
SINDH MDCAT PAST PAPER: 2019

#BIOLOGY

1. In sexual reproduction, sex cells contain number of chromosomes when compared to other cells of body.

- A. Same**
- B. Half ✓**
- C. Double**
- D. All of the above**

2. Kinetochore is a complex of associated with the centromere of a chromosome to which the microtubules of spindle attach.

- A. DNA**
- B. Carbohydrates**
- C. Proteins ✓**
- D. Nucleosomes**

3. Pituitary gland releases and hormone while ovaries produce and progesterone.

- A. Follicle stimulating and luteinizing, estrogen ✓**
- B. Estrogen and follicle stimulating, luteinizing**
- C. Luteinizing and estrogen, follicle stimulating**
- D. Follicle stimulating and estrogen, luteinizing**

4. In higher animal's bodies, tissue fluid is isotonic as contrary to plants because in plant's cell:

- A. Cell membrane creates resistance in water uptake
- B. Plastids creates resistance in water uptake
- C. Chlorophyll creates resistance in water uptake
- D. Cell wall creates resistance in water uptake ✓

5. Which one is NOT an involuntary function?

- A. Breathing
- B. Pumping of blood
- C. Skeletal muscle movement ✓
- D. Blinking of eyes

6. In gametogenesis, which resultant product is non-functional?

- A. Spermatozoa
- B. Eugenia
- C. Polar body ✓
- D. Ovum

7. The passageways of the respiratory system are lined by mucous secreting cells called _____.

- A. Tracheal cells
- B. Goblet cells ✓
- C. Surfactant cells
- D. Pleural cells

8. Virus can only survive and reproduce inside a ____.

- A. Animal cell**
- B. Bacterial cell**
- C. Living cell ✓**
- D. Non-Living cell**

9. In addition to smaller hind limb muscle mass, the mutant "mini muscle" gene exhibit lower heart rates during physical activity, larger kidneys and livers in mice. This is a very good example of ____.

- A. Epistasis**
- B. Multiple alleles**
- C. Co-dominance**
- D. Pleiotropy ✓**

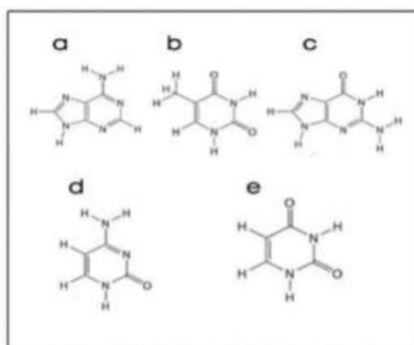
10. ____ is the stage of mitosis characterized by the physical separation of _____ chromatids.

- A. Interphase , Offspring**
- B. Telophase , F1 Chromatids**
- C. Metaphase , Homologous**
- D. Anaphase , Sister ✓**

11. A man who has type AB blood could not father a child with type ____ blood, because he would pass on either the ____ or the B allele to all of his offspring.

- A. A , O**
- B. O , A ✓**
- C. B , O**
- D. B , A**

12. Identify purine and pyrimidines from the following figures:



- A. a and b purines, c, d, and e pyrimidines
- B. d and b purines, c, a, and e pyrimidines
- C. a and e purines, c, d, and b pyrimidines
- D. a and e purines, b, d, and e pyrimidines ✓

13. A cross between a black cat and a tan cat produces a tabby pattern (black and tan fur together). What percent of kittens would have tan fur if a tabby cat is crossed with a black cat?

- A. 100%
- B. 50%
- C. 25%
- D. 0% ✓

14. Which factor decides what type of variation should be flourished and passed on in to the next generations?

- A. Species
- B. Population
- C. Survival
- D. Environment ✓

15. Hemophilia is a sex linked _____ trait.

- A. Dominant
- B. Co-dominant
- C. Pleiotropic
- D. Recessive ✓

16. Which of the following is a type of cell division that plays an important role in evolution?

- A. Meiosis ✓
- B. Mitosis
- C. Apoptosis
- D. Amitosis

17. The "d" and "D" alleles are used for lighter and darker skin color in humans respectively. By keeping in view the inheritance pattern of skin color in human beings, choose which combination is showing medium skin color from the following picture:

		a	b	c	d	e
a	Gene 1	d1d1	d1D1	D1D1	D1d1	D1D1
b	Gene 2	d2d2	d2d2	D2d1	D2d2	D2D2
c	Gene 3	d3d3	d3d3	d3d3	D3D3	D3D3

- A. Column a
- B. Column c ✓
- C. Row b
- D. Row c

18. There existed two varieties of Female Fresh Water Mollusks in which some were streamlined and some had high bulge. Over the generations, Male Fresh Water Mollusks learned that high bulge favors more production of offspring. So they started preferring to mate with females having high bulge as compared to streamlined. Will this effect Hardy Weinberg equilibrium in the population ?

- A. No, it will not affect Hardy Weinberg equilibrium**
- B. Yes, it will affect Hardy Weinberg equilibrium ✓**
- C. It will help to balance equilibrium**
- D. Hardy Weinberg equilibrium doesn't apply here**

19. A _____ is mostly a non-protein chemical compound that is required for the protein's biological activity.

- A. Active site**
- B. Substrate**
- C. Cofactor ✓**
- D. Enzyme**

20. All of the following belong to same kingdom EXCEPT:

- A. Plasmodium**
- B. Fern ✓**
- C. Chlamydomonas**
- D. Euglena**

21. Why some vegetables lose water when salt is applied to them ?

- A. Due to less negative water potential of external environment than the cell**
- B. Due to more negative water potential of external environment than the cell ✓**
- C. Due to less positive water potential of external environment than the cell**
- D. Due to more positive water potential of external environment than the cell**

22. What type of protein is present in eukaryotic DNA but NOT in prokaryotic DNA?

- A. Receptor protein**
- B. Glycoprotein**
- C. Chromatid protein**
- D. Histone protein ✓**

23. Whenever a muscle contracts, a sarcomere can be shorten up to _____% of its total length.

- A. 15**
- B. 25**
- C. 35 ✓**
- D. 45**

24. The second stage of the Prophase of Meiosis, following Leptotene, during which homologous chromosomes begin to pair is called:

- A. Anaphase**
- B. Zygotene ✓**
- C. Diplotene**
- D. Pachytene**

25. Formation of _____ will be greater with the faster break down of glucose and glycogen to compensate energy requirements in anaerobic respiration.

- A. Enzymes
- B. Hormones
- C. Lactic acid ✓
- D. Fat

26. A strand, almost _____ nucleotides long is wrapped around a core of _____ histone proteins to form a structure called a Nucleosome.

- A. 200-4
- B. 200-8 ✓
- C. 200-16
- D. 2000-4

27. A group of biologically active molecules formed from amino acids which interact with the surface of the lipid bilayer of cell membranes are called _____.

- A. Integral Proteins
- B. Peripheral proteins ✓
- C. Cell wall
- D. Plasmodesmata

28. Transport of three protons through the ATPase complex are required for the production of one _____.

- A. Sugar molecule
- B. NADP molecule
- C. ATP molecule ✓
- D. NADPH molecule

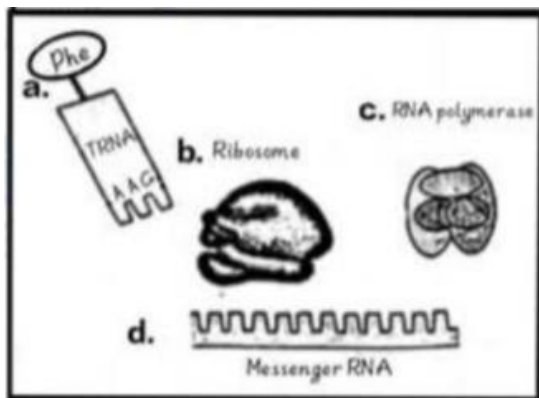
29. Which one of the following options is NOT an example of genetic engineering?

- A. Insulin producing bacteria
- B. Oil eating bacteria
- C. Photosynthetic bacteria ✓
- D. Metal extracting bacteria

30. In a forest there are a lot of plants, trees, shrubs and herbs. What will the Palm trees face if they grow in the same forest?

- A. Intra specific competition
- B. Inter specific competition
- C. Environmental competition
- D. All of the above ✓

31. Pick the odd one out in the following picture.

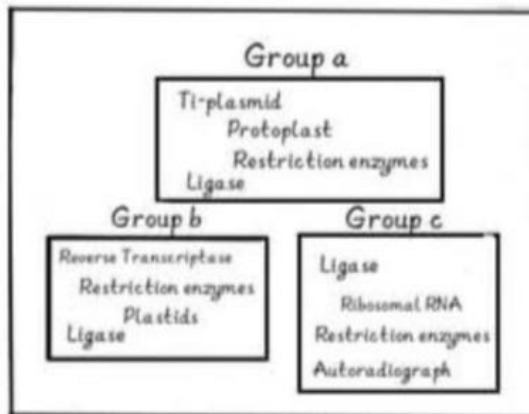


- A.
- B.
- C. ✓
- D.

32. While working in a laboratory, before studying sample under microscope, it was immersed in a dye solution to obtain ____.

- A. Magnification
- B. Image
- C. Match
- D. Contrast ✓

33. Pathway of energy used by muscles converted from food is:



- A. Food-ATP-creatine phosphate- protein
- B. Food- glycogen- ATP-creatine phosphate
- C. Food- glycogen-creatine phosphate- ATP ✓
- D. Food- protein-creatine phosphate- ATP

34. A is an organism that makes ATP by aerobic respiration if oxygen is present, but is capable of switching to fermentation, if oxygen is absent.

- A. Cellular anaerobe
- B. Respiratory anaerobe
- C. Obligate anaerobe
- D. Facultative anaerobe ✓

35. Choose the best group from the following to produce transgenic plants in the laboratory:

- A. Group a ✓
- B. Group b
- C. Group b & c
- D. Group c

36. Which one of the following is NOT a mode of transmission of AIDS?

- A. Through unsterilized needles
- B. Through contact with open wounds
- C. Through blood transfusion
- D. Through holding hands ✓

37. The following results of a cross between two individuals shown in the picture is:

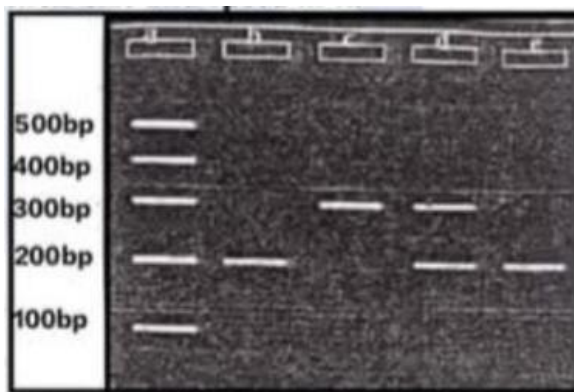
	b	b
B	Bb	Bb
b	bb	bb

- A. One that is homozygous dominant and other has a dominant phenotype, but has a mother with recessive phenotype.
- B. One that is homozygous recessive and other has a dominant phenotype, but has a mother with recessive phenotype. ✓
- C. One that is homozygous recessive and other has a dominant phenotype, but has a brother with recessive phenotype.
- D. One that is homozygous recessive and other has a recessive phenotype, but has a father with dominant phenotype.

38. An enzyme called is responsible for copying a DNA sequence into an RNA sequence.

- A. Restriction enzyme**
- B. Reverse transcriptase**
- C. RNA polymerase ✓**
- D. DNA polymerase**

39. Following picture is of technique, as DNA molecules are separated on the basis of their size and speed in it.



- A. Cloning**
- B. Recombinant DNA technique**
- C. Cell culture**
- D. Gel Electrophoresis ✓**

40. When plant cell receives a signal for death, it commits suicide by rupturing:

- A. Nucleus**
- B. Cell membrane**
- C. Tonoplast ✓**
- D. Chloroplast**

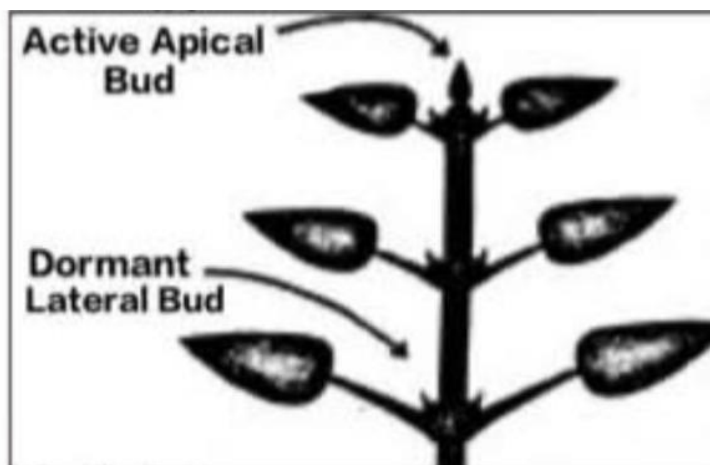
41. Cell permeability and transport processes of Cell Membrane depend upon its component.

- A. Phospholipid ✓**
- B. Carbohydrates**
- C. Polysaccharides**
- D. Cellulose**

42. Which disorder among the following CANNOT be detected by amniocentesis?

- A. Hemophilia**
- B. Heart defects ✓**
- C. Tay-Sachs disease**
- D. Cystic fibrosis**

43. What is the phenomenon shown in the following picture:



- A. Abscission**
- B. Senescence**
- C. Apical dominance ✓**
- D. Ripening**

44. In a laboratory while working on a new species of fish, it is found that the fish has two varieties, red and brown. It was determined by another group of scientists in another laboratory that brown is a dominant color in this species. If we have brown fish with us in the laboratory, how can we determine whether they are homozygous or heterozygous for the trait?

- A. Breed this fish with a red fish and check F1 generation ✓**
- B. Breed this fish with a red fish and check F2 generation**
- C. Breed this fish with a brown fish and check F1 generation**
- D. Breed this fish with a brown fish and check F2 generation**

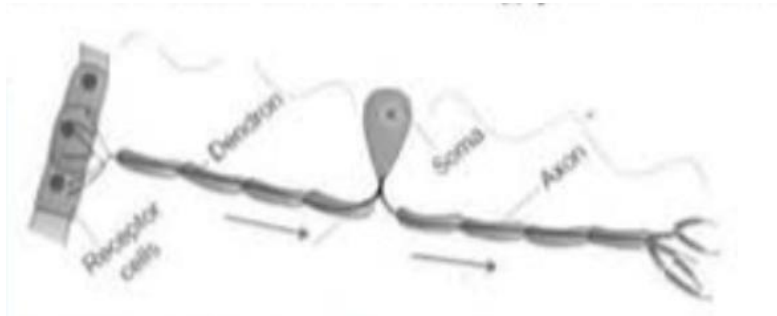
45. Which one is NOT true for co-ordination in animals?

- A. Transmission by the nervous system is short-lived, whereas transmission by the hormonal system is long-lasting.**
- B. The nervous system uses electrical impulses to send signals through neurons, whereas the hormonal coordination uses chemical messengers transported into blood.**
- C. Responses are often permanent in the hormonal system, but temporary and reversible in the nervous system.**
- D. In nervous system, secretory chemicals are released in blood while in hormonal system; secretory chemicals are released in extracellular fluids. ✓**

46. Plant pigments responsible for red, yellow and orange colors in many fruits & vegetables are:

- A. Chlorophyll a**
- B. Chlorophyll b**
- C. Carotenoids ✓**
- D. Cellulose**

47. What does the following picture show?



- A. Motor Neuron
- B. Sensory neuron ✓
- C. Inter neuron
- D. Nerve

48. As a result of competition among friends, Ahmed eats a lot of pakoras, resulting in rise of salts in blood, to compensate _____ mechanism will be triggered in the body.

- A. Positive feed back
- B. Negative feed back ✓
- C. Internal feed back
- D. External feed back

49. Due to the presence of _____, reabsorption of water is increased in the collecting duct.

- A. Mg
- B. ADH ✓
- C. Kidney stones
- D. High pH

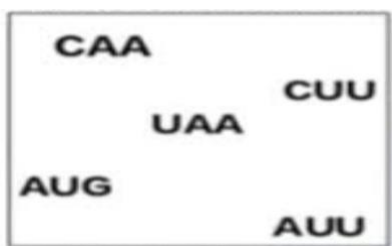
50. When a color blind male marries a normal female, what will be the chances of colorblindness in his grandsons, if his daughter marries to a normal male?

- A. 10%
- B. 25%
- C. 50% ✓
- D. 100%

51. Humans are _____ and mostly use _____ means for thermoregulation.

- A. Ectotherm, behavioral
- B. Endotherm, physiological ✓
- C. Ectotherm, physiological
- D. Endotherm, behavioral

52. Read the code mentioned in the following picture and arrange the sequence of all five codons in which Leucine is at 3rd position while isoleucine at 4th position. Keep in mind that CUU is the code for Leucine, AUU for Isoleucine and CAA for glutamine.



- A. UAA-AUG-CAA-CUU-AUU
- B. AUG-CAA-CUU-AUU-UAA ✓
- C. AUU-AUG-CAA-CUU-UAA
- D. AUG-UAA-CUU-AUU-CAA

53. Because it is capable of dissolving more substances than any other liquid, _____ is called the "universal solvent".

- A. Ethane**
- B. Alcohol**
- C. Chloroform**
- D. Water ✓**

54. Which animals support Darwin's view of Inheritance of desirable variations?

- A. Giraffe**
- B. Galapagos finches**
- C. Snake**
- D. All of the above ✓**

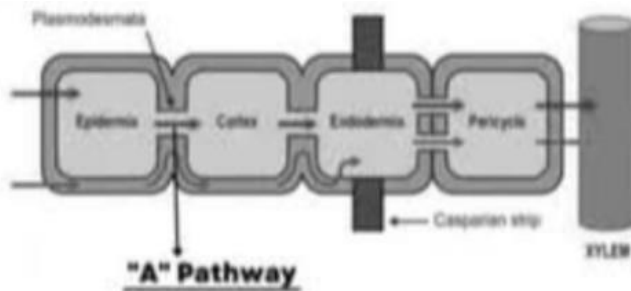
55. Interphase is a phase of the cell cycle defined only by the absence of _____.

- A. Enzymes**
- B. DNA**
- C. Replication**
- D. Cell division ✓**

56. Juxta-medullary nephrons are present only in:

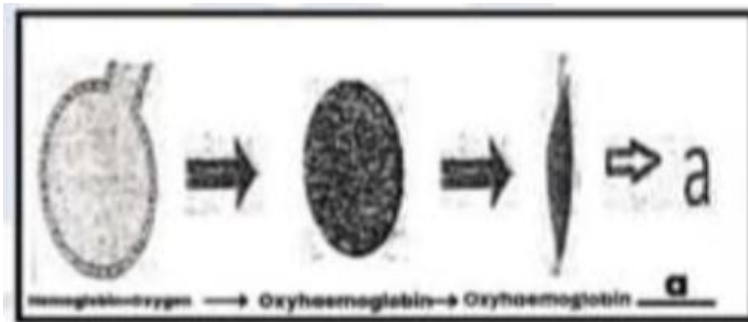
- A. Fishes and amphibians**
- B. Amphibians and birds**
- C. Birds and mammals ✓**
- D. Mammals and fishes**

57. What does 'A' in the following picture show?



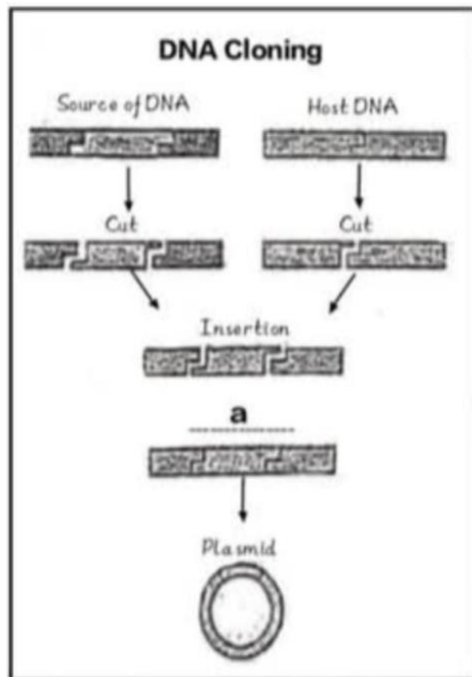
- A. Cellular pathway
- B. Symplast pathway ✓
- C. Apoplast pathway
- D. Water pathway

58. What does 'a' in the following picture show?



- A. Dissociation of oxyhaemoglobin ✓
- B. Reassociation of oxyhaemoglobin
- C. Recombination of oxyhaemoglobin
- D. Breakdown of haemoglobin

59. What is Molecule "a" in the following picture?

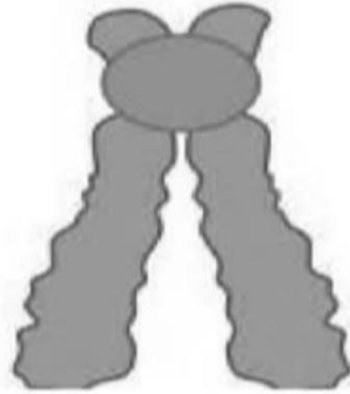


- A. Host cell
- B. Donor cell
- C. Restriction enzyme
- D. Recombinant DNA ✓

60. A group of immune cells that mediates the cellular immune response by processing and presenting antigens for recognition by certain other cells of immune system is called _____.

- A. Natural killer cells
- B. Interferons
- C. Antigen-presenting cells ✓
- D. Vaccines

61. Name the type of the following chromosome.



- A. Metacentric**
- B. Sub-metacentric**
- C. Telocentric**
- D. Acrocentric ✓**

62. The complete aerobic oxidation of glucose results in the synthesis of as many as _____ molecules of ATP.

- A. 16**
- B. 26**
- C. 36 ✓**
- D. 46**

63. Primary function of fats in aquatic mammals is _____ and in terrestrial mammals is _____.

- A. to reserve water, to reserve salts**
- B. to reserve salts, to reserve water**
- C. to reserve food, conserving heat**
- D. conserving heat, to reserve food ✓**

64. Crossing over is an exchange of genes between _____ resulting in a mixture of parental characteristics in offspring.

- A. Sister Chromatids**
- B. Non homologous Chromosomes**
- C. Sex chromosomes**
- D. Homologous chromosomes ✓**

65. All of the following are reflex actions EXCEPT:

- A. Change in the size of the pupil in response to light**
- B. Swallowing of bolus ✓**
- C. Sudden jerky withdrawal of hand when pricked**
- D. Knees jerk in response to a blow**

66. What is q in Hardy Weinberg equilibrium?

- A. Frequency of the dominant allele**
- B. Frequency of the recessive allele ✓**
- C. Frequency of both alleles**
- D. Number of both alleles**

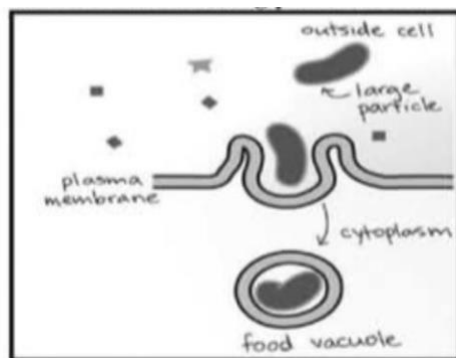
67. Genome of viruses is composed of _____.

- A. DNA**
- B. RNA**
- C. Protein**
- D. Both A & B ✓**

68. Carbon dioxide fixation can be enhanced by enhancing the efficiency of:

- A. Auxins
- B. Ribulose biphosphate ✓
- C. Lactoferrin
- D. Agrobacterium

69. Label the following phenomenon.



- A. Exocytosis
- B. Osmosis
- C. Diffusion
- D. Phagocytosis ✓

70. There is a small population of beetles on a grass in which some are green and some are brown in color. A group of students is passing from that place and walks on them. By chance, green color beetles are pressed under their feet resulting in:

- A. The balance of the genetic equilibrium of that population
- B. No affect to the genetic equilibrium of that population
- C. Change in the genetic equilibrium of that population ✓
- D. Genetic equilibrium doesn't apply in that population

71. Which of the following is NOT true for a gene?

- A. A gene is a sequence of nucleotides in DNA**
- B. A gene is the basic unit of heredity**
- C. A gene codes for a molecule that has a function**
- D. A gene expresses to form chromosomes ✓**

72. Function of respiratory passage, Cilia is to keep the airways clear of:

- A. Carbon dioxide**
- B. Oxygen**
- C. Dust ✓**
- D. Carbon mono oxide**

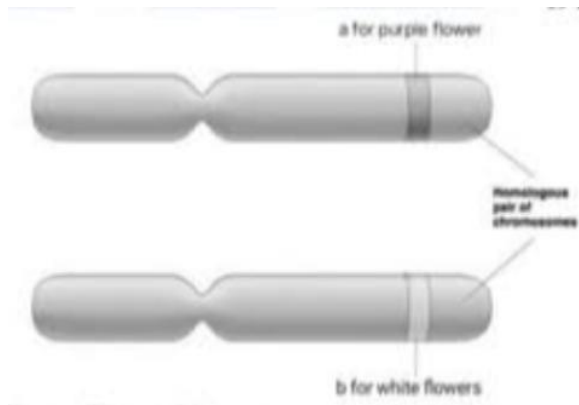
73. _____ is the storage form of carbohydrates in animals and humans which is equivalent to the _____ in plants.

- A. Glycogen, cellulose**
- B. Starch, cellulose**
- C. Glycogen, starch ✓**
- D. Starch, glycogen**

74. As an essential element in living organisms, _____ ion is playing important role in insulin secretion, release of neurotransmitters, muscles contraction and heartbeat regulation.

- A. Sodium**
- B. Potassium**
- C. Calcium ✓**
- D. Chloride**

75. What are a and b in the following picture?



- A. Allele and allele ✓
- B. Allele and gene
- C. Gene and gene
- D. Mutation and gene

76. Arrange the following according to the level of protein structures:

a.	Lysozyme
b.	Haemoglobin
c.	Insulin
d.	Hairs

- A. c, d, a, b ✓
- B. a, b, c, d
- C. d, c, b, a
- D. a, d, c, b

77. In egg, Ca^{+2} plays important role especially at the time of fertilization. Therefore, _____ are present in many thousand numbers inside the cell membrane.

- A. Ribosomes
- B. Chloroplast
- C. Mitochondria
- D. Endoplasmic reticulum ✓

78. Genetic equilibrium is a:

- A. Change of allele and gene frequency in a population
- B. Stability of allele and gene quantity in a population
- C. Change of allele and gene number in a population
- D. Stability of allele and gene frequency in a population ✓

79. Choose the term from the following which is NOT a part of gene therapy?

- A. Bone marrow transplant
- B. Retrovirus
- C. DNA Fingerprinting ✓
- D. Somatic cells

80. Synapse formed at the sites where the terminal branches of the axon of a motor neuron contact a target muscle cell is called:

- A. Sensory end plate
- B. Synapse end plate
- C. Motor end plate ✓
- D. Post synaptic membrane

#CHEMISTRY

81. Which of the following gases is used for welding purposes?

- A. ethene
- B. ethane ✓
- C. propane
- D. ethyne

82. The chief ore of Aluminum is:

- A. Na_3AlF_6
- B. $\text{Al}_2\text{O}_3 \cdot n\text{H}_2\text{O}$ ✓
- C. Al_2O_3
- D. $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$

83. Sp^3 hybrid orbitals are formed by the mixing of:

- A. One s and two p
- B. One s and three p ✓
- C. One s and one p
- D. Two s and two p

84. Which one of the following bond has highest bond energy?

- A. $\text{C}=\text{C}$
- B. $\text{C}\equiv\text{C}$
- C. $\text{N}\equiv\text{N}$ ✓
- D. $\text{H}-\text{F}$

85. Diamond is a bad conductor because it:

- A. has a tight structure**
- B. has high density**
- C. has no free electron in crystal ✓**
- D. is transparent to light**

86. Ethers show the phenomenon of:

- A. Position isomerism**
- B. Functional group isomerism**
- C. Metamerism ✓**
- D. Cis-trans isomerism**

87. Metallic character of the elements:

- A. decreases down the groups**
- B. increases down the groups ✓**
- C. decreases across the periods**
- D. increases across the periods**

88. The nature of positive rays depends on:

- A. The nature of the electrode**
- B. The nature of the discharge tube**
- C. The nature of the residual gas ✓**
- D. The shape of the electrodes**

89. The net heat change in a chemical reaction is same whether it is brought about in two or more different ways in one or several steps. It is known as:

- A. Henry's law**
- B. Hess's law ✓**
- C. Joule's principle**
- D. Dalton's law**

90. The volume occupied by 1.4 g N₂ at STP is:

- A. 22.4 dm³**
- B. 1.12 dm³ ✓**
- C. 11.2 dm³**
- D. 1.4 dm³**

91. Molarity of pure water is:

- A. 01**
- B. 18**
- C. 36**
- D. 55.5 ✓**

92. The value of R (the gas constant) is:

- A. 0.0821dm³ atm k mole⁻¹**
- B. 803143 Nm k⁻¹ mole**
- C. 0.0821 dm³ atm k⁻¹ mole⁻¹ ✓**
- D. 8.3143 dm³ atm k⁻¹ mole⁻¹**

93. Tritium, an isotope of hydrogen contains:

- A. Equal number of electrons and neutrons**
- B. Equal number of electrons, protons and neutrons**
- C. Number of neutrons are double than the number of protons ✓**
- D. Number of neutrons are half than the number of protons**

94. Which statement about the following equilibrium is correct?
 $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) = 2\text{SO}_3(\text{g}) \Delta H = -395\text{KJ/mole}$

- A. The value of K_p falls with rise in temperature ✓**
- B. The value of K_p falls with increase in pressure**
- C. The value of K_p is equal to K_c**
- D. The value of K_p remains constant with rise in temperature**

95. The chemical name of $[\text{Zn}(\text{OH})_4]^{2-}$ is:

- A. Tetrahydroxy zinc (II)**
- B. Tetrahydroxo zincate (IV)**
- C. Tetrahydroxo zincate (II) ✓**
- D. Pentahydroxy zincate (II)**

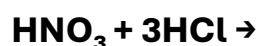
96. When 5d orbital is complete, the entering electron will go to:

- A. 6s**
- B. 6p ✓**
- C. 5p**
- D. 4f**

97. Which of the following of pair groups belong to meta directing group?

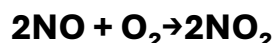
- A. $-\text{NH}_3$ and $-\text{NO}_2$
- B. $-\text{OR}$ and $-\text{OH}$
- C. $-\text{NO}_3$ and $-\text{SO}_3\text{H}$ ✓
- D. Cl and $-\text{COOH}$

98. What are the products of the below mentioned equation?



- A. $2\text{H}_2\text{O} + \text{NOCl} + \text{Cl}_2$
- B. $\text{H}_2 + \text{NOCl} + 2\text{HOCl}$
- C. $\text{H}_2\text{O} + \text{NO}_2\text{Cl} + 2\text{HCl}$
- D. $2\text{H}_2\text{O} + \text{NOCl} + 2\text{Cl}$ ✓

99. What is the order of the following reaction:



- A. 0
- B. 1
- C. 2
- D. 3 ✓

100. One Calorie is equivalent to:

- A. 0.4184 J
- B. 41.84 J
- C. 4.184 J ✓
- D. 418.4 J

101. Paramagnetic elements contain:

- A. All paired electrons**
- B. All unpaired electrons**
- C. Few unpaired electrons ✓**
- D. Unequal electrons and protons**

102. How many atmospheres correspond to 1050 torr?

- A. 1.050**
- B. 10.38**
- C. 1.380 ✓**
- D. 2.760**

103. The mass of an electron is:

- A. 1.008 amu**
- B. 1.009 amu**
- C. 0.000550 amu ✓**
- D. 0.5500 amu**

104. The rate of E1 reaction depends upon:

- A. The concentration of substrate ✓**
- B. The concentration of nucleophile**
- C. The concentration of nucleophile and substrate**
- D. The amount of the solvent used**

105. The number of bonds in nitrogen molecules are:

- A. One σ and one π
- B. One σ and two π ✓
- C. Three σ only
- D. Two σ and one π

106. An ionic compound $A+B^-$ is most likely to be formed when:

- A. The ionization energy of A is high and electron affinity of B is low
- B. The ionization energy of A is low and electron affinity of B is high ✓
- C. Both ionization energy of A and electron affinity of B are equal
- D. Both ionization energy of A and electron affinity of B are high

107. The electrophile in aromatic sulphonation is:

- A. H_2SO_4
- B. HSO_4
- C. SO_3H^+ ✓
- D. SO_3

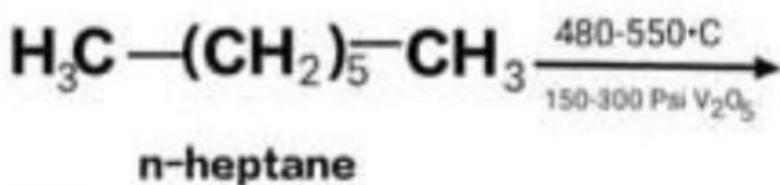
108. Choose the correct IUPAC name for the following complex.
 $[Cr(NH_3)_4Cl_2]Cl$

- A. Trichlorotetra amine chromium (III)
- B. Dichlorotetra amine chromium (III) chloride ✓
- C. Dichlorotetra ammonia chromium (III) chloride
- D. Dichlorotetra amine chromate (III) chloride

109. SN^2 reactions can be best carried out with:

- A. Primary alkyl halides ✓
- B. Secondary alkyl halides
- C. Tertiary alkyl halides
- D. Both primary and tertiary alkyl halides

110. Name the main product formed in result of the following reaction.



- A. Benzene
- B. Toulene
- C. Xylene
- D. Cyclohexane

111. The pH of $10^{-3} \text{ mol dm}^{-3}$ of an aqueous solution of H_2SO_4 is:

- A. 3.0
- B. 2.7 ✓
- C. 2.0
- D. 1.5

112. The oxidation state of Cl in HClO_4 is:

- A. -1
- B. +5
- C. +7 ✓
- D. -7

113. In a zero order reaction, the rate is independent of:

- A. temperature of reaction
- B. concentration of reaction ✓
- C. concentration of products
- D. catalyst used

114. Which one of the following is NOT a nucleophile?

- A. H_2S
- B. BF_3 ✓
- C. NH_3
- D. CN^-

115. Which of the following molecules have zero dipole moments?

- A. NH_3
- B. CHCl_3
- C. H_2O
- D. BF_3 ✓

116. The ligand field effect splits five degenerated d-orbitals into two sets with different energies, the pair of high energy degenerate orbitals is:

- A. d_{xy} , d_{yz}
- B. d_{yz} , d_{zx}
- C. $d_{x^2-y^2}$, d_{z^2} ✓
- D. $d_{x^2-y^2}$, d_{y^2}

117. The change in heat energy of a chemical reaction at constant temperature and pressure is called:

- A. Enthalpy change ✓**
- B. Heat of sublimation**
- C. Internal energy change**
- D. Heat of formation**

118. A catalyst increases the rate of reaction by:

- A. decreasing the activation energy ✓**
- B. decreasing the concentration of reactants**
- C. decreasing the temperature**
- D. increasing the temperature**

119. The unit cell parameters of mono clinic system are:

- A. $a=b \neq c$ $\alpha=\beta=\gamma=90^\circ$**
- B. $a \neq b \neq c$ $\alpha=\gamma=90^\circ$ $\beta \neq 90^\circ$ ✓**
- C. $a \neq b = c$ $\alpha=\beta=90^\circ$ $\gamma \neq 90^\circ$**
- D. $a=b=c$ $\alpha=\beta=\gamma=90^\circ$**

120. Which of the following will have maximum value of heat of hydration?

- A. Na⁺**
- B. Cs⁺**
- C. Mg²⁺ ✓**
- D. Ca²⁺**

121. The colour of transition metal complexes is due to:

- A. d-d transition of electrons ✓
- B. Paramagnetic nature of transition elements
- C. Loss of s-electrons
- D. Refraction phenomenon

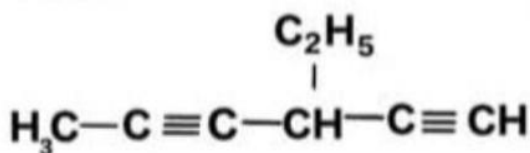
122. Determine the significant figures in 0.0085:

- A. 4
- B. 3
- C. 2 ✓
- D. 1

123. Orbitals having same energy are called:

- A. Hybrid orbitals
- B. Degenerate orbitals ✓
- C. Valence orbitals
- D. Sub-orbitals

124. Write the chemical name of the given structure.



- A. 4-ethyl-2,5-hexadiyne
- B. 3-ethyl-1,4-hexadiene
- C. 3-ethyl-1,4-hexadiyne ✓
- D. 3-ethyl-2,5-hexadiyne

125. Copper (Cu, Z=29) is a:

- A. d' system with respect to electronic configuration**
- B. d' system with respect to electronic configuration**
- C. d' system with respect to electronic configuration**
- D. d¹⁰ system with respect to electronic configuration ✓**

126. The carbon number of gasoline is:

- A. C5 - C6**
- B. C6 - C7**
- C. C5 - C10 ✓**
- D. C12 - C15**

127. The oxidation number of Br- in Br₂ is:

- A. -1**
- B. -2**
- C. 0 ✓**
- D. +1**

128. The number of moles of CO₂ which contain 8.0 g of oxygen is:

- A. 0.25 ✓**
- B. 0.50**
- C. 0.75**
- D. 1.0**

129. Hydrogen bonds are represented by:

- A. dative bonds
- B. full bond
- C. partial charges
- D. dotted bonds ✓

130. Effusion of gases take place through a hole with:

- A. Hole dimensions
- B. Infinite dimensions
- C. Slit like dimensions
- D. Molecular dimensions ✓

131. The units of K_{sp} for the following reaction are:



- A. mol dm^{-6}
- B. $\text{mol}^7 \text{dm}^{-5}$
- C. $\text{mol}^8 \text{dm}^{-9}$ ✓
- D. mol dm^{-9}

132. In t-butyl alcohol, the tertiary carbon is bonded to:

- A. No H-atoms ✓
- B. One H-atoms
- C. Three H-atoms
- D. Four C-atoms

133. The standard reduction potential of hydrogen electrode is:

- A. -0.76 volts**
- B. 0.00 volts ✓**
- C. +1.5 volts**
- D. 1.0 volts**

134. Down's cell is used to prepare:

- A. Sodium carbonate**
- B. Sodium bicarbonate**
- C. Sodium hydroxide**
- D. Sodium metal ✓**

135. Which of the hydrogen compounds has the highest percentage of ionic character?

- A. HCl**
- B. HBr**
- C. HI**
- D. HF ✓**

136. Quantum number values for 2p orbitals are:

- A. $n=2$ $l=1$ ✓**
- B. $n=2$ $l=2$**
- C. $n=2$ $l=0$**
- D. $n=1$ $l=0$**

137. Solubility product of AgCl is $2.0 \times 10^{-10} \text{ mol}^2 \text{ dm}^{-6}$ Maximum concentration of Ag^+ ions in the solution is:

- A. $2.0 \times 10^{-12} \text{ mol dm}^{-3}$
- B. $1.4 \times 10^{-12} \text{ mol dm}^{-3}$
- C. $1.0 \times 10^{-12} \text{ mol dm}^{-3}$
- D. $2.5 \times 10^{-10} \text{ mol dm}^{-3}$ ✓

138. A limiting reactant is the one, which:

- A. is taken in lesser quantity in grams as compared to the other reactant
- B. Is taken in lesser quantity in volume as compared to the other reactant
- C. gives the minimum amount of the product which is required ✓
- D. gives equal amount of the reactants and products

139. The chemical formula of Tincal is:

- A. $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$
- B. $\text{Na}_2\text{B}_4\text{O}_7 \cdot \text{H}_2\text{O}$
- C. $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ✓
- D. $\text{Na}_2\text{B}_4\text{O}_5 \cdot 10\text{H}_2\text{O}$

140. Hydrogen resembles with the elements of groups:

- A. I-A, V-A and VIII-A
- B. I-A, IV-A and VI-A
- C. I-A, II-A and VII-A
- D. I-A, IV-A and VII-A ✓

#PHYSICS

141. In Compton Scattering experiment the X-ray wavelength change $\Delta\lambda$ is _____. Here h is Plank constant, m is rest mass of electron and θ is angle after scattering.

- A. $\Delta\lambda = h/mc(1+\cos\theta)$
- B. $\Delta\lambda = h/mc(1-\cos^2\theta)$
- C. $\Delta\lambda = h/mc(1-\cos\theta)$ ✓
- D. $\Delta\lambda = h/mc'(1-\cos\theta)$

142. An object is falling down with a speed of 20 m/s. After 3 seconds its velocity will be _____ m/s ($g=10 \text{ m/s}^2$).

- A. 05
- B. 50 ✓
- C. 55
- D. 95

143. In Young's double slit experiment, if d is separation between two slits, λ is wavelength of light and θ is angle of line from center of slits to the point of observation on the screen; then for maxima (bright fringe); the formula is:

- A. $2d\sin\theta = m\lambda$; $m = 0, 1, 2$,
- B. $d\sin\theta = m\lambda$; $m = 0, 1, 2$, ✓
- C. $d\sin\theta = (m+1/2)\lambda$; $m = 0, 1, 2$,
- D. $2m\sin\theta = d\lambda$; $m = 0, 1, 2$,

144. The polarization of light by tourmaline crystals is due to _____ effect.

- A. selective diffraction
- B. selective reflection
- C. selective interference
- D. selective absorption ✓

145. A paratrooper is falling down with uniform velocity and also rotating with a constant angular velocity of 0.2 rad/sec. The body satisfies _____.

- A. First condition of equilibrium but not second
- B. Second condition of equilibrium but not first
- C. First and second condition of equilibrium ✓
- D. Neither First nor the second condition of equilibrium

146. If ${}^{92}\text{U}^{235}$ decays by emitting two α , one β and two gamma rays the new daughter element y is = _____.

- A. ${}^{88}\text{y}^{227}$
- B. ${}^{89}\text{y}^{227}$
- C. ${}^{90}\text{y}^{227}$ ✓
- D. ${}^{89}\text{y}^{231}$

147. A changing current in a coil sets up a changing magnetic field around it which in turn induces an e.m.f. in it. This effect is known as ____.

- A. Simple induction
- B. Mutual induction
- C. Self-Induction ✓
- D. EMF induction

148. The principle of an AC generator is _____.

- A. Lenz's law
- B. Faraday's law ✓
- C. Self-Induction
- D. Ampere's law

149. A material that does NOT become radioactive after absorbing neutrons is called _____.

- A. Shielding
- B. Reactor fuel
- C. Control material ✓
- D. Coolant

150. The Bragg's Law for measurement of wave length λ of x-rays, using crystal lattice planes having distance d between each other, for constructive interference for integral multiple of λ is _____.

- A. $m\lambda = 2d/\sin\theta$
- B. $2\lambda = m d \sin\theta$
- C. $m\lambda = 2d \sin\theta$ ✓
- D. $d\lambda = 2m \sin\theta$

151. The velocity of particle is related to time according to equation $v=ct^3$. The dimensions of constant c are _____.

- A. $L^{-1} T^{-1}$
- B. LT^{-3}
- C. LT^{-4} ✓
- D. $L^{-2} T^{-2}$

152. What should the distance of an object from a convex lens of focal length $f=10$ cm in order to produce an erect image twice as large as the object?

- A. 20 cm from the lens**
- B. 15 cm from the lens**
- C. 10 cm from the lens**
- D. 05 cm from the lens ✓**

153. The scalar or Dot product of Vectors $(3i-2j+4k)$ and $(2i+2j-3k)$ is ____.

- A. -9**
- B. -10 ✓**
- C. -11**
- D. 10**

154. The sum of Kinetic Energy and the Potential Energy is always constant provided ____ motion.

- A. there is greater force of friction involved during**
- B. body is in simple harmonic ✓**
- C. there is less force of friction Involved during**
- D. no force of friction involved during**

155. Three times decrease in the distance between the plates of a parallel plate capacitor will ____.

- A. decrease the capacitance three times**
- B. decrease the capacitance nine times**
- C. increase the capacitance three times ✓**
- D. increase the capacitance six times**

156. A car of mass 1200 Kg initially at rest has been accelerated to speed of 8 m/s in 16 meters. Average acceleration of car is _____ m/s² and Force is _____ N.

- A. 1.5 and 1500**
- B. 2.5 and 2400**
- C. 3.5 and 3500**
- D. 2 and 2400 ✓**

157. In SI system of units, the fundamental units of length, mass, and time are _____, _____ and _____ respectively.

- A. Meter, Kilogram and Kilo-second**
- B. Kilometer, Kilogram and Hour**
- C. Meter, Kilogram and Second ✓**
- D. Centimeter, Centigram and Second**

158. In Nuclear Physics the mass defect is referred to _____.

- A. difference in masses of free neutron and proton**
- B. difference in masses of free neutrons and bonded nucleus**
- C. difference in masses of free nuclear constituent and bonded nucleus ✓**
- D. difference between atomic mass and atomic number**

159. The formula for Paschen series for Hydrogen spectrum is _____.

- A. $1/\lambda = RH (1/2^2 - 1/n^2)$; $n=3,4,5...$**
- B. $1/\lambda = RH (1/1^2 - 1/n^2)$; $n=2,3,4,5...$**
- C. $1/\lambda = RH (1/4^2 - 1/n^2)$; $n=5,6,7...$**
- D. $1/\lambda = RH (1/3^2 - 1/n^2)$; $n=4,5,6... ✓$**

160. The necessary condition for the Boyle's law to hold is that the process must be _____.

- A. Isobaric**
- B. Adiabatic**
- C. Isochoric**
- D. Isothermal ✓**

161. In inelastic collision the kinetic energy before and after the collision _____ but the momentum of the system before and after the collision is _____.

- A. Conserved... conserved**
- B. Changes... conserved ✓**
- C. Changes... changes**
- D. Conserved... changes**

162. Which statement describes the electric potential difference between two points in electric field of charge Q?

- A. The difference of electric field between the points per unit charge.**
- B. The ratio of the power dissipated between the points to the mass of charge.**
- C. The work done in moving a test charge between points divided by magnitude of test charge. ✓**
- D. The force required to move a unit positive charge between the points per unit charge.**

163. When an object is thrown upward, it rises to height h . How high is the object in terms of h , when it has lost $1/3$ of its original kinetic energy?

- A. $h/2$
- B. $h/3$ ✓
- C. $h/4$
- D. $h/6$

164. The internal energy of the system decreases in an adiabatic process. Which of the following must be true regarding this process?

- A. Heat flows out of the system
- B. Work is done by the system ✓
- C. Work is done on the system
- D. The potential energy of the system is changing

165. If μ_0 is permeability of the medium and ϵ_0 is permittivity of the medium then value of $\sqrt{1/\mu_0\epsilon_0}$ is equal to ____.

- A. Planks constant
- B. Speed of sound waves
- C. Speed of ultrasound waves
- D. Speed of light ✓

166. In a step up transformer ____.

- A. $V_s > V_p$ while $I_s > I_p$
- B. $V_s < V_p$ while $I_s > I_p$
- C. $V_s = V_p$ while $I_s > I_p$
- D. $V_s > V_p$ while $I_s < I_p$ ✓

167. If compressible medium has bulk modulus denoted by B and density denoted by ρ , then the Newton formula for speed of sound in medium is _____.

- A. $V = \sqrt{B/\rho}$ ✓**
- B. $V = \sqrt{B\rho}$**
- C. $V = B\rho$**
- D. $V = \sqrt{\rho/B}$**

168. In order to produce pair production the minimum energy of photon required is _____.

- A. 1.02 KeV**
- B. 1.02 MeV ✓**
- C. 10.2 KeV**
- D. 1.00 MeV**

169. The Bohr's postulate for stationary orbits of Hydrogen atom is _____ Here m is mass of electron, v velocity, r orbital radius and h is Plank's constant.

- A. $mr = nhv/2\pi$**
- B. $mvr = nh/2\pi$ ✓**
- C. $mvr = nh/2\pi r$**
- D. $mv = nhr/2\pi$**

170. A car starts from rest and moves with constant acceleration. During the 4th second of its motion, it covers a distance of 21 meters. The acceleration of the car is _____ ms^2 .

- A. 04**
- B. 06 ✓**
- C. 08**
- D. 16**

171. Which particle (marked A) is obtained in the following nuclear reaction?



- A. $\text{A} = 1\text{H}^1$**
- B. $\text{A} = 1\text{n}^1$ ✓**
- C. $\text{A} = 1\text{H}^1$**
- D. $\text{A} = 2\text{He}^2$**

172. An electron is moving with velocity v and has momentum $3 \times 10^{-26} \text{ kg.m/s}$. The de Broglie wavelength associated with it is _____.

Value of $h = 6.63 \times 10^{-34} \text{ Js}$

- A. 24.1nm**
- B. 22.1 μm**
- C. 22.1nm ✓**
- D. 22.1mm**

173. The Laplace's correction to Newton's formula is based on the fact that the compressions and rarefactions occur as _____.

- A. Adiabatic process ✓**
- B. Isothermal process**
- C. Isochoric process**
- D. Isobaric process**

174. A car of 500 Kg is travelling at a constant speed of 9 m/s around a curve of 100 m. What is the centripetal force?

- A. 205N**
- B. 305N**
- C. 405N ✓**
- D. 505N**

175. When a train while whistling passes near you, a considerable change in the pitch of sound is heard. When the train is moving away, the pitch of the sound _____ whereas the pitch of the sound _____ when the train is approaching.

- A. increases... decreases
- B. increases... remains same
- C. decreases... increases ✓
- D. decreases... remains same

176. The vector product of two vectors A and B is _____ vectors A and B.

- A. equal to the product of magnitudes of
- B. in the plane parallel to
- C. perpendicular to the plane containing ✓
- D. less in magnitude than the product of magnitudes of

177. If a conductor carrying current I is placed in a uniform magnetic field B , it experiences a magnetic force F . The direction of this force F _.

- A. Is parallel to current I only
- B. Is perpendicular to current I only
- C. Is perpendicular to magnetic field B only
- D. Is perpendicular to both current I and magnetic field B ✓

178. A battery of 12 volts is connected to three resistors of 4 Ohm, 5 Ohm, and 3 Ohm joined together in parallel. The current through the 3 Ohm resistance is _____.

- A. 1.0 A
- B. 2.5 A
- C. 3.0 A
- D. 4.0 A ✓

179. If the time interval between the occurrence of two events is measured in a frame with no relative motion in which two events occur, then the time t measured by an observer in a frame moving with relative velocity v is _____.

- A. $t = t_0 / \sqrt{1 - \sqrt{c}}$**
- B. $t = t_0 / \sqrt{1 - \sqrt{c^2}}$ ✓**
- C. $t = t_0 / \sqrt{1 + \sqrt{c^2}}$**
- D. $t = t_0 / \sqrt{\sqrt{c^2} - 1}$**

180. A traveling wave, in which the particles of the distributed medium move parallel to the direction of propagation of the wave, is called:

- A. Transverse wave**
- B. Circular waves**
- C. Longitudinal wave ✓**
- D. Stationary waves**

**181. Choose the word most similar in meaning to the capitalized one.
DEMONSTRATE:**

- A. Establish**
- B. Invent**
- C. Produce**
- D. Show ✓**

**182. Choose the word most similar in meaning to the capitalized one.
FLEE:**

- A. Escape ✓**
- B. Face**
- C. Fear**
- D. Flow**

**183. Choose the word most similar in meaning to the capitalized one.
UNAMBIGUOUS:**

- A. Exact**
- B. Clear ✓**
- C. Interesting**
- D. Sufficient**

**184. Choose the word most similar in meaning to the capitalized one.
LEGEND:**

- A. History**
- B. Outburst**
- C. Place**
- D. Story ✓**

185. That freedom means freedom only from foreign domination is an outworn idea. It is not merely governments that should be free but the people themselves who should be free; and no freedom has any real value for the common man or woman unless it means freedom from want, freedom from disease, freedom from ignorance. This is the main task which confronts us if we are to take our rightful place in the modern world. We cannot hold the clock back, and therefore it is we who must go forward at a double pace, bending all our resources and all our energies to this great purpose.

An "outworn" idea is ____.

- A. Great**
- B. Not new ✓**
- C. Scientific**
- D. Undeveloped**

186. "The great purpose" mentioned by the writer at the end of the passage refers to _____.

- A. Freedom from foreign domination**
- B. People themselves should be free**
- C. The real value of freedom**
- D. Taking our rightful place in the modern world ✓**

187. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters. BRILLIANT:

- A. Adequate**
- B. Dull ✓**
- C. Troubled**
- D. Unprejudiced**

188. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters. ENFEEBLED:

- A. Distanced**
- B. Dominant**
- C. Mistaken**
- D. Powerful ✓**

189. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters. INVADERS:

- A. Characteristics**
- B. Historians**
- C. Inhabitants ✓**
- D. Results**

190. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

UNLIKELY:

- A. Familiar**
- B. Possible ✓**
- C. Powerful**
- D. Take for granted**

191. Anglo-Saxon is now, of course, a dead language, but a good deal of its vocabulary has survived, in one form or another, to the present day. Most of the very common words in modern English are Anglo-Saxon in origin: nouns like father, mother, food, drink, bed, hunger; most of the prepositions and conjunctions; and nearly all the strong verbs. When it was mixed with Norman French, there were three main results: the grammar was simplified, the pronunciation and spellings became much more complicated, and the vocabulary was enormously extended. French is a Latin language, so the major part of our vocabulary is now Latin in origin.

A "dead language" is _____.

- A. A dialect of language**
- B. Latin language**
- C. Mixed with other languages**
- D. No more spoken ✓**

192. The vocabulary was "enormously extended" means vocabulary has:

- A. Increased ✓**
- B. Reduced**
- C. Simplified**
- D. Survived**

193. Identify the word or phrase that needs to be changed for the sentence to be correct.

"When I go into a bank, I get frighten."

- A. When**
- B. A**
- C. Get**
- D. Frighten ✓**

194. Identify the word or phrase that needs to be changed for the sentence to be correct.

"The fact of the matter is never I'd been out to the theatre that night, had supper afterwards, and came in late."

- A. Never ✓**
- B. That**
- C. Afterwards**
- D. Late**

195. Identify the word or phrase that needs to be changed for the sentence to be correct.

"In Maxwell's days, no instruments had been made which could register the greatly enormously long waves of electricity."

- A. No**
- B. Could**
- C. Greatly ✓**
- D. Long**

196. Identify the word or phrase that needs to be changed for the sentence to be correct.

"This long experience of European domination has naturally produced a mood of quite resistance."

- A. This**
- B. Long**
- C. European**
- D. Quite ✓**

197. "The house _____ before we moved in."

- A. Paint**
- B. Painted**
- C. Has painted**
- D. Was painted ✓**

198. Her hair was hanging _____ her back.

- A. Beyond**
- B. By**
- C. Down ✓**
- D. From**

199. We must _____ back by six o'clock.

- A. Be ✓**
- B. Can**
- C. Has**
- D. Have**

200. Birds usually _____ eggs in their nests.

- A. Laid**
- B. Lain**
- C. Lay ✓**
- D. Lie**