

Reg. No. :

Name :

Third Semester B.Sc. Degree Examination, January 2019
First Degree Programme Under CBCSS
Complementary Course - III : For Botany and Zoology
BC 1331 : ENZYMES AND BIOENERGETICS
(2014 Adm. Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION - A

Very Short Answer Type- Maximum two sentences. Answer **all** questions.

(10×1=10 Marks)

1. What are Ligases ? *Glutamine synthase*
2. Define Km value.
3. Example for non-competitive enzyme inhibition.
4. What are Prosthetic groups ? *non protein part*
5. Co enzyme form of flavins. *FMN & FAD*
6. What are Ubiquinones ? *component of ETC, aerobic respire CO_2*
7. Inhibitors of ETC. *Azide, CO, CN, Rotenone, Antimycin A, cyanide*
8. Role of hydrogen sulphide in ETC. *inhibits IV of ETC*
9. Thin filaments. *actin, myosin, tropomyosin*
10. Meaning of photosynthetic electron transport.

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SECTION – B

Short Answer Questions. **Not** to exceed one paragraph) Answer **any eight**.

(8×2=16 Marks)

11. How enzymes are classified ?
12. Advantage of Lineweaver Burk plot.
13. Non-competitive enzyme inhibition.
14. Isoenzymes.
15. Functions of vitamin A.
16. Role of thiamine in metabolism.
17. Write two reactions of NADP.
18. Why the name ETC ?
19. Meaning of P/O ratio.
20. Inhibition of ETC.
21. Energy sources of muscle contraction.
22. Nitrogen fixing enzymes.

SECTION – C

(Short essays **not** to exceed **120** words). Answer **any six**.

(6×4=24 Marks)

23. Explain how temperature affect velocity of enzyme catalysed reaction.
24. Uncouplers of ETC.
25. Note on enzyme purification.
26. Differentiate Photosystem I and II.
27. Clinical importance of LDH.
28. Physiological functions of Vitamin C.



29. Note on Unit sarcomere.
30. Role of calcium in muscle contraction.
31. Retoenzymes.

SECTION – D

Long essay. Answer **any two**.

(15×2=30 Marks)

32. Essay on enzyme inhibition.
 33. Details of ETC.
 34. Explain the sliding filament theory of n.
 35. Details of Calvin cyclic.
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(Pages : 2)

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Reg. No. : 259 14 132010

Name : Lalbans

Third Semester B.Sc. Degree Examination, December 2015
First Degree Programme Under CBCSS
Complementary Course for Botany and Zoology
BC 1331 : ENZYMES AND BIOENERGETICS
(2014 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Very Short Answer Type – Maximum **two** sentences. Answer **all** questions.

(10×1=10 Marks)

1. What is the nature of enzymes ?
2. Give any two examples of coenzymes.
3. Why is biological oxidation essential ?
4. What is Hill reaction ? *O₂ released from H₂O during p. synthesis*
5. Name the diagnostic enzyme for muscle disorders. *CK*
6. Name the fat soluble vitamins.
7. Name the inhibitors of site III of ETC.
8. Why photosynthesis is also called oxidation and reduction reaction ? *Reduction of CO₂ to sugar & oxidn of H₂O to O₂*
9. What is an allosteric site ?
10. What is phosphorylation ? *addn of P to an organic compound.*

SECTION – II

Short Answer Questions – **Not** to exceed **one** paragraph. Answer **any eight** questions.

(8×2=16 Marks)

11. What is the difference between prosthetic group and coenzyme ? *prosthetic group → protein coenzyme*
12. What is the role of Vitamin A ?
13. What is P/O ratio ?
14. Explain the role of the pink colour pigment in the root nodule of legume plants. What is it called ?

*(leghaemoglobin → plant
leucine → bacteria)*

P.T.O.



15. Why Lineweaver-Burk curve or equation is preferred ?
16. Name the sulphur containing vitamins.
17. Name the various ATP sites in the respiratory chain.
18. Name the processes which take place in the grana and stroma region of chloroplasts.
19. Define a substrate of enzyme.
20. Name any two enzymes where FMN is a coenzyme.
21. What is substrate level phosphorylation ?
22. Nitrogen fixation is shown by prokaryotes only. Why not by eukaryotes ?

SECTION – III

Short Essay – **Not** to exceed 120 words. Answer **any six** questions. (6×4=24 Marks)

23. What are the factors which influence enzyme activity ?
24. Explain the classification of vitamins.
25. What is meant by redox potential ? Explain with examples.
26. Where does the photolysis of H_2O occur ? What is its significance ?
27. What are Zymogens ? How are they activated ? Give examples.
28. What are NAD^+ and $NADP^+$? Explain their functions.
29. Where is the electron transport chain is located and how the enzymes are arranged ?
30. What is Nitrogenase enzyme and mention its functions ?
31. What do you know chemiosmotic hypothesis proposed by Mitchell ?

SECTION – IV

Long Essay – Answer **any two** questions. (2×15=30 Marks)

32. State the clinical importance of enzymes.
33. What are the main physiological functions of Biotin ?
34. State the uncouplers of oxidative phosphorylation.
35. Describe in brief photorespiration.



Reg. No. :

Name :

Third Semester B.Sc. Degree Examination, November 2014
First Degree Programme under CBCSS
BIOCHEMISTRY
Complementary Course for Botany and Zoology
BC 1331 : Enzymes and Bioenergetics
(2013 admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

(Very short answer type maximum **two** sentences). Answer **all** questions.

(10×1=10 Marks)

1. What are Enzymes ?
2. What is meant by irreversible inhibition ?
3. List two properties of coenzymes.
4. List two properties of prosthetic groups.
5. Define vitamins.
6. Name the source and the deficiency symptom of folic acid.
7. What is meant by ΔG .
8. Name the universal currency of free energy.
9. Name the proteins that are involved in muscle contraction.
10. List two reactions of photosynthesis

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SECTION – II

(Short answer questions **not** to exceed **one** paragraph). Answer **any eight** questions. **(8×2=16 Marks)**

11. Name any two marker enzymes.
- ✓ 12. What is meant by Allosteric regulation ?
- ✓ 13. Explain double reciprocal plot.
14. Name two deficiency symptoms of vitamin B₁.
15. List two sources of vitamin B₂.
16. What are the functions of vitamin E ?
- ✓ 17. What is meant by ΔG° ?
- ✓ 18. List any two properties of spontaneous reaction.
19. List any two enzymes of respiratory chain.
- ✓ 20. Write a note on redox-potential ?
- ✓ 21. Write a note on chlorophyll a and b.
- ✓ 22. Give a short note on the symbiotic bacteria involved in Nitrogen fixation.

SECTION – III

(Short essay **not** to exceed **120** words) Answer **any six** questions. **(6×4=24 Marks)**

- ✓ 23. Explain competitive inhibition with suitable example.
- ✓ 24. Write a note on classification of enzymes.
25. Explain the importance of vitamin B₁₂.
26. Write a note on the importance of nicotinic acid.
27. Explain the function and deficiency symptoms of pyridoxone.
- ✓ 28. Write about any one high energy compound.

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29. Explain the sliding filament theory.
30. Write a note on the uncouplers of oxidative phosphorylation.
- ✓ 31. Explain the nitrogen fixation in plants.

SECTION – IV

(Long Essay) Answer **any two** questions.

(2×15=30 Marks)

32. Describe the factors affecting enzyme catalyzed reaction.
 33. Discuss the properties, function and deficiency symptoms of vitamin A.
 34. Describe Mitochondrial electron transport chain.
 35. Elaborate on C₄ pathway.
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Reg. No. _____

Name: _____

Third Semester B.Sc. Degree Examination, December 2013
First Degree Programme under CBCSS
Complementary Course for Botany and Zoology
BC 1331 – ENZYMES AND BIOENERGETICS

Time : 3 Hours

Max Weight 30

SECTION – A

Objective type questions. Answer **all sixteen** questions. Weight per bunch = 1

- I. 1. The protein part of enzyme is
a) Prosthetic group ✓ b) Apoenzyme
c) Holoenzyme d) Zymogen
2. The substance which inactivates an enzyme by denaturing is called
a) enzyme inhibitor b) allosteric inhibitor
c) competitive inhibitor d) irreversible inhibitor ✓
3. A coenzyme is
a) Organic or inorganic group that is essential for enzyme activity
b) Organic non proteinaceous group that is essential for enzyme activity ✓
c) One that shares function of another enzyme
d) Same enzyme found in different organs or tissues
4. Hydrogen cyanide binds to the active site of an enzyme that is part of the pathway that form ATP in cells, in this way it prevents the enzyme activity. Hence hydrogen cyanide can best be described as a
a) coenzyme b) allosteric modulator
c) competitive inhibitor ✓ d) cofactor
- II. 5. Production of NADPH in a chloroplast takes place during
a) Cyclic photophosphorylation b) Non cyclic photophosphorylation ✓
c) Series photophosphorylation d) Substrate level photophosphorylation



6. The molecule in the calvin cycle that combines with carbon dioxide is
- a) glyceraldehyde phosphate
 - b) ribulose biphosphate
 - c) phospho enol pyruvic acid
 - d) citric acid
7. Why it is difficult for most plants to carry out photosynthesis in very hot dry environments such as deserts ?
- a) The light is too intense and overpowers pigment molecules
 - b) The closing of stomata keeps CO_2 from entering and O_2 from leaving the plant
 - c) CO_2 builds up in the leaves blocking carbon fixation
 - d) The green house effect is intensified in a desert environment
8. In a plant cell, the light reactions of photosynthesis takes place in the
- a) Cytosol
 - b) Endoplasmic reticulum
 - c) Chloroplast
 - d) Leucoplasts
- III. 9. Vitamin K is required for
- a) Respiration
 - b) Synthesis of prothrombin
 - c) Calcium metabolism
 - d) Carbohydrate metabolism
10. Deficiency of Vitamin E brings about
- a) Scurvy
 - b) Beri-Beri
 - c) Slow clotting of blood
 - d) Impotence
11. Which of the following is required for the development of erythrocytes ?
- a) Vitamin A
 - b) Vitamin B_{12}
 - c) Vitamin E
 - d) Vitamin K
12. Pellagra is caused due to prolonged deficiency of
- a) Niacin
 - b) Ascorbic acid
 - c) Thiamine
 - d) Folic acid
- IV. 13. Nitrate reductase enzyme contain
- a) Flavoprotein
 - b) Molybdenum
 - c) Leghemoglobin
 - d) Both a) and b)
14. Which of the following is an inhibitor of mitochondrial electron transport system ?
- a) Amytal
 - b) Rotenone
 - c) Piericidin
 - d) All of these

15. The production of ATP by oxidative phosphorylation is driven by the energy from
- a) Coenzyme A
 - b) Isomerization of the cytochromes
 - c) The diffusion of protons from the intermembrane space to the matrix of the mitochondrion
 - d) None of these
16. The primary electron acceptor in cyclic photophosphorylation is
- a) A protein that contains iron and sulphur
 - b) Carbon dioxide
 - c) FAD
 - d) NADP⁺

SECTION – B

Short answer questions. Answer **any eight** questions. Weight 1.

- 17. What is the reaction catalysed by lyases ? Give one example.
- 18. Define a metalloenzyme. Write two reactions catalyzed by a metalloenzyme.
- 19. How chymotrypsinogen is converted to chymotrypsin ? Mention its importance.
- 20. Explain the term substrate level phosphorylation with suitable examples.
- 21. Write any two inhibitors of electron transport chain and mention its site of action.
- 22. How Vitamin D is synthesized in our body ? What is its importance ?
- 23. Explain the term stereospecificity with suitable examples.
- 24. Write the coenzyme form of nicotinic acid. Mention a reaction catalyzed by this coenzyme.
- 25. What is photorespiration ?
- 26. Write the reaction catalysed by nitrogenase complex.
- 27. What is meant by P/O ratio ? Mention its significance in respiration.
- 28. Write the reaction catalyzed by Rubisco.



SECTION – C

Short essay. Answer **any five** questions. Weight **2**.

29. Distinguish between C_3 and C_4 plants.
30. Write out the Henderson-Hasselbalch equation for buffer solutions. How pK_a related to K_a ?
31. What are the physiological functions of Vitamin K ?
32. Explain the term allosteric regulation with suitable examples.
33. Write briefly on muscle contraction with special reference to energy sources for contraction ?
34. Briefly explain the mitochondrial electron transport chain.
35. What are the different isoenzyme forms of lactate dehydrogenase ? Explain its clinical application.
36. Write short note on redox potential and free energy change in chemical reactions.

SECTION – D

Long essay. Answer **any two** questions. Weight **4**.

37. Discuss on oxidative phosphorylation.
 38. Write an account on enzyme inhibition.
 39. Outline the pathway of carbon in dark reaction.
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- 6) Combination of apoenzyme and coenzyme produces
- a) Prosthetic group
 - b) Holoenzyme
 - c) Enzyme-product-complex
 - d) Enzyme-substrate complex
- 7) Enzymes generally have
- a) Same pH and temperature optima
 - b) Same pH and different temperature optima
 - c) Different pH but same temperature optima
 - d) Different pH and different temperature optima
- 8) Inactive zymogens are precursors of all the following gastro intestinal enzymes except
- a) trypsin
 - b) chymotrypsin
 - c) pepsin
 - d) ribonuclease
- III. 9) Enzyme inhibition caused by a substance resembling substrate molecule is
- a) allosteric inhibition
 - b) competitive inhibition
 - c) non competitive inhibition
 - d) feed back inhibition
- 10) Enzymes with different molecular configuration but with same function are called
- a) Isoenzymes
 - b) Apoenzymes
 - c) Coenzymes
 - d) Inducible enzymes
- 11) Km value of an enzyme is the substrate concentration at which the reaction attains
- a) $\frac{1}{2} v_{max}$
 - b) $\frac{1}{4} v_{max}$
 - c) $2 v_{max}$
 - d) $4 v_{max}$
- 12) Enzyme inhibition caused by a product of enzyme catalyzed reaction is
- a) competitive inhibition
 - b) non competitive inhibition
 - c) feed back inhibition
 - d) metabolic antagonism
- IV. 13) Night blindness is caused by the deficiency of
- a) Vitamin D
 - b) Vitamin C
 - c) Vitamin A
 - d) Vitamin K



- 14) Which among the following is a high energy compound ?
a) PEP
b) Malonate
c) AMP
d) Oxalo acetate
- 15) The coenzyme form of nicotinic acid is
a) FMNK
b) TPP
c) NAD⁺
d) COQ
- 16) The enzyme which forms the peptide bond is known as
a) Esterase
b) Carbohydrase
c) Amidase
d) Peptidyl transferase

SECTION -B

Short Answer Questions

(Answer **any eight** questions – weight – 1).

- 17) What is an allosteric enzyme ? Give an example.
- 18) Write the Michaelis-Menten equation ? What is its significance ?
- 19) How is vitamin D synthesized in our body ?
- 20) What are the coenzyme forms of pyridoxine ?
- 21) How pepsinogen is converted into pepsin ?
- 22) Name two muscle proteins.
- 23) What is the significance of nitrogenase enzyme ?
- 24) Write the reaction catalyzed by Rubisco ?
- 25) Name two uncoupling agents of electron transport chain. How do they act ?
- 26) What is the significance of stereospecificity of enzymes ?
- 27) What is the coenzyme form of thiamine ? Mention its significance.
- 28) Name two high energy phosphate compounds.

SECTION – C (Short Essay)

(Answer **any five** questions – weight – 2).

- 29) Distinguish between competitive and non competitive type of enzyme inhibition by means of double reciprocal plot.
- 30) Distinguish between substrate level phosphorylation and oxidative phosphorylation.
- 31) Explain the sliding filament theory for muscle contraction.
- 32) Write briefly on criteria of purity of enzymes.
- 33) Photorespiration is a wasteful process. Explain.
- 34) Explain the mechanism of nitrogen fixation.
- 35) Write short note on physiological functions of Vitamin A.
- 36) Explain the significance of photosystem I and II in Non cyclic photosynthetic electron transport and photophosphorylation.

SECTION – D (Long Essay)

Answer **any two** questions – weight – 4.

- 37) Discuss on mitochondrial electron transport chain and mechanism of oxidative phosphorylation.
 - 38) Write an account on factors affecting velocity of an enzyme catalysed reaction.
 - 39) Discuss on water soluble vitamins with special reference to coenzymes.
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Reg. No. : _____

(Pages : 4)

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Name : _____

Third Semester B.Sc. Degree Examination, October/November 2011
First Degree Programme under CBCSS
Complementary Course Common for Botany and Zoology
BC 1331 - ENZYMES AND BIOENERGETICS

Time: 3 Hours

Weight : 30

SECTION - A

Objective type of questions. Answer all bunch of four questions carries one weightage. (4×1=4 Weight)

I. 1) Amylase enzyme belongs to the class

- a) Dehydrogenases b) Lyases
c) Hydrolases d) Oxidases

2) At extreme temperatures enzyme activity decreases due to

- a) Inhibition b) Denaturation
c) Activation d) Renaturation

3) Double reciprocal plot means

- a) $1/S$ against $1/V$ plot b) - S against - V plot
c) $1/S$ against $1/-V$ plot d) V against S plot

4) An example for allosteric enzyme is

- a) Protein Kinase b) PEPCK
c) ATC d) Glycerate Kinase

II. 5) Vitamin with hormone function is

- a) Vit - A b) Vit - C c) Vit - D d) Vit - E

6) Coenzyme form of folic acid is

- a) Tetra hydro folate b) Mono hydro folate
c) FAD d) FMN

P.T.O.

- 7) B vitamins are rich in
 a) tubers
 c) inner layers of cereals
 ✓ b) outer layers of cereals
 d) in fruits
- 8) Thiamine pyrophosphate is associated with
 a) Carboxylases
 c) Decarboxylases
 ✓ b) Hydrolases
 d) Dehydrogenases
- III. 9) Free energy of hydrolysis of ATP is
 ✓ a) Negative b) Positive c) Medium d) Low
- 10) P/O ratio of NAD is
 a) 2 b) 1 ✓ c) 3 d) 0
- 11) Cyanide inhibit the electron transport at
 a) First span
 ✓ c) Third span
 b) Second span
 d) All the above
- 12) Hydrolysis of ATP yield
 a) 5 K.cal ✓ b) 7.3 K.cal c) 7 K.cal d) 9 K.cal
- IV. 13) Cytochrome f is associated with *not of Lyllebs.*
 ✓ a) Cyclic photophosphorylation ✓ b) Non Cyclic
 c) Mitochondrial ETC d) Peroxisomal ETC
- 14) In C_3 plants CO_2 is attached to
 ✓ a) 1, 3 Bis phosphoglycerate b) Glyceraldehyde 3 phosphate
 c) DHAP d) 1, 2 B.P.G.
- 15) The energy source of Nitrogen fixation is in the form of
 ✓ a) ATP b) GTP
 c) $NADH + H^+$ d) $FADH_2$
- 16) The enzyme associated with Nitrogen assimilation is
 ✓ a) Glutamine Synthase b) Glutamate Synthase
 c) Glutamine Reductase d) Glutamate Reductase

SECTION – B

(Short Answer Questions)

Answer any eight questions, each carries one weightage.

(8×1=8 Weight)

- V. 17) What are Ligases ?
- 18) Prove $K_m = [S]$.
- 19) What are Zymogens ?
- 20) Name the B vitamins.
- 21) Differentiate NAD and NADP. *Nicotinamide form*
- 22) Which coenzyme is formed from Vit. B₁₂ ?
- 23) What do you mean by redox couple ?
- 24) In which compartment of cell Oxidative Phosphorylation takes place.
- 25) Write the structure of ATP.
- 26) Name the components of photosystem - I.
- 27) Differentiate light and dark reaction of photosynthesis.
- 28) What you mean by C₃ Pathway ?

SECTION – C

(Short Essay)

Answer any five, each carries two weightages.

(5×2=10 Weight)

- VI. 29) Comments on double reciprocal plot.
- 30) Note on marker enzymes.
- 31) Write note on physiological role of Vit. C.
- 32) Importance of Vit B.



- 33) List the electron carriers in mitochondrial electron transport.
- 34) Differentiate oxidative and substrate level phosphorylation.
- 35) Explain cyclic phosphorylation.
- 36) Note on Nitrogen assimilation.

SECTION – D

(Long Essay)

Answer any two question, each carries four weightages.

(2×4=8 Weight)

- VII. 37) Differentiate competitive and Noncompetitive enzyme inhibition.
- 38) Explain mitochondrial electron transport.
- 39) Detailed note on Calvin cycle.
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Reg. No. :25018132010.....

Name :Ashna M.

Third Semester B.Sc Degree Examination, October 2019

First Degree Programme under CBCSS

(For Botany and Zoology)

Complementary Course – III

BC 1331 : ENZYMES AND BIOENERGETICS

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

1. Answer **all** questions. Very short answer type – Maximum **2** sentences :
1. Meaning of specific activity.
2. What you mean by broadly specific enzymes?
3. Differentiate pepsinogen and pepsin.
4. Precursor of Vitamin D.
5. Meaning of redox potential.
6. Role of Iron sulphur proteins in ETC.
7. Number of ATP produced from NADH in ETC.
8. What are Myosins?

9. Thick filaments.
10. Meaning of light reactions.

(10 × 1 = 10 Marks)

SECTION – B

Short Answer Questions – Not to exceed one paragraph. Answer any **eight**.

- ✓ 11. How enzymes are classified?
- ✓ 12. Advantages of Lineweaver Burk plot.
- ✓ 13. Non-Competitive enzyme inhibition.
- ✓ 14. Isoenzymes.
- ✓ 15. Functions of vitamin A.
16. Role of thiamine in metabolism.
- ✓ 17. Write two reactions of NADP.
- ✓ 18. Why the name ETC?
- ✓ 19. Meaning of P/O ratio.
20. Inhibition of ETC.
- ✓ 21. Energy sources of muscle contraction.
- ✓ 22. Nitrogen fixing enzymes.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six**. Short essays – Not to exceed **120** words.

23. Cyclic photophosphorylation.
24. Chemiosmotic theory.
25. Major electro carrying complexes in ETC.
26. Note on competitive enzyme inhibition.
27. Describe co enzymes of flavins?
28. What are high energy compounds?
29. Note on muscle proteins.
30. Differentiate C3 and C4 plants.
31. Nitrogen cycle.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two**. Long essay. Each carries **15** marks.

32. Essay on B complex vitamins.
33. Mechanisms of Oxidative phosphorylation.
34. Explain non-cyclic photo phosphorylation.
35. Details of enzyme regulation.

(2 × 15 = 30 Marks)



Reg. No. : 25016132018

Name : Anurba A.S.

Third Semester B.Sc. Degree Examination, December 2017
First Degree Programme under CBCSS
Complementary Course for Botany & Zoology
BC 1331 : ENZYMES AND BIOENERGETICS
(2014 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Very short answer type – Maximum two sentences.)

Answer all questions).

(10×1 = 10 Marks)

1. What is K_m (Michaelis constant) ?
2. Give full form of TPP as coenzyme.
3. What is oxidative phosphorylation ?
4. Mention the different photosynthetic pigments.
5. What are non-competitive inhibitors ?
6. What is the biological active form of Vitamin D ?
7. Name different coenzymes (any two) involved in biological oxidation.
8. Give any example of substrate level phosphorylation.
9. What happens to the carbohydrates formed in photosynthesis of green plants at a later stage ?
10. What are isoenzymes ? Give any two examples.

D - 3120

SECTION - II

(Short answer questions – **not** to exceed **one** paragraph.)

(Answer **any eight** questions).

(8×2 = 16 Marks)

- 11. What are enzyme inhibitors ?
- 12. What is the role of Vitamin D ?
- 13. Give the examples of substrate level phosphorylation.
- 14. Name the essential elements present in nitrogenase enzyme. What type of essential elements are they ?
- 15. Give the example of competitive inhibitors.
- 16. What is the biochemical role of biotin ?
- 17. Name few reactions where P/O ratio is 2.
- 18. Name an anaerobic, free lining, photo-heterotrophic nitrogen fixing bacterium.
- 19. What are activators ?
- 20. What is the "biological active" form of Thiamine ?
- 21. What are uncouplers ?
- 22. Write the balanced equation of nitrogen fixation.


SECTION - III

(Short essay – **not** to exceed **120** words.)

(Answer **any six** questions).

(6×4 = 24 Marks)

- 23. What are enzymes ? How are they classified ?
- 24. What are the physiological roles of Folic acid ?
- 25. Define Electron Transport Chain (ETC) or respiratory chain.
- 26. Give comparison between cyclic and non-cyclic photo-phosphorylation.

- 
27. What is meant by active site ? Explain with examples.
 - 28. What are the general functions of ascorbic acid ?
 - 29. Explain photosynthesis.
 - 30. What is coenzyme Q ? What are its role in ETC ?
 31. How the reducing equivalents are passed in ETC ?

SECTION - IV

(Long essay).

(Answer **any two** questions).

(15×2 = 30 Marks)

- 32. State the salient differentiating points of competitive and non-competitive inhibitions.
 33. Discuss any three important metabolic role of Vitamin C.
 - 34. Show schematically the exact sites of ATP production in the ETC.
 35. Discuss the photosystem - I and photosystem - II in photosynthesis.
-