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प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No. | | | | | | | | |

प्रश्नपुस्तिका सीरीज
Question Booklet Series
C

M.Sc (Biotechnology) Third Semester, Examination, February/March-2022
MBT-3004
Enzymology and Enzyme Technology

Time : 1:30 Hours **Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : –

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही– सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. **इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमे से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET)में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वांइट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।**
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक–पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : – **प्रश्नपुस्तिका खोलने पर प्रथमतः जॉच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभॉति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।**

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1. The _____inhibition gives the following rate equation.

$$V = \frac{Vmax[s]}{km + [s]\{+\frac{I}{Ki}\}}$$

(A) Non-competitive

(B) Mixed

(C) Un-competitive

(D) Competitive

2. _____is an enzyme used to dissolve blood clots.

(A) Uricase

(B) Lysozyme

(C) Urokinase

(D) Asparginase

3. Which of the following is the best method for isolating enzymes form cell free extract?

(A) pH treatment

(B) Temperature treatment

(C) Chemical treatment

(D) Osmotic shock

4. Which of the following is not involved in covalent catalysis?

(A) Bases which catalyze the reaction by accepting a proton

(B) Electron rich nucleophilic function group of amino acid side chain

(C) Electron deficient electrophilic portion of substrate

(D) Acylated, phosphorylated or glycosylated enzyme nucleophile as covalent intermediate

5. If the physical accompanying the reaction is heat output, the biosensors are referred to as _____.

(A) Potentiometric biosensors

(B) Optical biosensors

(C) Calorimetric biosensors

(D) Amperometric biosensors

6. Which of the following is not a clinical condition associated with transaminases?

(A) Cardiac arrest

(B) Macroamylsemia

(C) Myocardial infarction

(D) Liver disease

7. Bromelain: Brewing industry:: Chymotrypsin: _____.

(A) Cheese making industry

(B) Leather industry

(C) Pharmaceutical industry

(D) Detergent industry

8. Which of the following is not true for isoenzymes?

(A) Regulation specific to distinct tissue and development stages

(B) Distinctive properties and patterns of metabolism to particular organ

(C) Regulatory metabolites are called effector or modulator or modifier

(D) Fine tuning of metabolism

9. Which of these factors is true for enzymes while controlling assays?

(A) Extreme high salt concentration can be tolerated

(B) pH (2-4) is suitable for maximum activity

(C) Macromolecular crowding does not alter the rates of the reaction

(D) Increase in substrate concentration leads to increase in the rate of reaction

10. 1 U = _____nanokatals.

(A) 16.67

(B) 3.14

(C) 9.8

(D) 273

11. Which of the following enzyme is used as therapeutic enzyme in treating allergies caused by penicillin?

(A) Rhodanase

(B) Uricase

(C) β - Lactamase

(D) Hyaluronidase

12. SI unit of enzyme activity is_____.

(A) mol

(B) m/s

(C) katal

(D) Newton

13. Which of the following precautions must not be followed while performing assays?

(A) The substrates, buffers etc., should be of high purity

(B) Enzyme preparation should as pure as possible

(C) The probe must be tiny and biocompatible

(D) Stability of the enzyme during the time taken by assay

14. Continuous assay: Glucose-6-phosphate dehydrogenase:: Luminescence method:_____.

(A) Hydrolases

(B) Bacterial luciferase

(C) Ornithine decarboxylase

(D) Glutamate decarboxylase

15. The change in absorbance is used as the basis for assaying enzymes using _____.

(A) Radio isotope method

(B) Luminescence method

(C) Biosensors

(D) Spectrophotometer

16. The method for determining molecular weight based on the size is_____.

(A) Mass spectrometry

(B) Ultracentrifugation

(C) Gel filtration

(D) Biosensor

17. In competitive inhibition, what happens to V_{max} and K_m if [I] = K_i?

(A) Lowers to 0.5 V_{max} and 0.5 K_m

(B) V_{max} is unchanged and K_m increases $2K_m$

(C) Lowers to 0.5 V_{max} and K_m remains unchanged

(D) Lowers to 0.67 V_{max} and K_m increases to $2K_m$

18. Where are non-microsomal enzymes present?

(A) In the Golgi apparatus

(B) Inside lysosomes

(C) In the cytoplasm in soluble form

(D) In oxysomes

19. What are the main function of P450?

(A) Oxidize steroids, fatty acids, and xenobiotics, and are important for the clearance of various compounds, as well as for hormone synthesis and breakdown

(B) Reduce steroids, fatty acids, and xenobiotics, and are important for the clearance of various compounds, as well as for hormone synthesis and breakdown

(C) Reduce steroids, fatty acids, and xenobiotics, and oxidize hormone

(D) Hydrolysis of hormones and xenobiotics and synthesis of steroids, fatty acids.

20. What is the unit of v_{max}?

(A) mmo1

(B) mo1/sec

(C) mo1

(D) mo1/hr

21. _____ is an enzyme, which is highly produced by egg white and lachrymal glands.

(A) Amylases

(B) Lysozyme

(C) Invertase

(D) Protease

22. What is the term 'K_m"?

(A) Concentration of the enzyme

(B) Concentration of the catalyst

(C) Concentration of the product

(D) Concentration of the substrate

23. Multiple form of the same enzyme is referred to as_____.

(A) Allosteric enzyme

(B) Biosensor

(C) Isoenzyme

(D) Effectors

24. Which of the following plot is also known as a double reciprocal plot?

(A) Line-weaver Burk plot

(B) Eadie-Hofstee plot

(C) Michaelis-Menten plot

(D) Langmuir plot

25. Which is the first step involved in chymotrypsin mediated peptide bond hydrolysis?

(A) Acylation

(B) Specific acid-base catalysis

(C) General acid-base catalysis

(D) Deacylation

26. In which of the following methods, the intensity of emitted light is used to study enzyme reaction?

(A) Discontinuous assay

(B) Luminescence method

(C) Biosensors

(D) Spectrophotometer

27. _____ involves substrates forming transient covalent bond with the residues present in the active site.

(A) Covalent catalysis

(B) Specific acid-base catalysis

(C) General acid-base catalysis

(D) Lock and key model

28. The study of rates of chemical reaction that are catalyzed by enzymes is referred to as _____.

(A) First order reaction kinetics

(B) Zero order reaction kinetics

(C) Chemical kinetics

(D) Enzyme kinetics

29. The class of enzymes which contains extensive group of enzymes are_____.

(A) Ligases

(B) Oxidoreductases

(C) Aldolases

(D) Esterases

30. Which of the oxidoreductases are involved in oxygen transfer form molecular oxygen?

(A) Peroxidases

(B) Oxidases

(C) Oxygenases

(D) Dehydrogenases

31. Which of the following is a systematic name given by enzyme commission?

(A) Renin

(B) Aspartate aminotransferase

(C) Glutathione synthetase

(D) D-xylose ketol-isomerase

32. The pH at which half the groups of a compound are ionized is referred to as _____.

(A) pK_a

(B) pI

(C) I

(D) K_m

33. Which of the following enzyme is not used in a brewery?

(A) α-amylase

(B) β-amylase

(C) Papain

(D) β-glucanase

34. The equation $t_{1/2}$=0.693/kd represent _____.

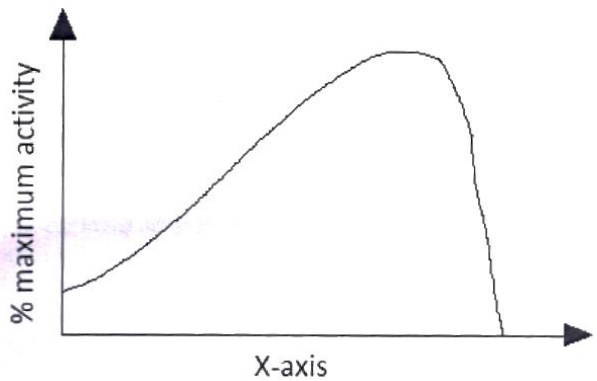
(A) Arrhenius equation

(B) Lineweaver Burk equation

(C) Half-life

(D) Gibbs-Helmholtz equation

35. The following graph represents the effect of _____ on activity of an enzyme catalyzed reaction.



(A) pH

(B) Incubation period

(C) Temperature

(D) Productivity

36. Which of the following clinical condition does not show increase of amylase concentration?

(A) Diabetic ketoacidosis

(B) Cardiac arrest

(C) Salivary gland disorders

(D) Ruptured ectopic pregnancy

37. The pH at which the net charge on the enzyme molecule is zero is called_____.

(A) pK_a

(B) Half-life

(C) Isoelectric point

(D) K_m

38. $V_{max}/v_0=K_m/[S_0]+1$ Equation is:

(A) Athel Cornish-Bowden

(B) Michaelis- Menten equation

(C) Eadie-Hofstee equation

(D) LB equation

39. Which of the following is not obtained from animal pancreas?

(A) Chymotrypsin

(B) Lipase

(C) Catalase

(D) Trypsin

40. An enzyme with a K_m of 5mM has a reaction rate of 100 mmo1/min at substrate concentration of 0.25 mmo1.What is the maximum reaction rate that this enzyme can achieve when its saturated with substrate?

(A) 2100

(B) 1500

(C) 1900

(D) 9000

41. Which of the following clinical conditions, the activity of creatine kinase is not seen?

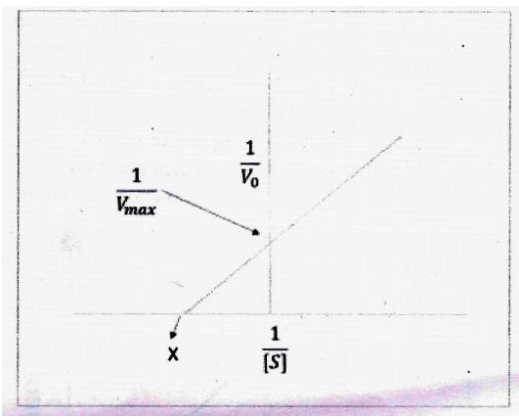
(A) Muscular dystrophy

(B) Muscle disease

(C) Pancreatitis

(D) Myocardial infarction

42. In the following plot, what does X represent?



(A) V_{max}

(B) K_m/V_{max}

(C) $-1/K_m$

(D) S_{max}

43. Which of the following equation is Hanes plot equation?

(A) $1/V_0=K_m/V_{max}.1/[S]+1/V_{max}$

(B) $V_0=V_{max}/[S]K_m+[S]$

(C) $V_0=K_m.V_0/S_0+V_{max}$

(D) $\frac{[S_0]}{v_0} = \frac{[S_0]}{V_{max}} + \frac{K_m}{V_{max}}$

44. Which of the following enzyme is used in the treatment of cancer?

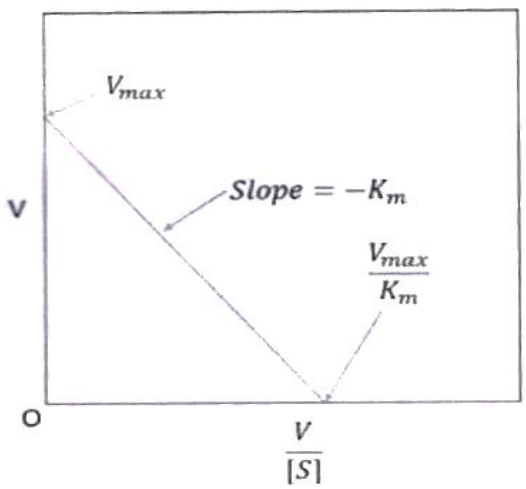
(A) Trypsin

(B) Lysozyme

(C) Asparginase

(D) Streptokinase

45. What does the following plot represents?



(A) Miachelis Menten plot

(B) Lineweaver Burk plot

(C) Eadie-Hosfstee plot

(D) Hanes plot

46. Proteolytic digestive enzymes which hydrolyze the peptide bond from the ends are referred to as _____.

(A) Proteinases

(B) Exopeptidases

(C) Endopeptidases

(D) Transaminase

47. Which of the following is termed as catalytic efficiency?

(A) K_{cat}

(B) K_m

(C) K_{cat}/K_m

(D) V_{max}

48. The catalytic efficiency of two distinct enzymes can be compared based on which of the following factor?

(A) K_m

(B) Product formation

(C) Size of the enzymes

(D) pH of optimum value

49. Acetylcholinesterase is found in_____.

(A) Saliva juice

(B) Pancreatic juice

(C) Matrix of synaptic cleft

(D) Tears

50. Which of the following is an example for irreversible inhibitor?

(A) Disulfiram

(B) Oseltamivir

(C) Protease inhibitors

(D) DIPF

51. The rate determining step of Michaelis-Menten kinetics is_____.

(A) The complex dissociation step to produce products

(B) The complex formation step

(C) The product formation step

(D) None of the mentioned

52. Which of the following enzyme hydrolyzes α – 1,4 linkages in starch and glycogen to yield maltase?

(A) Transaminase

(B) Proteinases

(C) α-amylase

(D) Chymotrypsin

53. Which of the following is the correct Line Weaver-Burk equation?

(A) $\frac{1}{v_0} = \frac{k_m}{V_{max}}.\frac{1}{[S_0]} + \frac{1}{[V_{max}]}$

(B) 1/Vmax=Km/V0[S]+1/V0

(C) V0=Vmax/[S]Km+[S]

(D) Vmax=V0/[S]Km+[S]

54. Which of the following is true about Michaelis-Menten kinetics?

(A) K_m, the Michaelis constant, is defined as that concentration of substrate at which enzyme is working at maximum velocity

(B) It describes single substrate enzymes

(C) K_m is defined as the concentration of substrate at which enzyme is working at half of maximum velocity.

(D) It assumes covalent binding occurs between enzyme and substrate

55. Name of the enzyme which catalyse:

$$\text{Sucrose} + H_2O \rightarrow \text{glucose} + \text{fructose}$$

(A) Sucrase

(B) Sucrose Hydrolase

(C) β- Fructofuranosidase

(D) β- Glucofuranosidase

56. Serine proteasesenzymes are so named because:

(A) They have a common catalytic mechanism characterized by the possession of a peculiarly reactive Ser residue that is essential for their enzymatic activity.

(B) They have a common catalytic mechanism characterized by the recognition of a peculiar Ser residue at the cleavage site.

(C) All serine proteases contain at least 10 Ser residue

(D) They hydrolyse Ser containing proteins only

57. Nanomaterials that display enzyme-like characteristics are known as:

(A) Abzymes

(B) Nanozymes

(C) DNAzymes

(D) Zymozymes

58. Ribonuclease catalyses the cleavage of the phosphodiester backbone of ribonucleic acids by a reaction involving transfer of a phosphate group form the:

(A) $5'$-position of one nucleotide to the $3'$-position of the next nucleotide in the chain

(B) $3'$-position of one nucleotide to the $5'$-position of the next nucleotide in the chain

(C) $5'$-position of one nucleotide to the $3'$-position of the same nucleotide in the chain

(D) $3'$-position of one nucleotide to the $5'$-position of the same nucleotide in the chain

59. An enzyme catalysed reaction is characterized by:

(A) Decreases ΔH, or ΔS more positive and lower the value of ΔG

(B) Increases ΔH or which makes ΔS less positive and lower the value of ΔG

(C) Increases ΔH or increase entropy and lower the value of ΔG

(D) None of the above

60. Oligomeric proteins consist of:

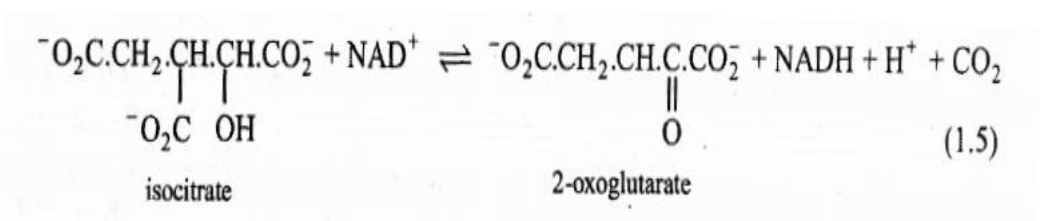
(A) Two or more polypeptide chains, which are usually linked to each other by covalent interactions.

(B) Two or more polypeptide chains, which are usually linked to each other by non-covalent interactions and never by peptide bonds.

(C) Two or more polypeptide chains, which are usually linked to each other by peptide bonds.

(D) Two or more polypeptide chains, which are usually linked to each other by peptide bonds and never by non-covalent interactions.

61. Systemic name of the Enzyme which catalyzes following reaction:



(A) Isocitrate: NAD+ oxidoreductase (decarboxylation)

(B) Isocitrate dehydrogenase

(C) 2- oxoglutarate carboxylase

(D) Isocitrate: NADH oxidoreductase

62. The region which contains the binding and catalytic sites is termed:

(A) Active site, of the enzyme

(B) Allosteric site

(C) Transition sites

(D) None

63. Cystine is:

(A) Unsaturated Fatty acid

(B) Nonpolar amino acid

(C) A sulphur containing Amino acid

(D) A dimeric compound, the who component cysteine units being linked by a disulphide bridge

64. _____ is an imino acid.

(A) Phe

(B) Leu

(C) Pro

(D) His

65. The turnover number:

(A) Represents the maximum number of substrate molecules which can be converted to products per molecule enzyme per unit time.

(B) Represents the maximum number of Enzyme molecules which can convert one molecule of substrate to products per unit time.

(C) Represents the maximum number of Product molecules which can be produced by an enzyme per unit time.

(D) None

66. The weak linkages resulting from dipole effects are sometimes termed:

(A) Coordinate bonds

(B) Salt bridges

(C) Van der Waals bonds

(D) Ionic interaction

67. Imidazole ring is found in:

(A) Trp

(B) Cys

(C) His

(D) Lys

68. Systemic name for lactate dehydrogenase is:

(A) (S)-lactate: NAD+ oxidoreductase

(B) L-lactate; NAD+ oxidoreductase

(C) Lactate: NADH oxidoreductase

(D) (S)-Pyruvate: NAD+ oxidoreductase

69. The term enzyme was first proposed by:

(A) James Sumner

(B) W. Kuhne

(C) Cleland

(D) Koshland

70. Reversible covalent modification involves:

(A) Activation of enzymes

(B) Inhibition of enzymes

(C) Either activation or inhibition of enzymes

(D) None of the above

71. Which of the following enzyme inhibitions shows Increased Km Value?

(A) Competitive inhibition

(B) Un-competitive inhibition

(C) Non-competitive inhibition

(D) Feedback inhibition

72. Apoenzymes dissociates form co-enzymes due to:

(A) Change in pH

(B) Change in temperature

(C) Change in substrate concentration

(D) Change in inhibitor concentration

73. Which of the following statement is incorrect?

(A) Enzymes are protein in nature

(B) Enzymes are colloidal in nature

(C) Enzymes are thermolabile

(D) Enzymes are inorganic catalyst

74. Which bond is not associated with Enzyme-substrate interaction?

(A) Hydrogen bonds

(B) Salt bridges

(C) Di-sulfide bonds

(D) Van deer Waal's force of attraction

75. Lock and key model is also known as:

(A) Emil Fischer model

(B) Induced fit model

(C) Khosland's Model

(D) Enzyme-substrate model

76. Uncatalyzed reaction shows_____ activation energy.

(A) Lower

(B) Higher

(C) Moderate

(D) Optimum

77. Enzyme code for Hexokinase is:

(A) E.C. 2.7.1.1

(B) E.C. 3.7.1.1

(C) E.C. 1.7.1.1

(D) E.C. 2.6.1.1

78. Enzyme acts best at a particular temperature called:

(A) Catalytic Temperature

(B) At normal Body temperature

(C) Optimum temperature

(D) None of the above

79. In competitive inhibition, inhibitors bears a close structural similarity with the:

(A) Co-enzyme

(B) Co-factor

(C) Prosthetic group

(D) Substrate

80. Feedback inhibition means:

(A) Initial product inhibition

(B) End Product inhibition

(C) Enzymatic induction

(D) None of the above

81. Activity of allosteric enzymes are influenced by:

(A) Allosteric modulators

(B) Allosteric site

(C) Catalytic site

(D) None of the above

82. Which enzymes do not require co-enzymes for their activity?

(A) The extracellular enzymes

(B) The intracellular Enzymes

(C) The mitochondrial enzymes

(D) The Proenzymes

83. Which of the following is not a co-enzyme?

(A) NAD

(B) FAD

(C) NADP

(D) Mn++

84. Abzymes are:

(A) Proteins

(B) DNAs

(C) RNAs

(D) Antibodies

85. Example of a Pro-enzyme:

(A) Pepsinogen

(B) Trypsin

(C) Chymotrypsin

(D) Lysine

86. Number of iron atoms in one hemoglobin molecule are:

(A) 1

(B) 3

(C) 4

(D) 8

87. Which of the following organelle is called 'Suicidal Bag'?

(A) Mitochondria

(B) Endoplasmic reticulum

(C) Lysosome

(D) Ribosome

88. Holoenzyme is made of:

(A) Apoenzyme and Zymogen

(B) Apoenzyme and Co-enzyme

(C) Co-enzyme and Prosthetic group

(D) Prosthetic group and Co-factor

89. Ribozymes are:

(A) RNA acting as enzymes

(B) Ribose sugar acting as enzyme

(C) Antibodies action as enzymes

(D) Protein acting as enzyme

90. Which of the following reaction is catalyzed by Lyase?

(A) Breaking of bonds

(B) Formation of bonds

(C) Intramolecular rearrangement of bonds

(D) Transfer of group from one molecule to another

91. What is the function of enzyme, Endonuclease?

(A) Cleave phosphodiester bond

(B) Cleave amino bonds

(C) Remove phosphate from a substrate

(D) Removal of H_2O

92. What is the function of phosphorylase?

(A) Transfer inorganic phosphate

(B) Transfer a carboxylate group

(C) Use H_2O_2 as the electron acceptor

(D) Transfer amino group

93. Name the enzyme which catalyzes the oxidation-reduction reaction?

(A) Transaminase

(B) Glutamine synthetase

(C) Phosphofructokinase

(D) Lactate dehydrogenase

94. Name the enzyme secreted by pancreas?

(A) Pepsin

(B) Papain

(C) Trypsin

(D) Alcohol dehydrogenase

95. Which of this vitamin is associated with the coenzyme Biocytin?

(A) Nicotinic acid

(B) Thiamine

(C) Biotin

(D) Pyridoxine

96. Name the coenzyme of riboflavin (B2)?

(A) NAD or NADP

(B) FAD and FMN

(C) Coenzyme A

(D) Thiamine pyrophosphate

97. What is an apoenzyme?

(A) It is a protein portion of an enzyme

(B) It is a non-protein group

(C) It is a complete, biologically active conjugated enzyme

(D) It is a prosthetic group

98. What is the nature of an enzyme?

(A) Vitamin

(B) Lipid

(C) Carbohydrate

(D) Protein

99. Enzyme increases the rate of reaction by lowering the:

(A) Activation energy

(B) Enthalpy

(C) Entropy

(D) Transition state

100. _____ is biocatalyst that increases the rate of the reaction without being changed.

(A) Aluminum oxide

(B) Silicon dioxide

(C) Enzyme

(D) Hydrogen peroxide

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Rough Work / रफ कार्य

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