

**A****DF-3001****B. Sc. (Microbiology) (Sem. III) Examination****March / April - 2016****MB-06 : Bioenergetics & Enzymology**

Time : Hours]

[Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. Sc. (MICROBIOLOGY) (SEM. 3)

Name of the Subject :
MB-06 : BIOENERGETICS & ENZYMOLOGY

Subject Code No. : 3 0 0 1 Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

- (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.

***O.M.R. Sheet ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ
O.M.R. Sheet-ની પાછળ છાપેલ છે.***

***Important instructions to fillup O.M.R. Sheet
is given on back side of the provided O.M.R. Sheet.***

- 1 Energy conserving reaction is also called :
- (A) Anabolism
 - (B) Catabolism and fuelling reactions
 - (C) Catabolism
 - (D) Fuelling reactions
- 2 _____ organisms reducing the organic molecules by using CO_2 as carbon source with the release of both energy and electron.
- (A) Chemolithoautotrophs
 - (B) Chemoheterotrophs
 - (C) Chemoorganoheterotrophs
 - (D) Chemoorganotrophs
- 3 Thermodynamics is a branch of science dealing with energy changes in a collection of matter, which is called :
- (A) System
 - (B) Assembly
 - (C) Reaction
 - (D) None of these
- 4 The second law of thermodynamics involves, which of the following process?
- (A) Chemical
 - (B) Physical
 - (C) Both Chemical and Physical
 - (D) None of these
- 5 One calorie of heat is equivalent to _____ Joules.
- (A) 4.4810
 - (B) 4.1840
 - (C) 4.8140
 - (D) 4.4840

- 6 Identify the correct definition of equilibrium constant :
- (A) 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.
 - (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 products.
 - (C) 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.
 - (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 reactants.
- 7 What is the relationship between $\Delta G^{\circ'}$ and K_{eq} ?
- (A) $G^{\circ} = -2.203RT \cdot \text{Log}K_{eq}$
 - (B) $G^{\circ} = -2.303RT \cdot \text{Log}K_{eq}$
 - (C) $G^{\circ} = -2.203RT \cdot \text{Log}K_{eq}$
 - (D) $G^{\circ} = -2.303RT \cdot \text{Log}K_{eq}$
- 8 Endergonic reaction is said to be :
- (A) When $\Delta G^{\circ'}$ is negative, the equilibrium constant is less than 1
 - (B) When $\Delta G^{\circ'}$ is positive, the equilibrium constant is less than 1
 - (C) When $\Delta G^{\circ'}$ is negative, the equilibrium constant is less than 2
 - (D) When $\Delta G^{\circ'}$ is positive, the equilibrium constant is less than 2
- 9 Which one is the true sentence for ATP in metabolism ?
- (A) ATP as a coupling agent
 - (B) ATP makes endergonic reactions more favourable
 - (C) ATP is formed by exergonic reactions
 - (D) All of these
- 10 Peptidoglycan layer of the bacterial wall is activated by the higher energy compound of :
- (A) Cytidine
 - (B) Deoxythymidine
 - (C) Uridine
 - (D) Guanosine

- 11 Which one is true for the standard reduction potential ?
- (A) The equilibrium constant of a reaction, E° , is a measure of tendency of the donor to lose electron
 - (B) The equilibrium constant of a reaction, E° , is a measure of tendency of the donor to acquire electron
 - (C) The equilibrium constant for reaction, A° , is a measure of tendency of the donor to lose electron
 - (D) The equilibrium constant for reaction, E° , is a measure of tendency of the acceptant to accept electron
- 12 The reference standard for the reduction potential is :
- (A) Hydrogen system with an E'_{\circ} of -0.42 volts
 - (B) Hydrogen system with an E'_{\circ} of -420 millivolts
 - (C) Both Hydrogen system with an E'_{\circ} of -0.42 volts and Hydrogen system with an E'_{\circ} of -420 millivolts
 - (D) None of these
- 13 The difference in reduction potentials between $\text{NAD}^{+} / \text{NADH}$ and $1/2\text{O}_2 / \text{H}_2\text{O}$ is :
- (A) 1.12 volts
 - (B) 1.13 volts
 - (C) 1.14 volts
 - (D) 1.15 volts
- 14 Select the most suitable statement for ETC :
- (A) The carriers are organized such that the first electron carrier has the positive E° and each successive carrier is slightly less negative.
 - (B) The carriers are organized such that the last electron carrier has the most negative E° and each successive carrier is negative.
 - (C) The carriers are organized such that the second electron carrier has the most negative E° and each successive carrier is more negative.
 - (D) The carriers are organized such that the first electron carrier has the most negative E° and each successive carrier is slightly less negative.

- 15 The nonheme iron protein active in photosynthetic electron transport system is _____.
- (A) Ferredoxin
 - (B) Quinone
 - (C) Ubiquinone
 - (D) Co enzyme Q
- 16 Trypsine enzyme was isolated by John H. Northrop and Kunitz from :
- (A) Beef kidney
 - (B) Beef liver
 - (C) Beef pancreas
 - (D) Swine stomach
- 17 The ratio of enzyme : substrate molecules can be as high as :
- (A) 1 : 1000
 - (B) 1 : 10000
 - (C) 1 : 50000
 - (D) 1 : 100000
- 18 Enzymes, vitamins and hormones can be classified in a single category of biological chemicals because all of them are :
- (A) Proteins
 - (B) Aid in regulating metabolism
 - (C) Synthesized in organisms
 - (D) Enhance the oxidative metabolism
- 19 Example of lipid hydrolyzing enzyme is :
- (A) Lecithinases
 - (B) Pepsin
 - (C) Bromolin
 - (D) Dipeptidase
- 20 The enzymes, which act normally within cells, are called :
- (A) Endoenzyme
 - (B) Exoenzyme
 - (C) Apoenzyme
 - (D) Ferment

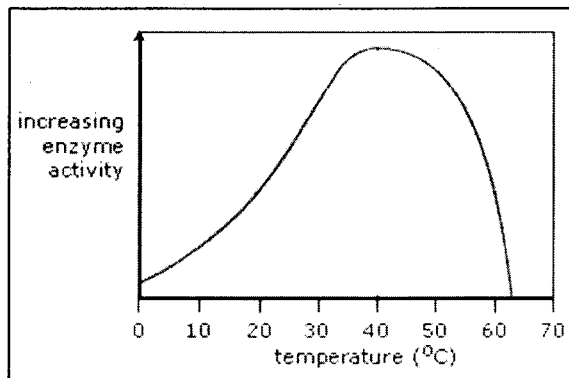
- 21 Which of the following are co-enzymes ?
- (A) Vitamin, Fe, Cu
 - (B) NADPH₂, Ca, Co
 - (C) NAD, NADP, FAD, FMN
 - (D) NAD, K, CoA
- 22 Which of the following is not an oxidation-reduction enzyme ?
- (A) Mutases
 - (B) Sulfatases
 - (C) Oxidases
 - (D) Hydrolases
- 23 Radio immuno assay procedure for diagnosis cases of hypertension has been developed by :
- (A) BARC
 - (B) TIFR
 - (C) Both BARC and TIFR
 - (D) None of these
- 24 Endonucleases promotes reactions leading to
- (A) Polymerisation
 - (B) Co-angulations
 - (C) DNA fragmentation
 - (D) Recombination
- 25 Generally, co-enzymes accounts for about _____% of entire enzyme molecule.
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4

- 26 The catalytic power of an enzyme is measured by the
- (A) Turn over number
 - (B) Molecular activity
 - (C) Both Turn over number and Molecular activity
 - (D) Topology
- 27 A single molecule of enzyme catalase can convert _____ H_2O_2 molecules into H_2O and CO_2 in a minute.
- (A) 5,000
 - (B) 50,000
 - (C) 5,00,000
 - (D) 50,00,000
- 28 The pattern of enzyme specificity has been recognised as :
- (A) Absolute specificity
 - (B) Group specificity
 - (C) Optical specificity
 - (D) All of these
- 29 The enzyme specificity of sucrose has been found mainly for :
- (A) Sucrose
 - (B) Raffinose
 - (C) Both Sucrose and Raffinose
 - (D) Glucose
- 30 The value used to measure the temperature sensitivity of a biological function is :
- (A) Temperature quotient
 - (B) Q_{10}
 - (C) Both of the above
 - (D) None of these

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

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

- 33 Identify correct optimum temperature for an enzyme from below graph :



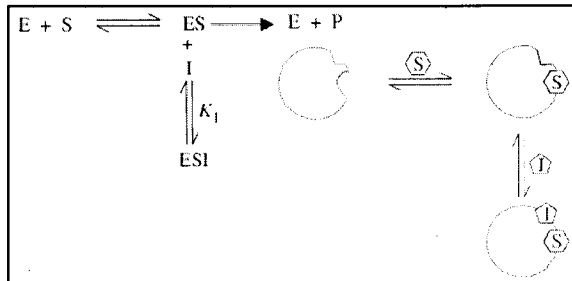
- (A) 10°C
 - (B) 30°C
 - (C) 40°C
 - (D) 60°C
- 34 Lysozyme is devoid of :
- (A) Co enzyme
 - (B) Co-enzyme or metal-ion co-factors
 - (C) Metal ion co-factors
 - (D) Co-factors
- 35 Complex enzyme systems that are not independent molecules, but occurs as aggregates in a mosaic pattern involving several different enzymes are known as :
- (A) Multienzyme system
 - (B) Enzyme system
 - (C) Both Multienzyme system and Enzyme system
 - (D) None of these

- 36 The shape of Lysozyme is :
- (A) Ellipsoidal
 - (B) Roughly ellipsoidal
 - (C) Smooth ellipsoidal
 - (D) None of these
- 37 In trypsin, an aspartate residue is present at _____ :
- (A) The bottom of the S_1 pocket
 - (B) The top of the S_1 pocket
 - (C) The bottom of the S_2 pocket
 - (D) The top of S_2 pocket
- 38 Activation energy is best defined as the difference between the :
- (A) Energy levels of the ground state and the transition state
 - (B) Molecular levels of the ground state and the transition state
 - (C) Molecular levels of the ground state and the normal state
 - (D) Molecular levels of the energy gap state and the normal state
- 39 The higher activation energy, _____ reaction.
- (A) Neutral
 - (B) Faster
 - (C) Slower
 - (D) All
- 40 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) $V = K \neq (PS)$
 - (B) $V = K \neq (ES)$
 - (C) $K = V \neq (PS)$
 - (D) $K = V \neq (ES)$

- 41 During the experimental determination of K_m , the velocity of reaction is measured as the function of :
- (A) Product concentration
 - (B) Enzyme concentration
 - (C) Substrate concentration
 - (D) Catalytic concentration
- 42 Enzyme Substrate complex are directly observed by :
- (A) Phase contrast microscope
 - (B) Compound microscope
 - (C) Darkfield microscope
 - (D) Electron microscope and X-ray crystallography
- 43 Conformational changes during substrate binding and catalysis have been demonstrated for various enzymes such as :
- (A) Phosphoglucomutase
 - (B) Creatinine kinase
 - (C) Carboxypeptidase
 - (D) All of these
- 44 K_m is defined as _____ in an enzyme catalysed reaction.
- (A) Product concentration to produce half-maximum velocity
 - (B) Substrate concentration to produce maximum velocity
 - (C) Product concentration to produce maximum velocity
 - (D) Substrate concentration to produce half-maximum velocity

- 45 Zinc containing metalloenzyme is :
- (A) Alcohol dehydrogenase
 - (B) Alkaline phosphate
 - (C) Carbonic anhydrase
 - (D) All of these
- 46 The chemical nature of inhibitors is :
- (A) Organic
 - (B) Inorganic
 - (C) Both Organic and Inorganic
 - (D) None of these
- 47 Substrate analogue is the :
- (A) Isomer which closely resembles the real substrate
 - (B) Enzyme which closely resembles the real substrate
 - (C) Product which closely resembles the real substrate
 - (D) Inhibitor which closely resembles the real substrate
- 48 Disadvantage of Lineweaver – Burk plot is :
- (A) Long extrapolation to determine K_m
 - (B) Uncertainty in results
 - (C) Both Long extrapolation to determine K_m and Uncertainty in results
 - (D) None of these

49 Identify the type of inhibition of enzyme shown below :



- (A) Noncompetitive inhibition
- (B) Competitive inhibition
- (C) Uncompetitive inhibition
- (D) Any of the these

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

- (A) α rays
- (B) β rays
- (C) X-rays
- (D) None of these