rauwolfia vomitoria* across the Himalayas.

(d) Coral reef systems in Scandinavian countries.

32. In which subphylum is the notochord present only in the larval tail ?

(a) Vertebrata. (b) Urochordata.

(c) Cephalochordata. (d) Both Urochordata and Cephalochordata.

33. Which of the following statements best distinguishes a prosthetic group from a co-enzyme ?

(a) Prosthetic groups are inorganic, while co-enzymes are organic.

(b) Prosthetic groups are loosely bound to the apoenzyme, while co-enzymes are tightly bound.

(c) Prosthetic groups are tightly bound to the apoenzyme, while co-enzymes are transiently associated.

(d) Prosthetic groups are protein constituents, while co-enzymes are non-protein.

34. What is the approximate number of base pairs in the haploid human genome ?

(a) 48502. (b) 4.6×10^6.

(c) 5386. (d) 3.3×10^9.

35. What is the correct sequence of ducts transporting sperm from the testis to the urethra ?

(a) Rete testis → Vas deferens → Vasa efferentia → Epididymis.

(b) Vasa efferentia → Epididymis → Vas deferens → Rete testis.

(c) Rete testis → Vasa efferentia → Epididymis → Vas deferens.

(d) Epididymis → Rete testis → Vas deferens → Vasa efferentia.

36. The primary mechanism for the exchange of oxygen and carbon dioxide at the alveoli and between blood and tissues is :

(a) Active transport.
(b) Facilitated diffusion.
(c) Osmosis.
(d) Simple diffusion.

37. According to Alexander von Humboldt's observations, species richness increases with :

(a) Explored area.
(b) Temperature.
(c) Altitude.
(d) Rainfall.

38. Which of the following types of white blood cells is the most abundant and functions to destroy foreign organisms through phagocytosis ?

(a) Basophils.
(b) Eosinophils.
(c) Neutrophils.
(d) Lymphocytes.

39. The Proximal Convoluted Tubule (PCT) is primarily responsible for :

(a) The secretion of large amounts of urea.
(b) Conditional reabsorption of sodium and water.
(c) The reabsorption of nearly all essential nutrients, and a significant portion of electrolytes and water.
(d) Making the filtrate more concentrated by reabsorbing water.

40. What is the specific genetic mutation responsible for sickle-cell anaemia ?

(a) Substitution of Adenine with Guanine at the first codon.
(b) Substitution of GAG to GUG at the sixth codon of the beta globin gene.
(c) Deletion of the sixth codon in the alpha globin gene.
(d) Duplication of GUG at the tenth codon of the beat globin gene.

41. What triggers ovulation during the menstrual cycle ?

(a) Decline in progesterone levels.
(b) Rapid surge in LH secretion.
(c) Increase in estrogen and progesterone together.
(d) Degeneration of corpus luteum.

42. Which of the following fermented products is prepared using *Saccharomyces cerevisiae* ?

(a) Curd.
(b) Roquefort cheese.
(c) Swiss cheese.
(d) Bread and wine.

43. The functional unit of contraction in a skeletal muscle fiber, defined as the region between two successive Z-lines, is called a :

(a) Myofibril. (b) Sarcomere.

(c) Myofilament. (d) Sarcoplasm.

44. In acquired immunity, which of the following statements are true ?

i. Primary response is of high intensity.

ii. Secondary response is faster and more intense.

iii. T-lymphocytes secrete antibodies to fight pathogens.

iv. B-lymphocytes produce antibodies.

(a) i and iii. (b) ii and iv.

(c) iii and iv. (d) i and ii.

45. The part of the neuron that typically transmits nerve impulses towards the cell body is the :

(a) Axon. (b) Synaptic knob.

(c) Dendrite. (d) Nissl's granule.

46. If the frequency of allele A in a population is 0.6, what is the expected frequency of heterozygous individuals (Aa) in this population according to the Hardy-Weinberg equation ?

(a) 0·48. (b) 0·36.

(c) 0·72. (d) 0·24.

47. Vasopressin, released by the posterior pituitary, primarily acts on the kidneys to :

(a) Stimulate the production of urine.

(b) Inhibit the reabsorption of electrolytes.

(c) Stimulate the resorption of water and electrolytes, reducing water loss.

(d) Increase the glomerular filtration rate.

48. Which contraceptive method provides additional protection against STDs and AIDS apart from preventing pregnancy ?

(a) Diaphragm. (b) Cervical cap.

(c) Condom. (d) IUD.

49. What was the first type of organism that is said to have invaded land ?

(a) Amphibians. (b) Reptiles.

(c) Plants. (d) Mammals.

50. If a double-stranded DNA has 30 % Adenine, what would be the expected percentage of Cytosine ?

(a) 30 %. (b) 20 %.

(c) 40 %. (d) 25 %.

51. Which of the following statements is true for the $[Ni(CO)_4]$ complex ?

(a) It exhibits a square planar geometry.

(b) It is a diamagnetic complex.

(c) It is a high-spin complex.

(d) It undergoes d-d transitions in the visible region.

52. If the rate law for a reaction is Rate = $k[A]^2[B]^3$, what is the effect on the rate of reaction when the concentration of A is doubled while the concentration of B is kept constant ?

(a) The rate will quadruple. (b) The rate will increase by a factor of 8.

(c) The rate will double. (d) The rate will increase by a factor of 6.

53. For a first order reaction, $t_{1/2}$ = 15 minutes. Calculate the rate constant of the reaction.

(a) 5.35×10^{-3} min.$^{-1}$ (b) 4.62×10^{-3} min.$^{-1}$

(c) 5.53×10^{-2} min.$^{-1}$ (d) 4.62×10^{-2} min.$^{-1}$

54. Which of the following is not a type of emulsion ?

(a) Oil-in water (O/W). (b) Water-in-oil (W/O).

(c) Gas-in-liquid (G/L). (d) Liquid-in-gas (L/G).

55. Which of the following is true about Kohlrausch's law in the context of electrolytic solutions ?

(a) The conductivity of a solution is independent of the concentration of ions.

(b) The limiting molar conductivity of an ion depends on its concentration.

(c) The sum of the limiting molar conductivities of all ions is constant at infinite dilution.

(d) Molar conductivity increases with the dilution of a solution.

56. The sugar found in sucrose is composed of :

(a) Glucose and Fructose. (b) Glucose and Galactose.

(c) Glucose and Mannose. (d) Glucose and Ribose.

57. What is the pH of 0.01 molar NaOH solution ?

(a) 10. (b) 6.

(c) 12. (d) 4.

58. Calculate the enthalpy change for the reaction :

$$CH_{4(g)} + 2\,O_{2(g)} \longrightarrow CO_{2(g)} + 2H_2O_{(l)}$$ at 25° C. and 1 atm. pressure.

Given $\Delta H^0_f(CO_2) = -393.5$ kJ mol.$^{-1}$
$\Delta H^0_f(H_2O) = -285.9$ kJ mol.$^{-1}$
$\Delta H^0_f(CH_4) = -74.8$ kJ mol.$^{-1}$

(a) -400.5 kJ mol.$^{-1}$
(b) -890.5 kJ mol.$^{-1}$
(c) -678.3 kJ mol.$^{-1}$
(d) -313.8 kJ mol.$^{-1}$

59. Which of the following cations is coloured in aqueous solution ?

(a) Cu^+.
(b) Zn^{2+}.
(c) Ti^{4+}.
(d) Ni^{2+}.

60. The CFSE for a high spin octahedral complex of a d^6 ion is :

(a) $-0.6\,\Delta_0$.
(b) $1.2\,\Delta_0$.
(c) $1.8\,\Delta_0$.
(d) $-0.4\,\Delta_0$.

61. Hydrogen is considered as fuel for the future because of _____.

(a) It produces only water when burned.
(b) It is easily obtainable from renewable sources.
(c) It is efficient in fuel cells.
(d) All of the above.

62. The metal present in ATP is :

(a) Zn.
(b) Mg.
(c) Fe.
(d) Ca.

63. Which of the following is the chemical formula of borax ?

(a) $Na_2B_4O_7.10H_2O$.
(b) $Na_2B_4O_7.5H_2O$.
(c) $Na_3B_4O_7.5H_2O$.
(d) $Na_4B_4O_7.10H_2O$.

64. The carbon atom in a benzene ring are :

(a) *sp* bybridised.
(b) sp^3 hybridised.
(c) sp^2 hybridised.
(d) None of these.

65. Homolytic fission of C-C bond leads to the formation of :

(a) Free radicals.
(b) Carbonium ions.
(c) Carbanions.
(d) None of these.

66. Which of the following is a nucleophile ?

(a) $AlCl_3$.
(b) H_3O^+.
(c) BF_3.
(d) CN^-.

67. Which of the following gases is primarily responsible for the formation of acid rain ?

(a) Carbon dioxide (CO_2).
(b) Nitrogen oxides (NO_x).
(c) Oxygen (O_2).
(d) Methane (CH_4).

68. Lucas reagent is :

(a) $HCl/NaNO_2$.
(b) H_2/Pd.
(c) $HCl/ZnCl_2$.
(d) $H_2/Pd/BaSO_4$.

69. Which compound has the highest boiling point ?

(a) CH_3CH_3.
(b) CH_3OCH_3.
(c) CH_3CH_2OH.
(d) CH_3COOH.

70. An aqueous solution of glycine is neutral because of the formation of :

(a) Carbanion.
(b) Zwitterion.
(c) Carbonium ions.
(d) Free radicals.

71. Which is the correct order of metallic character ?

(a) P < Si < Be < Mg < Na.
(b) Si < P < Be < Na < Mg.
(c) P > Si > Be > Mg > Na.
(d) Si > P > Be > Na > Mg.

72. Which of the following carbohydrates is a disaccharide ?

(a) Fructose.
(b) Glucose.
(c) Sucrose.
(d) Galactose.

73. Which type of bond is responsible for the primary structure of proteins ?

(a) Hydrogen bond.
(b) Ionic bond.
(c) Peptic bond.
(d) Disulfide bond.

74. What is the effect of electron-withdrawing groups on the basicity of amines ?

(a) Increase basicity.
(b) Decrease basicity.
(c) No effect.
(d) Amines become neutral.

75. The Pauli Exclusion Principle states that :

(a) No two electrons in an atom can have the same set of quantum numbers.
(b) Electrons fill orbitals in order of increasing energy.

(c) Electrons will pair up in an orbital if there is no other orbital available.

(d) Electrons will always occupy the lowest energy level first.

76. Two objects of masses m_1 and m_2 fall from the heights h_1 and h_2 respectively. The ratio of magnitude of their moments when they hit the ground is :

(a) $\frac{\sqrt{h_1}}{\sqrt{h_2}}$.

(b) $\frac{m_1}{m_2}$.

(c) $\frac{m_1}{m_2}\frac{\sqrt{h_1}}{\sqrt{h_2}}$.

(d) $\frac{\sqrt{m_1}}{\sqrt{m_2}}$.

77. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. The longer piece will have a force constant of :

(a) $\frac{2}{3}k$.

(b) $3k$.

(c) $6k$.

(d) $\frac{3}{2}k$.

78. The electric field at a point associated with a light wave is given by E = 200]{sin (6×10^{15}) t + sin (9×10^{15})t} Vm^{-1}. If this light falls on a metal surface having a work function of 2.5 eV the maximum kinetic energy of photoelectrons will be (given $h = 4.14 \times 10^{-15}$ eVs).

(a) 1.9 eV.

(b) 3.27 eV.

(c) 3.6 eV.

(d) 3.42 eV.

79. In a process, volume and temperature of one mole of an ideal monoatomic gas are varied according to the relative VT = K where K is a constant. If the temperature of the gas is increased by ΔT the amount of heat absorbed by the gas is (R is gas constant)

(a) $\frac{R}{2}\Delta T$.

(b) $\frac{2K}{3}\Delta T$.

(c) $\frac{KR}{2}\Delta T$.

(d) $\frac{3R}{2}\Delta T$.

80. A radioactive material is reduced to 1/8th of its original amount in 3 days. If 8×10^{-3} kg. is left after 5 days, the initial amount of the material is :

(a) 32 g.

(b) 256 g.

(c) 40 g.

(d) 64 g.

81. A particle executes simple harmonic motion of amplitude A. The distance from the mean position when its kinetic energy becomes equal to its potential energy is :

(a) $\sqrt{2}$A. (b) 2A.

(c) $\frac{1}{\sqrt{2}}$A. (d) $\frac{1}{2}$A.

82. A uniform metallic wire has a resistance of 18 Ω and is beng into an equilateral triangle. Then resistance between any two vertices of the triangle is :

(a) 8 Ω. (b) 12 Ω.

(c) 4 Ω. (d) 2 Ω.

83. What is the minimum energy required to launch a satellite of mass *m* from the surface of a planet of mass M and radius R in a circular orbit at an altitude of 2R :

(a) $\frac{3GmM}{2R}$. (b) $\frac{GmM}{2R}$.

(c) $\frac{GmM}{3R}$. (d) $\frac{5GmM}{6R}$.

84. A time dependent force F = 6*t* acts on a particle of mass 1 kg. If the particle starts from rest the work done by the force during the first 1 second will be :

(a) 9J. (b) 18J.

(c) 4.5J. (d) 22J.

85. Two capacitors with capacitance C_1 and C_2, when connected in parallel has an equivalent capacitance 4 times the equivalent capacitance when they are connected in series. The ratio of their capacitance C_2/C_1 :

(a) 1. (b) 4.

(c) 2. (d) 1/2.

86. When you walk through a metal detector carrying a metal object in your pocket it raise an alarm, this phenomenon is due to :

(a) Electromagnetic induction. (b) Resonance in ac circuits.

(c) Mutual induction in ac circuits. (d) Interferences of electromagnetic waves.

87. A charge Q moves a distance *d* in a magnetic field B. The value of work done by the field is :

(a) 1. (b) Infinite.

(c) Zero. (d) Bd.

88. If the momentum of a body is increased by 20 % then its kinetic energy increases by :

(a) 36 %. (b) 40 %.

(c) 44 %. (d) 48 %.

89. The expression for time in terms of universal gravitational constant G, Planck's constant h and speed of light c is proportional to :

(a) $\sqrt{\frac{Gh}{c^3}}$. (b) $\sqrt{\frac{c^3}{Gh}}$.

(c) $\sqrt{\frac{hc^3}{G}}$. (d) $\sqrt{\frac{Gh}{c^5}}$.

90. Two forces P and Q of magnitude 2F and 3F, respectively'. are at an angle θ with each other. If the force Q is boubled, their resultant also gets doubled, then the angle is :

(a) 30°. (b) 60°.

(c) 90°. (d) 120°.

91. Angle between the hour hand and the minute hand in circular measure of half past 4 is :

(a) $\frac{\pi}{3}$. (b) $\frac{\pi}{4}$.

(c) $\frac{\pi}{2}$. (d) None of these.

92. If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$, the the value of A + B is :

(a) $\frac{\pi}{6}$. (b) $\frac{\pi}{4}$.

(c) π. (d) 0.

93. The value of the product $4^{\frac{1}{3}} \cdot 4^{\frac{1}{9}} \cdot 4^{\frac{1}{27}} \cdots \infty$ is :

(a) 4. (b) 64.

(c) 2. (d) 46.

D 123863 (Pages : 18) Name.....

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APRIL 2025

INTEGRATED M.Sc. BOTANY/INTEGRATED M.Sc. ZOOLOGY

Time : Two Hours Maximum : 400 Marks

Each question carries 4 marks.
1 mark will be deducted for each wrong answer.

1. Which one of the following statement is not true for Bryophytes :

   (a) Their zygote undergo reduction division immediately.

   (b) They are called amphibians of the plant kingdom.

   (c) They show photosynthetic nature.

   (d) Their spore germinates and produces gametophyte.

2. How many of the following are unicellular eukaryotes?

   Chlorella, Yeast, Gonyaulax, Euglena, Archaebacteria, Diatoms, Trypanosoma Mycoplasma, E. coli, Physarum, Amoeba.

   (a) 3. (b) 7.

   (c) 8. (d) 6.

3. Which of the following is not correct for meristematic tissue ?

   (a) Primary cell wall is present.

   (b) Ergastic substances are absent.

   (c) They have dense cytoplasm.

   (d) They have prominent and small nucleus.

4. In brown algae asexual spores are :

   (a) Pear shaped and have two unequal flagella.

   (b) Pear shaped and have two unequal cillia.

   (c) Oval shaped and have two unequal flagella.

   (d) Comma-shaped and biflagellate.

5. During formation of glucose which of the following is obtained from water :

(a) Oxygen. (b) Hydrogen.

(c) Both (a) and (b). (d) None of the above.

6. In meiosis, division is :

(a) I is reductional and II equational.

(b) I is equational and II is reductional.

(c) Both reductional.

(d) Both equational.

7. Abscisic acid controls :

(a) Shoot elongation.

(b) Cell elongation and cell wall formation.

(c) Cell division.

(d) Leaf fall and dormancy.

8. Placentation found in tomato is :

(a) Marginal. (b) Axile.

(c) Parietal. (d) basal.

9. A protoplast is a cell :

(a) Without plasma membrane. (b) Without nucleus.

(c) Undergoing division. (d) Without cell wall.

10. Dimorphic chloroplasts are present in :

(a) Sugar cane. (b) Cotton.

(c) Pea. (d) Mango.

11. During TCA which of the following intermediate is a result of two successive decarboxylations ?

(a) Oxalosuccinic acid (b) α-ketoglutaric acid

(c) Succinyl acid. (d) Cis aconitic acid.

12. How many calvin cycle required to produce 5 molecules of glucose ?

(a) 60. (b) 15.

(c) 30. (d) 90.

13. The rosette habit of cabbage can be changed by application of :

(a) IAA. (b) GA.

(c) ABA. (d) Ethophan.

14. Ethylene connected with :

(a) Aerobic respiration. (b) Climactic.

(c) Anaerobic. (d) Fermentation.

15. In angiosperms, which structure encloses the male gametophyte and aids in its dispersal ?

(a) Stigma. (b) Style.

(c) Ovule. (d) Pollen grain.

16. Which of the following mechanisms contributes to the maintenance of genetic diversity in flowering plants ?

(a) Self-pollination. (b) Apomixis.

(c) Cleistogamy. (d) Allogamy.

17. Which of the following is an example of a selectable marker used in recombinant DNA technology ?

(a) LacZ gene.

(b) GFP gene.

(c) Ampicillin resistance gene.

(d) Insulin gene.

18. Which restriction site is not present in pBR322 plasmid ?

(a) *EcoRI*. (b) *Hind III*.

(c) *Hind II*. (d) *Sal I*.

19. A human protein which is obtained from transgenic animal used to treat Emphysema :

(a) α - lactalbumin. (b) Thyroxine.

(c) α -1-antitrypsin. (d) Insulin.

20. The Golden Rice variety is rich in :

(a) Vitamin C. (b) Beta-carotene.

(c) Biotin. (d) Lysine.

21. The interaction between sea anemone and clown fish is an example for :

(a) Commensalism. (b) Mutualism.

(c) Ammensalism. (d) Parasitism.

22. The number of deaths in the population during a given period is referred to :

(a) Natality. (b) Mortality.

(c) Sex-ratio. (d) None of the above.

23. In logistic growth curve lag phase shows ————.

(a) Fast growth. (b) Initial stage of growth.

(c) Stationary phase of growth. (d) Diminishing phase of growth.

24. Example for dicot endospermic seed is :

(a) Pea. (b) Mango.

(c) Castor. (d) Bean.

25. Which of the following organisms plays a crucial role in nutrient cycling in an ecosystem ?

(a) Herbivore. (b) Carnivore.

(c) Producer. (d) Decomposer.

26. Which of the following hormones is an example of an inhibiting hormone produced by the hypothalamus ?

(a) Oxytocin.

(b) Somatostatin.

(c) Gonadotrophin releasing hormone.

(d) Thyroxine.

27. What is the function of the thalamus in the brain ?

(a) Controls hunger and thirst.

(b) Co-ordinates motor and sensory signalling.

(c) Connects the brain to the spinal cord.

(d) Secretes hormones for pituitary gland regulation.

28. Which protein masks the active sites on actin filaments in a resting muscle ?

(a) Myosin. (b) Tropomyosin.

(c) Troponin. (d) Meromyosin.

29. Which of the following bones is part of the axial skeleton ?

(a) Femur. (b) Humerus.

(c) Sternum. (d) Pelvis.

30. Which of the following is *not* normally filtered into the Bowman's capsule ?

(a) Glucose. (b) Sodium ions.

(c) Proteins. (d) Urea.

31. What are the typical stroke volume and cardiac output of a healthy adult man ?

(a) 60 ml, 4800 ml. (b) 70 ml, 5000 ml.

(c) 80 ml, 4800 ml. (d) 75 ml, 6000 ml.

32. Which of the following conditions is favourable for the formation of oxyhaemoglobin in the lungs ?

(a) Low pO_2, high pCO_2, high temperature.

(b) High pO_2, low pCO_2, low H^+ concentration.

(c) Low pO_2, low pCO_2, high H^+ concentration.

(d) High pO2, high pCO_2, high temperature.

33. Which of the following pulmonary capacities includes the Tidal Volume and Inspiratory Reserve Volume ?

(a) Inspiratory Capacity. (b) Vital Capacity.

(c) Functional Residual Capacity. (d) Total Lung Capacity.

34. Which of the following statements is incorrect ?

(a) Sucrose is a disaccharide.

(b) Cellulose is a polysaccharide.

(c) Uracil is a purine.

(d) Glycine is an amino acid.

35. What happens when substrate concentration increases in an enzyme-catalyzed reaction ?

(a) The reaction reaches a maximum velocity when the enzyme is saturated.

(b) The enzyme activity increases continuously with no limit.

(c) The enzyme activity decreases due to substrate inhibition.

(d) The enzyme activity stops completely after a certain point.

36. Which of the following statements about the frog's nervous system is correct ?

(a) Frogs have 12 pairs of cranial nerves.

(b) The brain is not protected by any bony structure.

(c) The hindbrain includes the cerebellum and medulla oblongata.

(d) The optic lobes are located in the forebrain.

37. Which one of the following animals is not homeothermic ?

(a) *Columba*. (b) *Camelus*.

(c) *Macropus*. (d) *Calotes*.

38. The excretory organs in *Apis* and *Locusta* are :

(a) Nephridia. (b) Green glands.

(c) Malpighian tubules. (d) Flame cells.

39. What is the primary use of Streptokinase produced by *Streptococcus* ?

(a) To lower blood cholesterol levels.

(b) To remove clots from blood vessels.

(c) To clarify fruit juices.

(d) To produce ethanol.

40. In birds, what is the mechanism of sex determination called, and how are the sex chromosomes distributed ?

(a) Male heterogamety, with males having ZW chromosomes.

(b) Female heterogamety, with females having ZW chromosomes.

(c) Male heterogamety, with females having ZZ chromosomes.

(d) Female heterogamety, with males having ZW chromosomes.

41. If the coding strand of a gene has the sequence 5'-ATGCGT-3', what will be the sequence of the mRNA transcribed ?

(a) 3'-UACGCA-5'. (b) 5'-TACGCA-3'.

(c) 5'-AUGCGU-3'. (d) 3'-AUGCGU-5'.

42. Which of the following cells provide nourishment to developing sperm cells in the seminiferous tubules ?

(a) Leydig cells. (b) Spermatogonia.

(c) Rete testis cells. (d) Sertoli cells.

43. Which of the following combination of chemicals was used by S. L. Miller in his experiment to simulate early Earth conditions ?

(a) CH_4, NH_3, H_2, H_2O.
(b) CO_2, O_2, N_2, H_2O.
(c) CH_4, O_2, NH_3, NH_3, H_2O.
(d) N_2, CH_4, O_2, H_2O.

44. In which ART method is sperm directly injected into the ovum ?

(a) ICSI.
(b) IVF.
(c) IUI.
(d) GIFT.

45. The introduction of which species into Lake Victoria caused the extinction of over 200 species of cichlid fish ?

(a) African catfish.
(b) Nile perch.
(c) Water hyacinth.
(d) Lantana.

46. Which structure is characterized by the presence of a fluid-filled cavity called antrum ?

(a) Primary follicle.
(b) Secondary follicle.
(c) Tertiary follicle.
(d) None of the above.

47. A woman with normal vision has a father who is colour blind. She marries a man with normal vision. What is the probability that their son will be colour blind ?

(a) 0 %.
(b) 25 %.
(c) 50 %.
(d) 100 %.

48. Which contraceptive method involves a non-steroidal, once-a-week pill ?

(a) LNG-20.
(b) Saheli.
(c) Multiload 375.
(d) Progestasert.

49. Information transfer from RNA to DNA is called :

(a) Transcription.
(b) Translation.
(c) Replication.
(d) Reverse transcription.

50. Which type of malaria is the most serious and can be fatal ?

(a) *Plasmodium vivax.* (b) *Plasmodium malariae.*

(c) *Plasmodium ovale.* (d) *Plasmodium falciparum.*

51. Which is the correct electronic configuration of Cr ?

(a) $1s^2\ 2s^2 2p^6\ 3s^2 3p^6\ 4s^2\ 3d^4$. (b) $1s^2\ 2s^2 2p^6\ 3s^2 3p^6\ 4s^2\ 3d^9$.

(c) $1s^2\ 2s^2\ 2p^6\ 3s^2 3p^6\ 4s^1\ 3d^5$. (d) $1s^2\ 2s^2 2p^6\ 3s^2 3p^6\ 4s^1\ 3d^{10}$.

52. Which statement is correct for empirical formula of a compound ?

(a) The formula that shows the simplest whole-number ratio of atoms in a molecule.

(b) The formula that shows the actual number of atoms of each element in a molecule.

(c) The formula that gives the molecular mass of the compound.

(d) The formula that shows the type of bonds in a compound.

53. Which element has the highest electronegativity ?

(a) Fluorine (F). (b) Oxygen (O).

(c) Nitrogen (N). (d) Chlorine (Cl).

54. Which of the following is an example of an intensive property ?

(a) Volume. (b) Mass.

(c) Temperature. (d) Internal energy.

55. In the redox reaction, $2Mg + O_2 \rightarrow 2MgO$, what is the oxidation state of oxygen in O_2 and MgO respectively ?

(a) 0 in O_2 and – 2 in MgO. (b) – 2 in O_2 and 0 in MgO.

(c) +2 in O_2 and –2 in MgO. (d) +1 in O_2 and – 1 in MgO.

56. What is the major product of the halogenation of methane (CH_4) in the presence of UV light ?

(a) Methanol. (b) Chloromethane.

(c) Ethane. (d) Methyl chloride.

57. The acidic character of alkynes is due to :

(a) The electron density on the sp-hybridized carbon.

(b) The electron density on the sp^2-hybridized carbon.

(c) The electron density on the *p*-orbitals of the carbon atoms.

(d) The presence of a hydroxyl group.

58. Which of the following amines will exhibit a strong basicity due to its structure ?

(a) Methylamine. (b) Aniline.

(c) Diethylamine. (d) Triethylamine

59. What is the product when a diazonium salt ($R - N_2^+$) reacts with an aromatic compound like benzene in the presence of a suitable catalyst ?

(a) Azo compound. (b) Alkylated product.

(c) Halogenated compound. (d) Aldehyde.

60. Predict the product of this reaction. $CH_3CH_2COCH_3 + I_2 \rightarrow$?

(a) CH_3CH_2I. (b) $CH_3CH_2COCH_2I$.

(c) $CH_3CH_2COCl_3$. (d) CHI_3.

61. $2CH_3CHO \xrightarrow{OH^-} CH_3CHOHCH_2CHO$:

This reaction is known as _____.

(a) Cannizaro reaction. (b) Aldol Condensation.

(c) Reformatsky reaction. (d) Clemimenson reaction.

62. Which of the following oligosaccharides is formed by the condensation of two glucose units ?

(a) Sucrose. (b) Lactose.

(c) Maltose. (d) Fructose.

63. Name the co-ordination compound $[Cu(NH_3)_4]^{2+}$?

(a) Tetraamminecopper (II) ion. (b) Tetraamminecopper (I) ion.

(c) Copper (II) tetraammine ion. (d) Copper (III) tetraammine ion.

64. Which of the following complexes exhibits cis-trans isomerism ?

(a) $[CoCl_2(NH_3)_4]^{2+}$. (b) $[PtCl_2(NH_3)_2]$.

(c) $[Ni(CO)_4]$. (d) $[Cr(H_2O)_6]^3$.

65. If the rate of a reaction is independent of the concentration of the reactant, the reaction is of which order ?

(a) Zero-order. (b) First-order.

(c) Second-order. (d) Third-order.

66. The half-life for a zero-order reaction is given by the equation $t_{1/2} = [A_0]/2k$. What happens to the half-life as the initial concentration $[A_0]$ increases ?

(a) It decreases. (b) It increases.

(c) It remains constant. (d) It becomes zero.

67. A reaction has an activation energy of 50 kJ/mol. If the temperature is increased by 10°C, what is the effect on the rate constant according to the Arrhenius equation ?

(a) The rate constant will increase by a factor of approximately 2.

(b) The rate constant will increase by a factor of approximately 4.

(c) The rate constant will decrease by a factor of 2.

(d) The rate constant will remain the same.

68. In Which of the following properties of colloids results in their ability to be visible under a microscope ?

(a) Brownian movement.

(b) The formation of a gel-like structure.

(c) Tyndall effect.

(d) Coagulation.

69. The lead storage battery (lead accumulator) works by the reversible reactions at the electrodes. Which is the correct reaction at the anode during the discharge process ?

(a) $Pb + H_2SO_4 \rightarrow PbSO_4 + 2e^-$.

(b) $PbO_2 + 4H^+ + 2e^- \rightarrow PbSO_4 + 2H_2O$.

(c) $PbSO_4 + 2e^- \rightarrow Pb + H_2SO_4$.

(d) $PbSO_4 + 4e^- \rightarrow Pb + SO_4^{2-}$.

70. In the case of abnormal molecular masses observed in colligative property measurements, the presence of the solute leads to :

(a) Higher vapor pressure than expected.

(b) Lower vapor pressure than expected.

(c) The solution boiling at a higher temperature than expected.

(d) The solution freezing at a lower temperature than expected.

71. Which of the following buffers would have the best capacity to maintain a pH of 4.75 ?

(a) A buffer made from acetic acid and sodium acetate.

(b) A buffer made from hydrochloric acid and sodium chloride.

(c) A buffer made from ammonia and ammonium chloride.

(d) A buffer made from citric acid and sodium citrate.

72. What is the conjugate base of H_2SO_4 (sulfuric acid) ?

(a) SO_4^{2-}.
(b) HSO_4^-.
(C) H_2SO_4.
(d) H_3O^+.

73. Which carbocation is more stable ?

(a) $CH_3{}^2C^+$.
(b) $(CH_3)C^-$.
(c) $(CH_3)_3C^+$.
(d) CH_3C^+.

74. Calculate the change in internal energy for the conversion of one mole of water at 100°C to steam at one atmosphere. The heat absorbed and work done by the system are 40.7 kJ and 3.1 kJ respectively.

(a) 40.7 kJ.
(b) 4.07 kJ.
(c) 37.6 kJ.
(d) 3.76 kJ.

75. Bond order order of O^{2+} ion is :

(a) 2.
(b) 2.5
(c) 1.5.
(d) 1.

76. A projectile is projected with a velocity $\left(6\hat{i}+8\hat{j}\right)m/s$. What is the horizontal range of the projectile ? (g =10m/s^2).

(a) 4.8 m.
(b) 9.6 m.
(c) 19.6 m.
(d) 14 m.

77. The density of a material in CGS system is 4g/cm^3. In a system of units if the unit of length is 10cm and unit of mass is 100g, what is the value of density of the material ?

(a) 0.04.
(b) 40.
(c) 0.4.
(d) 400.

78. Identify the unit vector in the following :

(a) $\hat{i} + \hat{j}$.

(b) $\frac{\hat{i}}{\sqrt{2}}$.

(c) $\hat{k} - \hat{j}$.

(d) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$.

79. If the linear momentum of an object is increased by 0.1 % then its kinetic energy is increased by :

(a) 0.1 %.

(b) 0.2 %.

(c) 0.4 %.

(d) 0.01 %.

80. What is the minimum velocity with which a body of mass must enter a vertical loop of radius R so that it can complete the loop ?

(a) $\sqrt{2gR}$.

(b) $\sqrt{3gR}$.

(c) $\sqrt{5gR}$.

(d) $\sqrt{gR}$.

81. Two points A and B are maintained at potential of 7V and – 4V respectively. The work done in moving 50 electrons from A to B is :

(a) 8.80×10^{-17} J.

(b) -8.80×10^{-17} J.

(c) 4.40×10^{-17} J.

(d) 5.80×10^{-17} J.

82. The force experienced by a particle having mass m and charge q accelerated through a potential difference V when it is kept under a perpendicular magnetic field B is :

(a) $\sqrt{\frac{2BVq^3}{m}}$.

(b) $\sqrt{\frac{B^2Vq^3}{2m}}$.

(c) $\sqrt{\frac{2B^2Vq^3}{m}}$.

(d) $\sqrt{\frac{2B^2Vq^3}{m^2}}$.

83. A non -conducting ring of charge q, mass m and radius r is rotated with constant angular speed ω. The ratio of its magnetic moment to angular momentum is :

(a) $\frac{q}{m}$.

(b) $\frac{2q}{m}$.

(c) $\frac{q}{2m}$.

(d) $\frac{q}{4m}$.

84. A radiation of energy E falls normally on a perfectly reflecting surface. The momentum transferred to the surface is :

(a) $\frac{E}{c}$.

(b) $2\frac{E}{c}$.

(c) Ec.

(d) $\frac{E}{c^2}$.

85. In Young's double slit experiment using a monochromatic light of wavelength λ the path difference corresponding to any point having half the peak intensity is :

(a) $(2n + 1)\frac{\lambda}{2}$.

(b) $(2n + 1)\frac{\lambda}{4}$.

(c) $(2n + 1)\frac{\lambda}{8}$.

(d) $(2n + 1)\frac{\lambda}{16}$.

86. The de-Broglie wavelength of an electron having kinetic energy E is λ. If the kinetic energy of electron becomes E/4 then its de-Broglie wavelength will be :

(a) $\frac{\lambda}{2}$.

(b) $\frac{\lambda}{\sqrt{2}}$.

(c) 2λ.

(d) $\sqrt{2}\lambda$.

87. A metal surface is illuminated by a radiation of wavelength 4500A°.The ejected photoelectron enters a constant magnetic field of 2mT making an angle 90° with the magnetic field. If it starts revolving in a circular path of radius 2mm., the work function of the metal is approximately

(a) 1.36eV. (b) 1.69eV.

(c) 2.78eV. (d) 2.33eV.

88. Consider an ideal gas confined in an isolated closed chamber. As the gas undergoes an adiabatic expansion the average time of collision between molecules increases as V^q, where V is the volume of gas. $\left(\gamma = \frac{C_p}{C_v}\right)$.

The value of q is :

(a) $\frac{3\gamma + 5}{6}$. (b) $\frac{3\gamma - 5}{6}$.

(c) $\frac{\gamma + 1}{2}$. (d) $\frac{\gamma - 1}{2}$.

89. Which level of the single ionized carbon has the same energy as the ground state energy of hydrogen atom ?

(a) 1. (b) 6.

(c) 4. (d) 8.

90. The half life of a radioactive substance is T. The time taken for disintegrating $\frac{7}{8}$ th part of its original mass will be :

(a) 3T. (b) 8T.

(c) 5T. (d) 2T.

91. If the fifth term of an arithmetic progression is 16 and the tenth term is 31, then its first term is :

(a) 3. (b) 4.

(c) 5. (d) 7.

92. Let S = {1, 2, 3} be a set. The relation R = {(1, 1), (1, 2), (2, 2), (2, 1), (1, 3) } on S is :

(a) Reflexive and symmetric.
(b) Symmetric and transitive.
(c) Reflexive and transitive.
(d) Not reflexive and not symmetric.

93. Find $\lim_{x \to 2} \frac{x^2 - 3x + 2}{x - 2}$.

(a) 1.
(b) 2.
(c) 3.
(d) 4.

94. In a class of 40 students, 25 students play chess and 26 play football. If each student play chess or football, the number of students who play both is :

(a) 10.
(b) 6.
(c) 11.
(d) 5.

95. In a group of players, each players hook hands with all the others. If the total number of handshakes is 28, what is the number of players ?

(a) 14.
(b) 10.
(c) 8.
(d) 7.

96. If two cards are drawn at random from a pack of 52 playing cards. What is the probability that the two cards are black ?

(a) $\frac{25}{102}$.
(b) $\frac{1}{2}$.
(c) $\frac{1}{26}$.
(d) $\frac{25}{52}$.

97. Find the area bounded by the curve $y = \sqrt{x}$, the straight line $x = 2$ and the x-axis.

(a) $\frac{2\sqrt{2}}{3}$.

(b) $\frac{4}{3}$.

(c) $\frac{4\sqrt{2}}{3}$.

(d) $\frac{1}{2\sqrt{2}}$.

98. If A and B are square matrices of order 2 with $|A| = 4$ and $|B| = 5$, then $|AB|$ is :

(a) 20.

(b) 9.

(c) 60.

(d) 27.

99. If $\cos A = \frac{\sqrt{3}}{2}$ and $\cos B = \frac{1}{2}$, then the value of $\tan (A + B)$ is :

(a) 0.

(b) 1.

(c) Not defined.

(d) $\frac{1}{\sqrt{2}}$.

100. The point on the curve $y = 8x - x^2$, where the tangent is parallel to x-axis is :

(a) (4, 8).

(b) (4, 16).

(c) (0, 0).

(d) (4, 0).