

## APG

### PROVISIONAL ANSWER KEY [CBRT]

Name of The Post	Associate Professor, Biochemistry, General State Service, Class-1
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### Instructions / સૂચના

**Candidate must ensure compliance to the instructions mentioned below, else objections shall not be considered: -**

- (1) All the suggestion should be submitted in prescribed format of suggestion sheet Physically.
- (2) Question wise suggestion to be submitted in the prescribed format (Suggestion Sheet) published on the website.
- (3) All suggestions are to be submitted with reference to the Master Question Paper with provisional answer key (Master Question Paper), published herewith on the website. Objections should be sent referring to the Question, Question No. & options of the Master Question Paper.
- (4) Suggestions regarding question nos. and options other than provisional answer key (Master Question Paper) shall not be considered.
- (5) Objections and answers suggested by the candidate should be in compliance with the responses given by him in his answer sheet. Objections shall not be considered, in case, if responses given in the answer sheet /response sheet and submitted suggestions are differed.
- (6) Objection for each question shall be made on separate sheet. Objection for more than one question in single sheet shall not be considered & treated as cancelled.

**ઉમેદવારે નીચેની સૂચનાઓનું પાલન કરવાની તકેદારી રાખવી, અન્યથા વાંધા-સૂચન અંગે કરેલ રજૂઆતો ધ્યાને લેવાશે નહીં**

- (1) ઉમેદવારે વાંધા-સૂચનો નિયત કરવામાં આવેલ વાંધા-સૂચન પત્રકથી રજૂ કરવાના રહેશે.
- (2) ઉમેદવારે પ્રશ્નપ્રમાણે વાંધા-સૂચનો રજૂ કરવા વેબસાઈટ પર પ્રસિધ્ધ થયેલ નિયત વાંધા-સૂચન પત્રકના નમૂનાનો જ ઉપયોગ કરવો.
- (3) ઉમેદવારે પોતાને પરીક્ષામાં મળેલ પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્નક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતા તમામ વાંધા-સૂચનો વેબસાઈટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કી (માસ્ટર પ્રશ્નપત્ર)ના પ્રશ્ન ક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા.
- (4) માસ્ટર પ્રશ્નપત્ર માં નિર્દિષ્ટ પ્રશ્ન અને વિકલ્પ સિવાયના વાંધા-સૂચન ધ્યાને લેવામાં આવશે નહીં.
- (5) ઉમેદવારે જે પ્રશ્નના વિકલ્પ પર વાંધો રજૂ કરેલ છે અને વિકલ્પ રૂપે જે જવાબ સૂચવેલ છે એ જવાબ ઉમેદવારે પોતાની ઉત્તરવહીમાં આપેલ હોવો જોઈએ. ઉમેદવારે સૂચવેલ જવાબ અને ઉત્તરવહીની જવાબ ભિન્ન હશે તો ઉમેદવારે રજૂ કરેલ વાંધા-સૂચન ધ્યાનમાં લેવાશે નહીં.
- (6) એક પ્રશ્ન માટે એક જ વાંધા-સૂચન પત્રક વાપરવું. એક જ વાંધા-સૂચન પત્રકમાં એકથી વધારે પ્રશ્નોની રજૂઆત કરેલ હશે તો તે અંગેના વાંધા-સૂચનો ધ્યાને લેવાશે નહીં.

001. In the treatment of burns, scientists can use stem cells to help them replace...
- (A) All parts of the patient's skin (B) Hair follicles and sweat glands  
(C) The outermost layer of the skin (D) All parts of the skin except sweat glands
002. Embryonic stem cells can differentiate into which types of cell?
- (A) Only brain stem cells and specialized brain cells  
(B) All types of specialized cells in the body  
(C) Only cells that can produce insulin  
(D) Only cells that can produce artificial skin
003. Neural stem cells from the brain can differentiate into which types of cell?
- (A) Only specialized brain cells  
(B) Specialized brain cells and specialized skin cells  
(C) All types of specialized cells  
(D) Only specialized blood cells
004. What is the least invasive source of stem cells from the human body?
- (A) Cord blood (B) Adipose tissue  
(C) Bone Marrow (D) Skin graft
005. What are the roles of stem cells in our bodies?
- (A) We are not sure what roles stem cells play in the body  
(B) They produce new specialized cells to replace cells that die or are used up  
(C) They fight against infections  
(D) They perform specialized roles in the body (e.g. produce insulin, transmit signals in the nervous system)
006. Neural stem cells from the brain can differentiate into which types of cell?
- (A) Only specialized brain cells  
(B) Specialized brain cells and specialized skin cells  
(C) All types of specialized cells  
(D) Only specialized blood cells
007. Father to son inheritance of disease could not be seen in
- (A) Autosomal Dominant (B) Autosomal Recessive  
(C) X linked Recessive (D) X linked Dominant
008. The same amino acids highlights which property of genetic code?
- (A) Degeneracy (B) Universal  
(C) Non overlapping (D) Comma less
009. Which of the following is X linked recessive disorder
- (A) Huntington's Disease (B) Cystic Fibrosis  
(C) Duchene Muscular Dystrophy (D) Marfan's syndrome
010. Alleles are ....
- (A) Alternate forms of genes (B) Linked genes  
(C) Chromosomes that have crossed over (D) Homologous chromosomes

011. The geometrical device that helps to find out all the possible combinations of male and female gametes is known as  
 (A) Bateson Square (B) Mendel Square  
 (C) Punnett Square (D) Mendel Square
012. In a family father is having a disease and mother is normal. The disease is inherited only to the daughters and not to the sons. What type of disease is it?  
 (A) Autosomal Dominant (B) Autosomal Recessive  
 (C) Sex linked Recessive  (D) Sex linked Dominant
013. Marked microsatellite instability is a feature of  
 (A) Multiple endocrine adenomatosis type 2  
 (B) Hereditary non-polyposis colon cancer (HNPCC)  
 (C) Familial adenomatous polyposis  
 (D) Neurofibromatosis 1
014. Which of the following is not a tumor suppressor gene?  
 (A) RET (B) RB1  
 (C) NF 1 (D) APC
015. Complete the following sentence. The Philadelphia chromosome  
 (A) Is an example of gene amplification  (B) Is a product of a reciprocal translocation  
 (C) Causes Burkitt's lymphoma (D) Causes retinoblastoma
016. In order to insert a foreign gene into a plasmid, both must  
 (A) Have identical DNA sequences (B) Originate from the same type of cell  
 (C) be cut by the same restriction enzyme (D) be of the same length
017. True about PCR is all EXCEPT:  
 (A) Needs Primers and Taq Polymerase  
 (B) Needs MgCl<sub>2</sub>  
 (C) Exponential increase in number  
 (D) Needs Restriction Endonuclease in every reaction
018. Sigma factor is a component of  
 (A) DNA Ligase (B) DNA polymerase  
 (C) RNA polymerase (D) Restriction endonuclease
019. During Translation role of enzyme peptidyl transferase is  
 (A) Transfer of phosphate  
 (B) Amino Acid activation  
 (C) Association of ribosomes with mRNA  
 (D) Peptide bond formation between adjacent Amino Acid
020. Which is the energy rich molecule is required for initiation of translation?  
 (A) ATP  (B) GTP  
 (C) CTP (D) AMP
021. In Lac-operon, the gene product of Lac A gene is  
 (A) Beta-galactoside permease  (B) Beta-galactoside transacetylase  
 (C) Beta-galactosidase (D) Beta-galactoside isomerase

022. True Replication of DNA is possible due to  
 (A) Complementary base pairing rule      (B) Phosphate Backbone  
 (C) Double helical structure      (D) polarity of DNA
023. What is the role of topoisomerases in eukaryotic DNA replication?  
 (A) Topoisomerase enzymes cut, uncoil and reseal the double stranded DNA  
 (B) Topoisomerase enzymes bind to the origin of replication sites within double stranded DNA  
 (C) Topoisomerase enzymes open up the double stranded DNA at the replication fork  
 (D) Topoisomerase enzymes join the Okazaki fragments together with phosphodiester bonds
024. All are applications of DNA fingerprinting Except  
 (A) In forensic science       (B) To amplify minisatellite  
 (C) To settle disputed parentage      (D) Diagnosis of inherited disorders
025. Mitochondrial DNA is a  
 (A) Simple, single stranded linear DNA molecule  
 (B) Simple, single stranded circular DNA molecule  
 (C) Simple, double stranded linear DNA molecule  
 (D) Simple, double stranded circular DNA molecule
026. To overcome diabetes, a person can increase the intake of \_\_\_\_\_ and reduce the intake of \_\_\_\_\_?  
 (A) carbohydrates, proteins      (B) proteins, fats  
 (C) fats, carbohydrates      (D) carbohydrates, fats
027. A person who is suffering from high blood pressure should cut down on \_\_\_\_\_?  
 (A) Sodium      (B) Potassium  
 (C) Calcium      (D) Magnesium
028. B.M.R. is subnormal in  
 (A) Addison's disease      (B) Adrenal tumour  
 (C) Cushing's syndrome      (D) Fever
029. Which of the following group contains only non essential amino acids  
 (A) Acidic amino acid      (B) Basic amino acid  
 (C) Aromatic amino acid      (D) Branch chain amino acid
030. The percentage of food nitrogen that is retained in the body represents  
 (A) Digestibility coefficient      (B) Biological value of proteins  
 (C) Protein efficiency ratio       (D) Net protein utilization
031. Which of the following oxidation reduction system has highest redox potential?  
 (A)  $\text{Fe}^{3+}$  cytochrome b /  $\text{Fe}^{2+}$        (B)  $\text{Fe}^{3+}$  cytochrome a /  $\text{Fe}^{2+}$   
 (C) Fumarate / Succinate      (D) Ubiquinone ox / red
032. In the presence of rotenone  
 (A) NADH is oxidized by electron transport  
 (B)  $\text{FADH}_2$  is oxidized by electron transport  
 (C) Cytochrome a is reduced by electron transport  
 (D) Cytochrome c is reduced

033. Oligomycin inhibits oxidative phosphorylation by  
 (A) Blocking translocase (B) By blocking proton channels  
 (C) By inhibiting NADH-Q reductase (D) By inhibiting cytochrome oxidase
034. Which of the following is considered an easily digestible source of protein?  
 (A) Egg albumin (B) Soyabean  
 (C) Fish flesh (D) Red meat
035. A chocolate bar contains 57 g carbohydrate, 8 g protein and 31 g fat per 100 g. What is its energy content?  
 (A) 525 kcal/100g (B) 667 kcal/100g  
 (C) 416 kcal/100g (D) None of the above
036. For sedentary individuals, basal metabolic rate (BMR) accounts for approximately what percentage of total energy expenditure?  
 (A) 20 - 30% (B) 40 - 50%  
 (C) 60 - 70 % (D) 80 - 90 %
037. The following fatty acid does not belongs to ω6 series linoleic acid  
 (A) Arachidonic acid (B) Gamma-linoleic acid  
 (C) Alpha-linolenic acid (D) Timnodonic acid
038. The gain in body weight (gm) per gram of protein ingested is known as  
 (A) Net protein utilization (B) Protein efficiency ratio  
 (C) Diagestibility coefficient (D) Biological value of protein
039. A child has accidentally ingested a chemical and has presented with high fever. The chemical is known to affect ATP formation in electron transport chain, which out of the followings could cause the similar manifestation  
 (A) Cyanide (B) Malonate  
 (C) 2,4 dinitrophenol (D) Rotenone
040. Which of the following vitamin is not a part of electron transport chain  
 (A) Nicotinamide (B) Ubiquinone  
 (C) Biotin (D) Riboflavin
041. The phosphate : oxygen ratio is defined as  
 (A) The moles of phosphate consumed divided by moles of oxygen consumed  
 (B) The moles of ATP formed divided by the milligrams of proteins  
 (C) The moles of CO<sub>2</sub> produced divided by moles of O<sub>2</sub> consumed  
 (D) The moles of ATP synthesised divided by the atom equivalents of O<sub>2</sub> consumed
042. Which of the following statement describing cytochrome oxidase is true?  
 (A) It is inhibited by copper  
 (B) It is also known as cytochrome b  
 (C) It transfers electrons from CoQ to cytochrome b  
 (D) It transfers 4 electrons and 4 protons to form H<sub>2</sub>O molecule
043. Differences between aerobic and anaerobic dehydrogenases are all EXCEPT:  
 (A) Aerobic dehydrogenases can react directly with oxygen  
 (B) Anaerobic dehydrogenases transfer hydrogen / electron to NAD which is oxidised in ETC  
 (C) Aerobic dehydrogenases produce H<sub>2</sub>O<sub>2</sub>, which is catabolised by catalase  
 (D) None of the above

044. A 32- year female working in a laboratory consumed cyanide and was rushed to hospital. She was declared dead upon reaching the hospital. Cyanide is a known inhibitor of Electron Transport chain (ETC). Which complex of ETC might have been inhibited?
- (A) Complex I (B) Complex II  
(C) Complex III (D) Complex IV
045. The enzymes of mitochondrial matrix include all except
- (A) Enzymes of fatty acid oxidation (B) Creatine kinase  
(C) Enzymes of TCA cycle (D) Pyruvate Dehydrogenase complex
046. Lumirhodopsin is stable only at temperature below
- (A)  $-10^{\circ}\text{C}$  (B)  $-20^{\circ}\text{C}$   
(C)  $-40^{\circ}\text{C}$  (D)  $-50^{\circ}\text{C}$
047. Thiamin deficiency causes decreased energy production because
- (A) It is required for process of transamination  
(B) It is a cofactor in oxidative reduction  
(C) It is a coenzyme for transketolase in pentose phosphate pathway  
(D) It is a coenzyme for pyruvate dehydrogenase and alpha ketoglutarate dehydrogenase
048. Which one of the following statement concerning Vitamin B12 is correct
- (A) The cofactor form is VitaminB12 itself  
(B) It is involved in the transfer of amino groups  
(C) It requires specific glycoprotein for its absorption  
(D) It is present in plant product
049. Retinol is transported in blood bound to
- (A) Aporetinol binding protein (B)  $\alpha_2$ -Globulin  
(C)  $\beta$ -Globulin (D) Albumin
050. Nyctalopia is
- (A) Drying of eyes (B) Destruction of cornea  
(C) Blindness (D) Inability to see in dimlight
051. Electrons from pyruvic acid enter the mitochondrial electron transport chain at
- (A) NADH-Q reductase (B) Coenzyme Q  
(C)  $\text{QH}_2$ - cytochrome c reductase (D) cytochrome c reductase
052. Which one of the following enzymes catalyzes substrate level phosphorylation in TCA cycle
- (A) Malate dehydrogenase (B) Succinate Thiokinase  
(C) Succinate dehydrogenase (D) Alpha keto glutarate dehydrogenasecomplex
053. The chemiosmotic theory is a concept that \_\_\_\_\_
- (A) the transport of  $\text{Na}^+$  and  $\text{K}^+$  across cell membranes is by active transport  
(B) explains how transport by facilitated diffusion reaches a saturation limit  
(C) a proton gradient that drives the formation of ATP  
(D) explains the blood-brain barrier

054. At one time the uncoupler 2,4-dinitrophenol was used as a weight reducing drug. Its side-effects, including death, resulted in its discontinued use. How could this drug cause weight loss?
- (A) The uncoupler is an allosteric activator of ATP synthase. This increases the rate of translocation of H<sup>+</sup> and the oxidation of fuels, including fats.
- (B) The uncoupler allows the oxidation of fats from adipose tissue without the production of ATP. This allows the oxidation to proceed continuously and use up the fats.
- (C) The uncoupler inhibits the transport of pyruvate into the matrix of the mitochondria. Fats are then degraded to glycerol and subsequently to pyruvate to provide the necessary energy. Thereby depleting fat stores.
- (D) The uncoupler causes ATP to be produced at a much higher rate than normal and this causes weight loss.
055. Which of the following is not a hemoprotein?
- (A) Catalase (B) Peroxidase
- (C) Ubiquinone (D) Cytochrome C
056. Which one of the following statements concern Vitamin D is correct
- (A) Chronic renal failure requires the oral administration of 1,25 Dihydroxycholecalciferol
- (B) It is required in the diet of individuals expose to sunlight 25 - hydroxycholecalciferol is the active form of Vitamin D
- (C) Vitamin D opposes the effect of Parathyroid hormon
- (D) None of the above
057. The enzyme  $\delta$ -aminolevulinate dehydratase contains
- (A) Zinc (B) Manganese
- (C) Magnesium (D) Calcium
058. Selenium is a cofactor in the following enzyme
- (A) Giutathion peroxidase (B) Cytochrome oxidase
- (C) Cytochrom reductase (D) Xanthine Oxidase
059. Fasting samples give lower values than post prandial samples for all parameter except
- (A) Glucose  (B) Phosphate
- (C) Triglyceride (D) Cholesterol
060. Parathyroid hormone regulates calcium homeostasis all the mechanism EXCEPT:
- (A) bone resorption
- (B) secretion of Calcitonin
- (C) increase absorption of calcium from intestine
- (D) increased reabsorption from renal tubules
061. What feature of cytochromes makes them valuable in electron transport systems?
- (A) aspartate residues in the active site (B) the multiple  $\alpha$ -helices
- (C) the porphyrin ring  (D) the iron ion
062. Vitamin required for the conversion of p-hydroxyphenylpyruvate to homogentisate is?
- (A) Folacin (B) Cobalamin
- (C) Ascorbic acid  (D) Niacin
063. Arsenite inhibits the reaction catalyzed by?
- (A)  $\alpha$  keto glutarate dehydrogenase (B) Aconitase
- (C) Isocitrate dehydrogenase (D) Succinate dehydrogenase

064. Death due to cyanide poisoning is a result of  
 (A) Cyanide hemoglobin complex formation  
 (B) Cyanide inhibits complex I of respiratory chain  
 (C) Cyanide inhibiting cytochrome oxidase  
 (D) Cyanide blocking oxygen transport in blood.
065. The energy yield during the conversion of succinate to Fumarate is?  
 (A) 2ATP (B) 1ATP  
 (C) 3ATP (D) No ATP
066. Which of the following is not true regarding ATP synthesis?  
 (A) ATP is formed by phosphorylation of ADP  
 (B) proton gradient is dissipated  
 (C) Oxidation is coupled to phosphorylation  
 (D) inner membrane pores are opened to release ATP
067. Which of the electron carriers is soluble and mobile ?  
 (A) CoQ (B) Cytochrome c  
 (C) Cytochrome A (D) Cytochrome b
068. In an enzyme assay, the substrate concentration is lower than the  $K_m$ , then the rate is  
 (A) Independent of enzyme concentration  
 (B) Independent of temperature  
 (C) Proportionate to the substrate concentration  
 (D) Approx. equal to  $V_{max}$
069. All of the following are Commonly analyzed in electrolyte profile EXCEPT:  
 (A)  $Mg^{++}$  (B)  $K^+$   
 (C)  $Na^+$  (D)  $HCO_3^-$
070. The inhibitor increases the  $K_m$  and its effect can be reversed by increasing the substrate concentration. Which of the following is an example of competitive enzyme inhibition?  
 (A) Effect of cyanide (B) Inhibition of glycolysis by fluoride  
 (C) Arresting cell division by methotrexate (D) Toxic effect of arsenate
071. All the following vitamins play key role in citric acid cycle EXCEPT :  
 (A) Riboflavin (B) Niacin  
 (C) Pantothenic acid  (D) Pyridoxine
072. Which of the following is the cause of Hypomagnesemia?  
 (A) Renal failure (B) Excessive oral intake of antacid  
 (C) Lithium ingestion  (D) Diabetes Mellitus
073. Marker for Bone formation is  
 (A) Hydroxy pro line (B) Osteocalcin  
 (C) Free Deoxypyridinoline  (D) None of the above
074. All the following will lead to lactic acidosis EXCEPT :  
 (A) Arsenite toxicity (B) Thiamin deficiency  
 (C) Chronic alcoholism  (D) Pyruvate kinase deficiency

075. All of the following are causes of Hypervolemic Hyponatremia  
 (A) Hospital Patients receiving sodium bicarbonate  
 (B) Cushing's syndrome  
 (C) Hyperaldosteronism  
 (D) Sickle cell anemia
076. Which of the following will lead to accumulation of Glycogen in lysosomes?  
 (A) Her's disease  (B) Pompe's disease  
 (C) Anderson's disease (D) Tarui's disease
077. All the following are decreased in liver cirrhosis EXCEPT :  
 (A) Transthyretin (B)  $\alpha_1$  antitrypsin  
 (C) IgA (D) Ceruloplasmin
078. All the above glands secrete antagonist hormones of Insulin EXCEPT  
 (A) Anterior Pituitary (B) Pancreas  
 (C) Adrenal Medulla  (D) Posterior pituitary
079. Which of the following is the cause of Hyperkalemia  
 (A) Carbenicillin  (B) Triamterene  
 (C) Amphotericin (D) None of the above
080. Eating unripe fruit of Akee tree causes  
 (A) Jamaican vomiting sickness (B) Dicarboxylic aciduria  
 (C) Zellweger's syndrome (D) None of the above
081. Which of the following is the cause Respiratory Alkalosis:  
 (A) Severe status Asthmaticus (B) Severe Pulmonary infections  
 (C) Pulmonary fibrosis  (D) Pneumonia
082. X linked recessive lipid storage disease with symptoms of skin rash, kidney failure has deficiency of:  
 (A) Hexosaminidase A (B) Arylsulfatase A  
 (C)  $\beta$  Galactosidase  (D)  $\alpha$  Galactosidase
083. Fill in the blank ;The main role of \_\_\_\_\_ in humans is to suppress appetite  
 (A) Adiponectin (B) Caffeine  
 (C) Perilipin  (D) Leptin
084. Cause of Metabolic acidosis with high anion gap and symptoms of optic papillitis is  
 (A) Methanol (B) Isoniazid  
 (C) Iron (D) Ischemia
085. Which of the following Metabolites will be elevated in blood plasma after 24 hrs of fast?  
 (A) Glucose (B) Glycogen  
 (C) Ketone bodies  (D) Non esterified fatty acids
086. All of the following are actions of Parathyroid Hormone EXCEPT :  
 (A) Stimulates Intestinal absorption of Calcium and Phosphate  
 (B) Increase Calcium reabsorption in the distal convoluted tubule  
 (C) Decreases reabsorption of phosphate  
 (D) Stimulates  $\text{Na}^+\text{-H}^+$  Antipporter activity

087. Which of the following drug reduces cholesterol levels by inhibiting the absorption of cholesterol by the intestine?
- (A) Ezetimibe (B) Pravastatin  
(C) Clofibrate (D) Nicotin
088. Fill in the blank \_\_\_\_\_ coupled with gas and liquid chromatographs result in versatile analytical instruments.
- (A) Mass Spectrometers (B) Spectrophotometers  
(C) Atomic absorption spectrophotometers (D) Flow cytometers
089. N-acetyl Neuraminic acid is a
- (A) Sugar acid (B) Amino sugar acid  
(C) Amino sugar (D) Sugar alcohol
090. Richner-Hanhert syndrome is defect in :
- (A) Fumaryl acetoacetate hydrolase (B) Homogentisate oxidase  
(C) Tyrosine aminotransferase (D) Phenylalanine hydroxylase
091. Which of the following mucopolysaccharides is non-sulfated and most abundant in tissues
- (A) Hyaluronic acid (B) Keratan sulfate  
(C) Heparin (D) Dermatan sulfate
092. Porphyria with which enzyme defect lack the symptom of photosensitivity
- (A) Uroporphyrinogen I synthase (B) Uroporphyrinogen III synthase  
(C) Uroporphyrinogen decarboxylase (D) Coproporphyrinogen oxidase
093. Sorbitol and Mannitol are
- (A) Optical Isomers (B) Anomers  
(C) Stereo-isomers (D) Epimers
094. In 100 ml plasma approximately \_\_\_\_\_ Bilirubin can be tightly bound to albumin at high affinity rate
- (A) 25 (B) 35  
(C) 45 (D) 65
095. Which of the following is not a function of nucleotides
- (A) Nucleic acid monomer (B) Ribozyme  
(C) Energy carrier molecule (D) Receptors
096.  $\delta$  bilirubin is
- (A) Unconjugated bilirubin bound with albumin  
(B) Unconjugated bilirubin not bound with albumin  
(C) Conjugated bilirubin not bound with albumin  
(D) Conjugated bilirubin bound with albumin
097. Which of the following is not a characteristic of nucleotide bases
- (A) Planar (B) Heterocyclic  
(C) Aliphatic (D) Ubiquitous
098. Fill in the blank ; Reappearance of \_\_\_\_\_ in urine is the sign of recovery in Hepatocellular jaundice.
- (A) Bilirubin (B) Biliverdin  
(C) Urobilin (D) Urobilinogen

099. In a diploid organism with 30,000 bases, haploid genome contains 23% "A" residues. What is the number of G residues in the genome of organism?  
 (A) 16000 (B) 16200  
 (C) 16500 (D) 14200
100. 6 mercaptourine and mycophenolic acid inhibit the reaction catalyzed by \_\_\_\_\_ :  
 (A) Adenylosuccinase (B) Transaminidase  
 (C) Adenylosuccinate synthase (D) IMP (Inosine Monophosphate dehydrogenase)
101. What makes water a liquid at room temperature  
 (A) Hydrogen bonds between water molecules  
 (B) Covalent bonding  
 (C) Non covalent interaction  
 (D) Vanderwall forces of attraction
102. Defect in which enzyme of nucleotide metabolism is associated with toxicity to 5 Flurouracil?  
 (A) Dihydropyrimidine dehydrogenase  
 (B) Orotate Phosphoribosyl transferase  
 (C) Orotidylic acid decarboxylase  
 (D) Purine nucleoside Phosphorylase
103. Which of the following fatty acid has least melting point  
 (A) Palmitic acid (B) Stearic acid  
 (C) Arachidonic acid (D) Timnodonic acid
104. All the patients with favism has \_\_\_\_\_ deficiency  
 (A) Glucose 6 Phosphate dehydrogenase  
 (B) Glycogen synthase  
 (C) Glyceraldehyde 3 Phosphate dehydrogenase  
 (D) Glucose 6 Phosphatase
105. Which of the following is false about fatty acids  
 (A) Melting point of fatty acids decreases with increase in degree of saturation  
 (B) Lipids in tissues that are subjected to cooling are more unsaturated  
 (C) Naturally occurring unsaturated long chain fatty acids are nearly Trans-configuration  
 (D) The membrane lipids contain mostly un-saturated fatty acids
106. Acquired secondary carnitine deficiency can be associated with following drug ?  
 (A) Primaquine (B) Sulfa drugs  
 (C) Barbiturates (D) Valproic acid
107. An example of glycerophospholipid involved in cell signalling  
 (A) Cardiolipin (B) Phosphatidic acid  
 (C) Phosphatidyl choline (D) Phosphatidyl inositol
108. Wrinkled tissue paper appearance of the cytosol is seen in \_\_\_\_\_.  
 (A) Tay sachs disease (B) Farber disease  
 (C) Gaucher disease (D) Fabry disease

109. Which of the following does not possess quaternary structure  
 (A) Myoglobin (B) Lactate dehydrogenase  
 (C) Immunoglobulin M (D) Creatine phosphokinase
110. Apo(a) is structurally homologous to:  
 (A) Plasminogen (B) Thrombin  
 (C) Calcium (D) None of the above
111. Which out of the following is peptide antibiotic  
 (A) Erythromycin  (B) Gramicidin  
 (C) Ciprofloxacin (D) Tetracyclin
112. Incretins are secreted by  
 (A) Pancreas (B) Anterior pituitary gland  
 (C) Intestine (D) Posterior pituitary gland
113. Chose the anticancer peptide among the following  
 (A) Bleomycin (B) Methotrexate  
 (C) Cytosinarabioside (D) Dideoxy inosine
114. Changes occurring in liver in postabsorptive state are all EXCEPT  
 (A) Phosphorylation of phosphorylase kinase  
 (B) Dephosphorylation of Glycogen synthase  
 (C) Dephosphorylation of pyruvate kinase  
 (D) None of the above
115. Choose the incorrect statement about anion gap out of the following  
 (A) In lactic acidosis, anion gap is increased  
 (B) Anion gap is decreased in Hypercalcemia  
 (C) Anion gap is decreased in Lithium toxicity  
 (D) Anion gap is decreased in ketoacidosis
116. In late fasting 50% gluconeogenesis occur in \_\_\_\_\_ of  
 (A) Liver (B) Muscle  
 (C) Heart  (D) Kidney
117. Excessive citrate in transfused blood can cause which of the following abnormality  
 (A) Metabolic alkalosis (B) Metabolic acidosis  
 (C) Respiratory alkalosis (D) Respiratory acidosis
118. Which of the following Urea cycle disorder is X linked ?  
 (A) Arginase (B) Carbamoyl Phosphate synthetase 1  
 (C) Arginosuccinate lyase  (D) Ornithine transcarbamoylase
119. All of the following are applications of nanotechnology and microtechnology EXCEPT:  
 (A) Drug discovery (B) Environmental monitoring  
 (C) Genomics  (D) None of the above
120. Which of the following is INCORRECT statement?  
 (A) Oligomycin binds to  $F_0$  domain of ATP synthase  
 (B) Uncoupling proteins occur in the mitochondrial matrix  
 (C) 2,4 dinitrophenol is lipophilic proton carrier  
 (D) None of the above

121. All of the following are characteristics of Point of care testing EXCEPT:  
 (A) Flexible test menus (B) Built in regulatory record keeping  
 (C) First results in a short time (D) High Instrument cost
122. Insulin inhibits all of the following enzymes EXCEPT:  
 (A) Transaminases (B) Ornithine transcarbamoylase  
 (C) Hormone sensitive lipase (D) RNA polymerase
123. Which of the following statement is INCORRECT ?  
 (A) Isotachopheresis is used to separate small anions and cations  
 (B) Isoelectric focusing electrophoresis is widely used in neonatal screening programs  
 (C) Pulsed field Electrophoresis is applied to typing various strains of bacterial DNA  
 (D) None of the above
124. Serum triglycerides are increased in all of the conditions EXCEPT:  
 (A) Pregnancy (B) Oral contraceptives  
 (C) Biliary obstruction (D) Alcoholism
125. True regarding Wobble's Hypothesis is  
 (A) Mismatch pairing could be seen at 3' end of anticodon  
 (B) Mismatch pairing could be seen at 5' end of anticodon  
 (C) Mismatch pairing could be seen at 3' end of Codon  
 (D) None of the above
126. PEST sequence which gives the message for protein breakdown is rich in all EXCEPT :  
 (A) Threonine (B) Glutamate  
 (C) Serine (D) Phenylalanine
127. Which of the following is included in Garrod's tetrad  
 (A) Phenylketonuria (B) Albinism  
 (C) Lysinuria (D) All of the above
128. Landenson's recommende delta check limit based on three days interval for Total bilirubin is  
 (A) 20% (B) 5%  
 (C) 30% (D) 50%
129. All of the following are causes of Hyperuricemia EXCEPT:  
 (A) Lead poisoning (B) Preeclampsia  
 (C) Psoriasis (D) Severe hepatocellular disease
130. Which of the following hormone has the longest half life as compared to others :  
 (A) Epinephrine (B) Thyroxine  
 (C) Insulin (D) ACTH
131. Which of the following is the most sensitive indicator of uncomplicated iron deficiency  
 (A) Ferritin (B) Iron  
 (C) RBC size (D) Hb concentration
132. Which of the following is CORRECT regarding hemoglobinopathies?  
 (A) Most common single gene disorder in the world  
 (B) Structural Hb variants  
 (C) Arise from the mutation in the globin chains  
 (D) All of the above

133. Which of the following toxicity will produce Porphyrria like symptoms?  
 (A) Lead  (B) Mercury  
 (C) Iron  (D) Copper
134. Reperfusion injury associated with all of the following EXCEPT:  
 (A) Membrane and microvascular damage  
 (B) Cell necrosis  
 (C) Increased intracellular high energy phosphates  
 (D) Arrhythmias
135. All of the following Gastrointestinal regulatory peptides are located in stomach EXCEPT:  
 (A) Ghrelin  (B) Leptin  
 (C) Somatostatin  (D) Neurotensin
136. All of the following are Causes of Prolactin elevation EXCEPT:  
 (A) Chronic renal failure  (B) Phenothiazines  
 (C) Tricyclic antidepressants  (D) None of the above
137. Which of the following is known to induce pseudo Cushing's syndrome  
 (A) Pheochromocytoma  (B) Psychosis  
 (C) Alcohol abuse  (D) None of the above
138. Detectable concentrations of TPOAb are observed in all the following patients EXCEPT:  
 (A) Idiopathic myxedema  (B) Grave's disease  
 (C) Type I diabetes mellitus  (D) Type II diabetes mellitus
139. Fill in the blank: Test for monoclonality were originally developed using the \_\_\_\_\_ methodology, which remains the gold standard for specificity for detection of clonal ity throughout a broad range of lymphoid malignancy  
 (A) Southern Blotting Hybridization  (B) Northern Blotting  
 (C) Western Blotting  (D) Immunoelectrophoresis
140. Which of the following DNA typing system is NOT PCR Based?  
 (A) STRs  (B) mtDNA  
 (C) RFLP analysis of VNTRs  (D) Studying gene expression in tumours
141. Ethical Issue/s associated with Presymptomatic DNA testing for Hereditary disease is/are  
 (A) Patient must be the 16 years of age  
 (B) Psychiatric assessment is done after testing  
 (C) Both (A) and (B)  
 (D) None of the above
142. All of the following are applications of microarray technique EXCEPT:  
 (A) Diagnosis of genetic diseases  (B) Pharmacogenetic testing for mutation  
 (C) Paternity testing  (D) Studying gene expression in tumours
143. All of the following are correct statement regarding Real Time PCR EXCEPT:  
 (A) dynamic hybridization assays  
 (B) data collected at a single point  
 (C) the data obtained provide information on sequence of the nucleic acid sample  
 (D) if target DNA is present the fluorescence increases

144. The richest source of dietary iron for Indian diet is  
(A) Jaggery (B) Rice  
(C) Moringa (D) All of the above
145. Fluid requirement in a normal adult per day is  
(A) 20 ml/kg body weight (B) 30 ml/kg body weight  
(C) 40 ml/kg body weight (D) 50 ml/kg body weight
146. What is not true about Trolox  
(A) It is water soluble  
(B) It is an analogue of vitamin E  
(C) Trolox can be derived from natural sources  
(D) It measures total antioxidant activities
147. Which is not true about vitamin A  
(A) 25% of vitamin A requirement is provided by preformed retinol and 75% by carotenoids  
(B) Pre-formed retinol is retinyl ester  
(C) 2 lakh IU vitamin A supplementation is given at the age of 1.5 years  
(D) Carotenoids are absorbed into duodenal mucosal cells
148. Dye used for staining ferric ion in the marrow is  
(A) Lugol's iodine (B) Coomassie stain  
(C) Giemsa stain (D) Perl's Prussian blue
149. What is true about TPN out of the following  
(A) Non-essential amino acids are supplemented  
(B) Fat administration is avoided due to fear of hyperlipidaemia  
(C) TPN is required for diabetes management  
(D) 6-10 mmol potassium is administered
150. Mitochondrial DNA is a  
(A) Simple, single stranded linear DNA molecule  
(B) Simple, single stranded circular DNA molecule  
(C) Simple, double stranded linear DNA molecule  
(D) Simple, double stranded circular DNA molecule
151. Which is not true regarding vitamin B12  
(A) Vitamin B12 deficiency leads to pernicious anemia.  
(B) Vitamin B12 deficiency can be distinguished from folic acid deficiency by sub-acute combined degeneration of spinal cord  
(C) Schilling test is done to diagnose vitamin B12 deficiency.  
(D) Pernicious anemia gives rise to vitamin B12 deficiency
152. Ferritin assay can be used for all except  
(A) Telogenic Alopecia (B) Leukaemia  
(C) Diabetes mellitus (D) None of the above
153. Rumack-Matthew nomogram is related to  
(A) Acid-base balance (B) Acetaminophen poisoning  
(C) Alcoholic acidosis (D) Cyanide poisoning

154. Vitamin A prophylaxis is begun with measles vaccine at 9 months of age, because —  
(A) Easy to access the babies  
 (B) Susceptibility to the disease increases  
(C) Vitamin A provides local immunity to the vaccine-induced respiratory tract infection  
(D) All of the above
155. Which one of the following is true regarding obesity?  
(A) BMI >25 Kg/m<sup>2</sup> is considered obesity in Indian population as per ICMR guidelines  
(B) BMI >23 Kg/m<sup>2</sup> is considered obese in Indian population as per ICMR guidelines  
(C) BMI is the best indicator for measuring obesity  
 (D) Truncal obesity leads to breast cancer in women
156. Matrix assisted laser desorption ionization (MALDI) spectrophotometry is used for analysis of  
(A) Small biological molecules  (B) complex molecules such as proteins  
(C) Minerals (D) Amino acids
157. The applications of Tandem Mass Spectrometry (MS-MS) include all except  
(A) drug screening (B) pesticides analysis  
(C) pollutants analysis  (D) Nucleotides analysis
158. In mass spectrometer, the sample that has to be analysed is bombarded with which of the following?  
(A) Protons  (B) Electrons  
(C) Neutrons (D) Alpha particles
159. Which of the following is not a limitation of Beer Lambert's law, which gives the relation between absorption, thickness, and concentration?  
(A) Pheochromocytoma Concentration must be lower  
 (B) Radiation must have higher bandwidth  
(C) Radiation source must be monochromatic  
(D) Does not consider factors other than thickness and concentration that affect absorbance
160. Atomic absorption spectrophotometry is used widely in clinical laboratories to measure elements such as all except  
(A) Blood aluminum (B) Serum calcium  
 (C) Urine copper (D) Blood lead levels
161. In an enzyme assay, the substrate concentration is lower than the K<sub>m</sub>, then the rate is:  
(A) Independent of enzyme conc  
(B) Independent of temperature  
 (C) Proportionate to the substrate concentration  
(D) Approx. equal to V<sub>max</sub>
162. The inhibitor increases the K<sub>m</sub> and its effect can be reversed by increasing the substrate concentration. Which of the following is an example of competitive enzyme inhibition?  
(A) Effect of cyanide (B) Inhibition of glycolysis by fluoride  
 (C) Arresting cell division by methotrexate (D) Toxic effect of arsenate

163. Which of the following is/are true about “Mechanism-based” inhibitors?
- (A) These are suicide inhibitors which are not substrate analogues but contain a chemical group that can be transformed by catalytic action of target enzyme.
- (B) These are enzyme specific and unreactive outside the confines of enzyme’s active site.
- (C) After binding to the active site, catalytic action of enzyme generates a highly reactive group that forms an ionic bond to, and temporarily blocks the function of a catalytically essential residue.
- (D) After binding to the active site, catalytic action of enzyme generates a highly reactive group that forms a covalent bond to, and blocks the function of a catalytically essential residue.
164. Time Relationships of Fluorescence Emission : The time required for a molecule to absorb radiant energy and to be promoted to an excited state is approximately
- (A)  $10^{-15}$ s (B)  $10^{-12}$ s
- (C)  $10^{-6}$ s (D)  $10^{-7}$ s
165. Gravimetry: The process of measuring the
- (A) mass (weight) of a substance (B) Charge of a substance
- (C) Gravity of a substance (D) Dimensions of a substance
166. Chemiluminescence is type of luminescence in which the excitation event is caused by a
- (A) Cellular Oxidation of substrate by enzyme
- (B) Biochemical
- (C) Electrochemical
- (D) None of the above
167. Stains used for serum protein in general electrophoresis are all except
- (A) Amido Black B  (B) Sudan Black B
- (C) Ponceau S (D) Coomassie Blue
168. Endosmosis or electroendosmotic flow in electrophoresis will explain the band position of
- (A) Albumin  (B) Gamma Globulin
- (C)  $\alpha$ 1 Proteins (D) Prebeta lipoproteins
169. Thin Layer Chromatography is called as high performance thin layer chromatography when particle size is less than
- (A) 3.5  $\mu$ m  (B) 4.5  $\mu$ m
- (C) 5.5  $\mu$ m (D) 6.5  $\mu$ m
170. Which of the following is not a feature of carrier gas used in gas chromatography?
- (A) It must be chemically inert
- (B) It should be suitable for the detector employed
- (C) It should not be completely pure
- (D) It should be cheap
171. Microarray generally contains
- (A) 1,000 to 5,000 genes in a gene chip (B) 5,000 to 10,000 genes in a gene chip
- (C) 5,000 to 20,000 genes in a gene chip (D) 20,000 to 30,000 genes in a gene chip
172. Enzyme used in Reverse Transcriptase PCR (RT-PCR) is
- (A) Taq polymerase  (B) Tth polymerase
- (C) Endonuclease (D) Ribonuclease

173. Which of the following statements is/are true about association of Cofactors with enzymes?  
 (A) Cofactors are tightly integrated into enzyme's structure  
 (B) Cofactors bind irreversibly to the enzyme  
 (C) Cofactors bind reversibly to the enzyme  
 (D) Cofactors serve as substrate shuttles for the enzymes
174. Which of the following enzymes does not belongs to aspartic protease family?  
 (A) Pepsin  (B) Chymotrypsin  
 (C) HIV protease (D) Lysosomalcathepsins
175. Fructose-2,6 - bisphosphatase illustrate which type of catalysis?  
 (A) Acid-Base catalysis (B) Catalysis by proximity  
 (C) Catalysis by Strain  (D) Covalent catalysis
176. Which of the following statements is false with regard to liver diseases?  
 (A) In viral hepatitis alanine aminotransferase level is moderately increased.  
 (B) In primary hepatomas aspartate aminotransferase level is markedly increased.  
 (C) In cirrhosis acid phosphatase level is markedly increased.  
 (D) In obstructive jaundice alkaline phosphatase level is increased
177. All are true about isoenzymes of alkaline phosphatase, *except*  
 (A) Alpha-2 variety is inhibited by phenyl alanine.  
 (B) Out of 6 isoenzymes the Regan isoenzyme is heat stable.  
 (C) Bone alkaline phosphatase (BAP), a heat labile fraction is used as a marker of metabolic bone disease.  
 (D) Regan isoenzyme is seen in lung and liver carcinoma.
178. All of the below are examples of non-competitive inhibition, *except*  
 (A) Disulfiram (B) BAL (British anti Lewesite)  
 (C) Aspirin (D) Heavy metal ions
179. A competitive inhibitor of an enzyme has which of the following properties?  
 (A) It can bind with ES complex  
 (B) It is frequently a feedback inhibitor  
 (C) It interferes with substrate binding to the enzyme  
 (D) It decreases the  $V_{max}$  and increases  $K_{max}$
180. Rise in which of the following serum non-enzymatic markers occur within 4 hrs after the onset of acute myocardial infarction?  
 (A) CTT (B) Myoglobin  
 (C) CT1 (D) G-GTP
181. After administration of Succinylcholine to the patient by the anaesthetist the patient underwent prolonged apnoea. What may be the possible reason for this?  
 (A) Cholinesterase deficiency (B) Peripheral neuropathy  
 (C) Pseudocholinesterase deficiency (D) Myasthenia gravis

182. Which of the following statements is incorrect about LDH?
- (A) Hemolysed samples should not be assayed for LDH as RBC's are rich in LDH.  
**(B)** In acute myocardial infarction S-LDH rises within 8hrs of onset and persists for more than 1 week.  
(C) In cases of breast carcinoma and prostatic carcinoma an increase in LDH-5 isoenzyme is seen.  
(D) LDH catalyses the reversible conversion of pyruvic acid and lactic acid.
183. Examples of competitive inhibitors given below are all, *except*:
- (A) Allopurinol (B) Sulphonamide  
**(C)** Flouride (D) Oseltamivir
184. All of the following are not a folate antagonist in eukaryotes, *except*
- (A) Trimethoprim (B) Sulphanilamide  
(C) Azaserine **(D)** Amethopterine
185. In a patient suspected of acute hemorrhagic pancreatitis, the most useful test for early diagnosis is:
- (A) Urinary lipase (B) Serum lipase  
(C) Urinary amylase **(D)** Serum amylase
186. For differentiating the elevated serum ALP found in obstructive jaundice as well as bone disorders which of the following enzyme estimation will be helpful?
- (A) Serum LDH (B) Serum ALT  
**(C)** Serum GGT (D) All of the above
187. All of the below listed enzymes are used for diagnostic purpose, *except*:
- (A) Urease (B) Hexokinase  
**(C)** Pancreatin (D) Reverse transcriptase
188. Chloride ion is required as an activator for which enzyme?
- (A) Trypsin (B) Elastin  
**(C)** Amylase (D) Lipase
189. Which of the following is the best diagnostic marker for myocardial infarction?
- (A) Cardiac troponin I (B) Cardiac troponin T  
**(C)** CK-MB (D) High sensitive TnT
190. A study was conducted to assess the extrapyramidal side effects of a new antipsychotic drug in patients with schizophrenia. Many of these patients were smokers and some of them were on anticholinergic drugs. What was the role of the anticholinergic drugs in this study?
- (A) Confounder (B) Random Variable  
**(C)** Effect Modifier (D) Independent Variable
191. The policy makers want to know whether introduction of a new rotavirus vaccine in the national immunization program is resulting in reduction of morbidity and mortality from rotavirus disease. Which of the following studies will they have to conduct to find an answer?
- (A) Case-control study (B) Ecological study  
**(C)** Field randomized trial (D) Case-series

192. Which of the following statement is incorrect about a good research question?
- (A) Research question should advance scientific knowledge, improve practice, influence policy  
 (B) Research question should be approved by the ethics committee  
 (C) Research question should confirm, refute or extend previous findings  
 (D) Feasibility should not be a criterion while developing research question
193. All the following are characteristic of good research hypothesis EXCEPT
- (A) Research hypothesis should be simple  
 (B) Research hypothesis should be devoid of any ambiguity about study participants and variables  
 (C) Research hypothesis should be focused on primary objective  
 (D) Research hypothesis should be written once the study is completed
194. All the following are components of 'FINER' criteria for a research question EXCEPT
- (A) Feasible (B) Reliable  
 (C) Novel (D) Ethical
195. All the following about literature review is correct EXCEPT
- (A) It identifies lacunae in the existing knowledge about a topic  
 (B) It saves valuable time for a researcher  
 (C) It helps the researcher in arriving at the conclusion of the study  
 (D) It suggests the researcher about new research topics
196. What is the appropriate measure when a researcher wishes to know the burden of a particular disease in terms of the number of deaths it causes in a specified geographical region and population?
- (A) Incidence density (B) Case fatality  
 (C) Attack rate (D) Disease specific mortality
197. What is the appropriate epidemiologic measure to determine the severity of an acute disease?
- (A) Incidence rate (B) Prevalence  
 (C) Mortality rate (D) Case fatality ratio
198. Which of the following study design will be helpful if the department of health wants to know the burden of a particular disease?
- (A) Ecological study (B) Cross sectional survey  
 (C) Case series (D) Case report
199. Characteristic of a cross sectional study is that
- (A) We can calculate the incidence of a disease  
 (B) We can test hypotheses  
 (C) It is difficult to conduct  
 (D) Exposure and outcome are assessed at the same time
200. Exposure is assigned by the investigator in which of the following epidemiological study?
- (A) Case-control (B) Cross-sectional  
 (C) Experimental (D) Cohort