DF-3001

B. Sc. (Microbiology) (Sem. III) Examination
March / April - 2016
MB-06 : Bioenergetics & Enzymology

C

Time : Hours] [Total Marks :

Instructions :

(1)

(2) This exam contains 50 multiple choice questions, each worth I mark.

(3) Choose only ONE most appropriate answer per question.

(4) Do not crease or fold the answer sheet.

1   Which of the following are co-enzymes ?

(A)   NAD, NADP, FAD, FMN

(B)   NAD, K, CoA

(C)   Vitamin, Fe, Cu

(D) $NADPH_2$, Ca, Co

2   Which of the following is not an oxidation-reduction enzyme ?

(A)   Oxidases

(B)   Hydrolases

(C)   Mutases

(D)   Sulfatases

3   Radio immuno assay procedure for diagnosis cases of hypertension has been developed by :

(A)   Both BARC and TIFR

(B)   None of these

(C)   BARC

(D)   TIFR

4   Endonucleases promotes reactions leading to

(A)   DNA fragmentation

(B)   Recombination

(C)   Polymerisation

(D)   Co-angulations


5   Generally, co-enzymes accounts for about _____% of entire enzyme molecule.

(A)   3

(B)   4

(C)   1

(D)   2

6   The catalytic power of an enzyme is measured by the

    (A)   Both Turn over number and Molecular activity

    (B)   Topology

    (C)   Turn over number

    (D)   Molecular activity

7   A single molecule of enzyme catalase can convert _____ H_2O_2 molecules into H_2O and CO_2 in a minute.

    (A)   5,00,000

    (B)   50,00,000

    (C)   5,000

    (D)   50,000

8   The pattern of enzyme specificity has been recognised as :

    (A)   Optical specificity

    (B)   All of these

    (C)   Absolute specificity

    (D)   Group specificity

9   The enzyme specificity of sucrose has been found mainly for :

    (A)   Both Sucrose and Raffinose

    (B)   Glucose

    (C)   Sucrose

    (D)   Raffinose

10 The value used to measure the temperature sensitivity of a biological function is :

    (A)   Both of these

    (B)   None of these

    (C)   Temperature quotient

    (D) Q_{10}

11 Remarkable similarity has been found in the ribonuclease structure of :
(A) Mice and humans
(B) *E.coli* and humans
(C) Cows and humans
(D) Rat and *E.coli*

12 Lysozyme is also known as :
(A) Ribonuclease
(B) All of these
(C) Muramidase
(D) RNase

13 Identify correct optimum temperature for an enzyme from below graph :
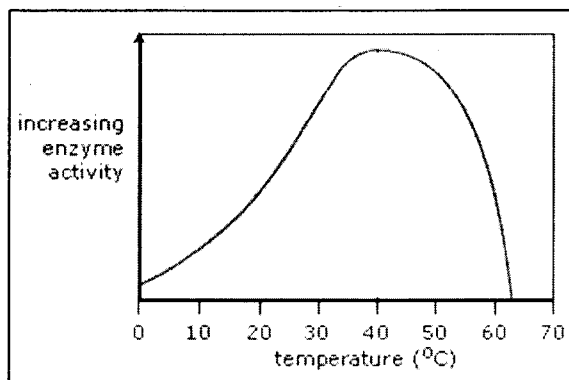
(A) 40°C
(B) 60°C
(C) 10°C
(D) 30°C

14 Lysozyme is devoid of :
(A) Metal ion co-factors
(B) Co-factors
(C) Co enzyme
(D) Co-enzyme or metal-ion co-factors

15 Complex enzyme systems that are not independent molecules, but occurs as aggregates in a mosaic pattern involving several different enzymes are known as :
(A) Both Multienzyme system and Enzyme system
(B) None of these
(C) Multienzyme system
(D) Enzyme system

16 The shape of Lysozyme is :

(A) Smooth ellipsoidal

(B) None of these

(C) Ellipsoidal

(D) Roughly ellipsoidal

17 In trypsine, an aspartate residue is present at _____ :

(A) The bottom of the S_2 pocket

(B) The top of S_2 pocket

(C) The bottom of the S_1 pocket

(D) The top of the S_1 pocket

18 Activation energy is best defined as the difference between the :

(A) Molecular levels of the ground state and the normal state

(B) Molecular levels of the energy gap state and the normal state

(C) Energy levels of the ground state and the transition state

(D) Molecular levels of the ground state and the transition state

19 The higher activation energy, _____ reaction.

(A) Slower

(B) All

(C) Neutral

(D) Faster

20 In MM equation, the rate of appearance of products is proportional to the concentration of the enzyme-substrate complex which is generally expressed by the following equation :

(A) $K = V \neq (PS)$

(B) $K = V \neq (ES)$

(C) $V = K \neq (PS)$

(D) $V = K \neq (ES)$

21 During the experimental determination of K_m, the velocity of reaction is measured as the function of :

(A) Substrate concentration

(B) Catalytic concentration

(C) Product concentration

(D) Enzyme concentration

22 Enzyme Substrate complex are directly observed by :

(A) Darkfield microscope

(B) Electron microscope and X-ray crystallography

(C) Phase contrast microscope

(D) Compound microscope

23 Conformational changes during substrate binding and catalysis have been demonstrated for various enzymes such as :

(A) Carboxypeptidase

(B) All of these

(C) Phosphoglucomutase

(D) Creatinine kinase

24 K_m is defined as _____ in an enzyme catalysed reaction.

(A) Product concentration to produce maximum velocity

(B) Substrate concentration to produce half-maximum velocity

(C) Product concentration to produce half-maximum velocity

(D) Substrate concentration to produce maximum velocity

25   Zinc containing metalloenzyme is :

(A) Carbonic anhydrase

(B) All of these

(C) Alcohol dehydrogenase

(D) Alkaline phosphate

26   The chemical nature of inhibitors is :

(A) Both Organic and Inorganic

(B) None of these

(C) Organic

(D) Inorganic

27   Substrate analogue is the :

(A) Product which closely resembles the real substrate

(B) Inhibitor which closely resembles the real substrate

(C) Isomer which closely resembles the real substrate

(D) Enzyme which closely resembles the real substrate

28   Disadvantage of Lineweaver – Burk plot is :

(A) Both Long extrapolation to determine Km and Uncertainty in results

(B) None of these

(C) Long extrapolation to determine Km

(D) Uncertainty in results

29   Identify the type of inhibition of enzyme shown below :
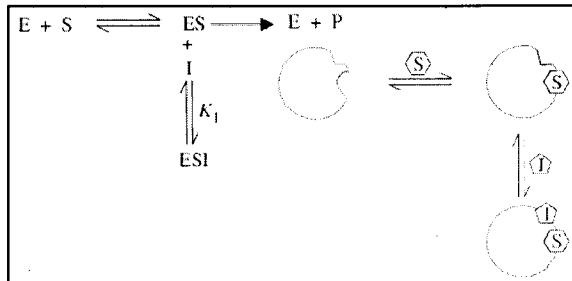
(A)   Uncompetitive inhibition

(B)   Any of the these

(C)   Noncompetitive inhibition

(D)   Competitive inhibition

30   A single crystal of protein or the protein fibers is capable of deflecting :

(A)   X-rays

(B)   None of these

(C) α rays

(D) β rays

31 Energy conserving reaction is also called :

(A) Catabolism

(B) Fuelling reactions

(C) Anabolism

(D) Catabolism and fuelling reactions

32 _____ organisms reducing the organic molecules by using CO_2 as carbon source with the release of both energy and electron.

(A) Chemoorganoheterotrophs

(B) Chemoorganotrophs

(C) Chemolithoautotrophs

(D) Chemoheterotrophs

33 Thermodynamics is a branch of science dealing with energy changes in a collection of matter, which is called :

(A) Reaction

(B) None of these

(C) System

(D) Assembly

34 The second law of thermodynamics involves, which of the following process?

(A) Both Chemical and Physical

(B) None of these

(C) Chemical

(D) Physical

35 One calorie of heat is equivalent to _____ Joules.

(A) 4.8140

(B) 4.4840

(C) 4.4810

(D) 4.1840

36   Identify the correct definition of equilibrium constant :
      (A)   Equilibrium is the state of a reaction where the rate of reaction in both
             sides is equal, with no further net change occurring in the concentration
             of reactants and products.
      (B)   Equilibrium is the state of a reaction where the rate of reaction in both
             sides is unequal, with no further net change occurring in the
             concentration of reactants.
      (C)   Equilibrium is the state of a reaction where the rate of reaction in both
             sides is unequal, with no further net change occurring in the
             concentration of reactants and products.
      (D)   Equilibrium is the state of a reaction where the rate of reaction in both
             sides is unequal, with no further net change occurring in the
             concentration of products.

37   What is the relationship between $\Delta G^{\circ\prime}$ and Keq ?
      (A) $G^o = -2.203RT.LogKeq$
      (B) $G^o = -2.303RT.LogKeq$
      (C) $G^{o'} = -2.203RT. LogKeq$
      (D) $G^{o'} = -2.303RT.LogKeq$

38   Endergonic reaction is said to be :
      (A)   When $\Delta G^{\circ\prime}$ is negative, the equilibrium constant is less than 2
      (B)   When $\Delta G^{\circ\prime}$ is positive, the equilibrium constant is less than 2
      (C)   When $\Delta G^{\circ\prime}$ is negative, the equilibrium constant is less than 1
      (D)   When $\Delta G^{\circ\prime}$ is positive, the equilibrium constant is less than 1

39   Which one is the true sentence for ATP in metabolism ?
      (A)   ATP is formed by exergonic reactions
      (B)   All of these
      (C)   ATP as a coupling agent
      (D)   ATP makes endergonic reactions more favourable

40   Peptidoglycan layer of the bacterial wall is activated by the higher energy
      compund of :
      (A)   Uridine
      (B)   Guanosine
      (C)   Cytidine
      (D)   Deoxythymidine

41 Which one is true for the standard reduction potential ?

(A) The equilibrium constant for reaction, A^o, is a measure of tendency of the donor to lose electron

(B) The equilibrium constant for reaction, E^o, is a measure of tendency of the acceptant to accept electron

(C) The equilibrium constant of a reaction, E^o, is a measure of tendency of the donor to lose electron

(D) The equilibrium constant of a reaction, E^o, is a measure of tendency of the donor to acquire electron

42 The reference standard for the reduction potential is :

(A) Both Hydrogen system with an E'_o of $- 0.42$ volts and Hydrogen system with an E'_o of $- 420$ millivolts

(B) None of these

(C) Hydrogen system with an E'_o of $- 0.42$ volts

(D) Hydrogen system with an E'_o of $- 420$ millivolts

43 The difference in reduction potentials between NAD $+$ / NADH and $1/2O_2/ H_2O$ is :

(A) 1.14 volts

(B) 1.15 volts

(C) 1.12 volts

(D) 1.13 volts

44 Select the most suitable statement for ETC :

(A) The carriers are organized such that the second electron carrier has the most negative E'^o and each successive carrier is more negative.

(B) The carriers are organized such that the first electron carrier has the most negative E'^o and each successive carrier is slightly less negative.

(C) The carriers are organized such that the first electron carrier has the positive E'^o and each successive carrier is slightly less negative.

(D) The carriers are organized such that the last electron carrier has the most negative E'^o and each successive carrier is negative.

45 The nonheme iron protein active in photosynthetic electron transport system is _____.

(A) Ubiquinone

(B) Co enzyme Q

(C) Ferredoxin

(D) Quinone

46 Trypsine enzyme was isolated by John H. Northrop and Kunitz from :

(A) Beef pancreas

(B) Swine stomach

(C) Beef kidney

(D) Beef liver

47 The ratio of enzyme : substrate molecules can be as high as :

(A) 1 : 50000

(B) 1 : 100000

(C) 1 : 1000

(D) 1 : 10000

48 Enzymes, vitamins and hormones can be classified in a single category of biological chemicals because all of them are :

(A) Synthesized in organisms

(B) Enhance the oxidative metabolism

(C) Proteins

(D) Aid in regulating metabolism

49 Example of lipid hydrolyzing enzyme is :

(A) Bromolin

(B) Dipeptidase

(C) Lecithinases

(D) Pepsin

50 The enzymes, which act normally within cells, are called :

(A) Apoenzyme

(B) Ferment

(C) Endoenzyme

(D) Exoenzyme