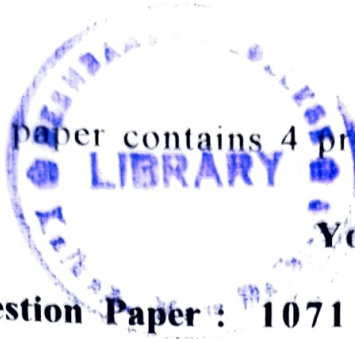


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Your Roll No.....

Sr. No. of Question Paper : 1071

I

Unique Paper Code : 2492012301

Name of the Paper : Metabolism of Lipids (DSC)

Name of the Course : **BSc (Hons) Biochemistry (NEP)**

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. **All** questions carry equal marks. Question no. 1 is compulsory.

1 (a) Justify the following :

- (i) Triacylglycerol is especially suitable as a storage fuel.

P.T.O.

- (ii) An individual with a genetic defect in enoyl CoA isomerase will have difficulty in metabolizing oil.
 - (iii) Linoleic and linolenic acids are essential to mammals.
 - (iv) Two isoenzymes of HMG CoA synthase are known.
 - (v) Fatty acid biosynthesis in rat liver homogenate is severely inhibited when avidin is added.
 - (vi) Brain, erythrocytes and adrenal medulla cannot utilize fatty acids for energy requirements.
- (b) Write the reactions catalyzed by the following enzymes :
- (i) HMG CoA Lyase
 - (ii) Acetyl CoA carboxylase (12,3)
2. Differentiate between the following :
- (a) Alpha and omega oxidation.
 - (b) Endogenous and Exogenous pathway of lipid

transport.

(c) Fatty acid oxidation in mitochondria and peroxisome. (5×3)

3. (a) Calculate the net number of ATP generated on complete oxidation of oleic acid.

(b) Give an overview of the digestion and absorption of lipids.

(c) With the help of a diagram explain the process by which a fatty acid is transported to mitochondria for its complete oxidation. (5×3)

4. Give the following conversions :

(a) Acetyl CoA to mevalonate

(b) Dihydroxyacetone phosphate to phosphatidic acid

(c) CDP-diacylglycerol to phosphatidylethanolamine (5×3)

5. (a) What are the various classes of lipoproteins? How do they differ from each other in terms of lipid composition?

(b) What are Ketone bodies and what are their uses? What is the significance of ketone bodies during P.T.O.

diabetes and starvation?

- (c) What are the various ways by which cholesterol biosynthesis is regulated? Elaborate. (5×3)

6. Write short notes on the following :

(a) Plasmalogen Synthesis

(b) Fatty Acid Synthase Complex

(c) Artherosclerosis (5×3)

[This question paper contains 4 printed pages.]

27/12/24
Your Roll No.....

Sr. No. of Question Paper : 1128

I

Unique Paper Code : 2492012302

Name of the Paper : Bioenergetics

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are **six** questions in this question paper.
3. Attempt any **four** questions. **All** questions carry equal marks. Question No. 1 is compulsory.

1. (a) Explain the following :

(i) Many thermodynamically favorable reactions like hydrolysis of ATP do not occur readily at room temperature.

(ii) Accessory pigments funnel light energy to the reaction center.

P.T.O.

- (iii) Oxygen is not evolved in cyclic photophosphorylation.
- (iv) An inhibitory protein inhibits ATP hydrolysis during ischemia.
- (v) Each cytochrome present in the ETC has a different reduction potential.
- (vi) Bioluminescence is the reverse of photosynthesis.

(b) Define the following terms :

- (i) Standard reduction potential
- (ii) Action spectrum
- (iii) Uncoupler

(12,3)

2. (a) Give the role of the following :

- (i) Isoprenoid chain in ubiquinone
- (ii) Brown fat in newborn mammals
- (iii) ANT in mitochondria

(b) Describe the structure of

ATP synthase. ... the binding change mechanism of the enzyme.

- (c) Plant mitochondria have an alternate rotenone insensitive NADH dehydrogenase and a cyanide resistant oxidase that constitutes an alternate pathway to oxidize NADH. Comment on the role of this alternate pathway in plants. (6,6,3)
3. (a) What is the role of cytochrome b_6f complex in the photosynthesis carried out by plants. Depict the flow of electrons and protons through this complex.
- (b) A thermodynamically unfavorable reaction can be driven in forward direction by coupling it to hydrolysis of ATP.
- (c) Differentiate between the universal electron carriers and the mitochondrial electron carriers. (6,6,3)
4. (a) With the help of a diagram explain the Z-scheme of photosynthesis.
- (b) Calculate the standard free-energy change for the oxidation-reduction reaction at pH 7.0
- $$\text{Acetaldehyde} + \text{NADH} + \text{H}^+ \rightarrow \text{Ethanol} + \text{NAD}^+$$
- Given that the standard reduction potential of acetaldehyde/ethanol redox pair = -0.197 and the standard reduction potential of NAD^+/NADH redox pair = -0.320V.

P.T.O.

(c) Give the mode of action of the following inhibitors :

- | | |
|---------------------|--------------------|
| (i) Amytal | (ii) Dinitrophenol |
| (iii) Atractyloside | (iv) Cyanide |
| (v) DCMU | (6,4,5) |

5. (a) Explain the chemiosmotic theory and discuss two evidences in support of the theory.

(b) Describe the photosynthetic machinery of purple bacteria.

(c) Calculate the Standard Free Energy change of the following reaction



Given that starting with 20 mM of Glucose-1-phosphate and no Glucose-6-phosphate, the final equilibrium mixture at 25°C and at pH = 7.0, contains 1.0 mM Glucose-1-phosphate and 19m M Glucose-6-phosphate.

Does the reaction proceed with a loss or gain of energy? (5,5,5)

6. Write short notes on the following :

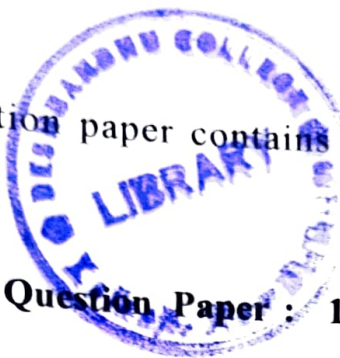
(a) Cyclic photophosphorylation

(b) Complex II of ETC

(c) Q-Cycle (5,5,5)

(200)

[This question paper contains 4 printed pages.]



09/01/2025

Your Roll No.....

Sr. No. of Question Paper : 1272

I

Unique Paper Code : 2493012003

Name of the Paper : DSE – Microbiology

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks.
5. Question no. 1 is compulsory.

P.T.O.

1. (a) Give the contribution of following Scientists.

- (i) Alexander Fleming
- (ii) Louis Pasteur
- (iii) Paul Ehrlich
- (iv) Sergei Winogradsky
- (v) Martinus W. Beijerinck

(b) Justify the following statements :

- (i) Agar-Agar is a better solidifying agent as compared to gelatin.
- (ii) Blood agar is both selective and enriched medium.
- (iii) Archaeobacteria is similar to both prokaryotes and Eukaryotes.
- (iv) Chlorine treatment should be avoided in water containing organic matter.

(c) What do you mean by "fermented food" and discuss with two suitable examples. (5,6,4)

2. (a) Compare the Gram positive and Gram-negative cell wall of the bacteria. What is the mechanism of Gram staining?
- (b) What are psychrophile and mesophiles? Discuss briefly dry heat and wet heat method of sterilization.
- (c) Why would microbial cells that are vigorously growing when inoculated into fresh culture medium have a shorter lag phase than those that have been stored in a refrigerator? (6,6,3)
3. (a) Discuss transduction and transformation bacterial gene transfer methods with suitable diagram.
- (b) What do you mean by gene mapping in bacteria? Discuss the method and significance.
- (c) Give the mechanism of action and application of Ethanol and UV in controlling microbial growth. (6,6,3)
4. (a) What do you understand by Human Microbiome. How does it influence gut health?
- (b) Schematically explain the industrial preparation of wine.

- (c) Discuss the characteristic features of Prions and Virioids? Give examples of any two diseases caused by them. (6,5,4)
5. (a) Describe the basic design of a fermenter. Differentiate between continuous and discontinuous culture?
- (b) Diagrammatically explain the following :
- (i) Two methods of isolation of a pure culture
 - (ii) Effect of temperature on microbial growth (9,6)
6. (a) Explain the various processes involved in the treatment of sewage. Mention the role of microbes in the wastewater treatment.
- (b) Define the doubling time and the mean growth rate constant. Calculate the mean growth rate and generation time of a culture that increases in the exponential phase from 5×10^2 to 1×10^8 in 12 hours.
- (c) What is Biogenesis? Give an experiment in support of it. (7,5,3)