Answer the following

a) Give 2 examples of physiological uncouplers of oxidative phoshorylation
Long chain Fatty acids, thyroxine, bilirubin

b) Name a drug that inhibits DNA Polymerase III
Cytosine Arabinoside (AraC) 2. Acyclovir (Acy) 3. Ganciclovir (Gan): 4. Foscarnet (FOS) 5. Gemcitabine (dFdC)

c) Name the enzyme involved in synthesis of eukaryotic mRNA
RNA polymerase

d) Name drug which inhibits HMG CoA reductase
Compactin , Atorvastatin, lovastatin

e) Name enzyme involved in removal of primer in prokaryotic replication
Polymerase I

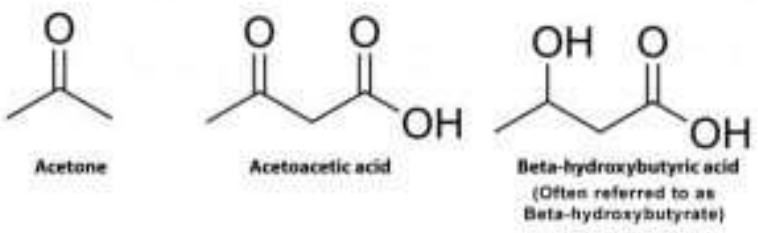
f) Name a drug inhibiting thymidylate synthase
Raltitrexed, flurouracil

g) How does tetracyaline inhibits protein synthesis
inhibit the initiation of translation in variety of ways by binding to the 30S ribosomal subunit, which is made up of 16S rRNA and 21 proteins. They inhibit the binding of aminoacyl-tRNA to the mRNA translation complex

h) Give the significance of glyoxylate pathway
The glyoxylate cycle allows plants and some microorganisms to grow on acetate because the cycle bypasses the decarboxylation steps of the citric acid cycle. The enzymes that permit the conversion of acetate into succinate-isocitrate (more...) ... Thus, organisms with the glyoxylate cycle gain a metabolic versatility.

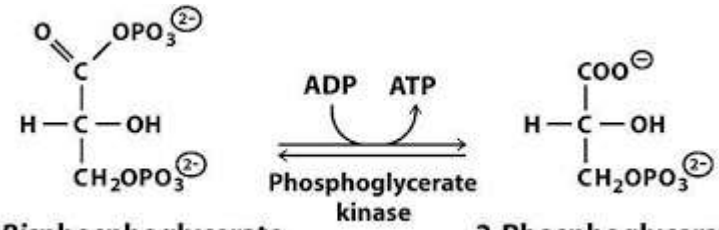
i) Give names of two shuttle systems for transfer of reducing equivalents to mitochondria 1. Aspartate malate shuttle
2.Glycerol phosphate shuttle

j) Enlist any two ketone bodies with its structure



k Define Substrate level phosphorylation with an example
Substrate-level phosphorylation is a metabolic reaction that results in the formation of ATP or GTP by the direct transfer of a phosphoryl group to ADP or GDP from another phosphorylated compound
he reaction catalyzed by phosphoglycerate kinase is readily reversible inside the cell. (In

biochemistry courses, we say that it is a near-equilibrium reaction.)



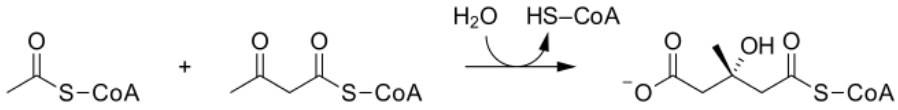
1,3-*Bis*phosphoglycerate **3-Phosphoglycerate**

When glucose is being synthesized (gluconeogenesis) the reaction goes from right to left and a molecule of ATP is used up to create 1,3-*bis*phosphoglycerate. During glycolysis, when glucose is being broken down, the reaction goes from left to right and a molecule of ATP is produced when the phosphate group on 1,3-*bis*phosphoglycerate is transferred to ADP.

This is an example of ATP synthesis by substrate-level phosphorylation. It's one of two such reactions in glycolysis and it's the main reason why the degradation of glucose can be used to produce useful energy. For example, when glucose is taken up from the blood stream by muscle cells and degraded to produce ATP that can be used in muscle contraction.

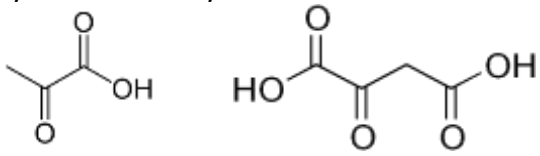
Q2 a) Give the names and structures of the substrate and product of the Following enzymatic

i) HMG CoA synthase



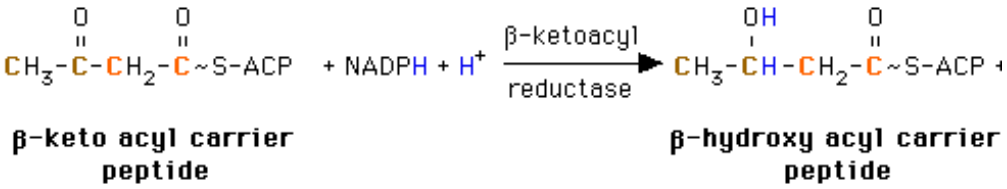
cetyl-CoA + H_2O + acetoacetyl-CoA (S)-3-hydroxy-3-methylglutaryl-CoA + CoA

ii) Pyruvate carboxylase



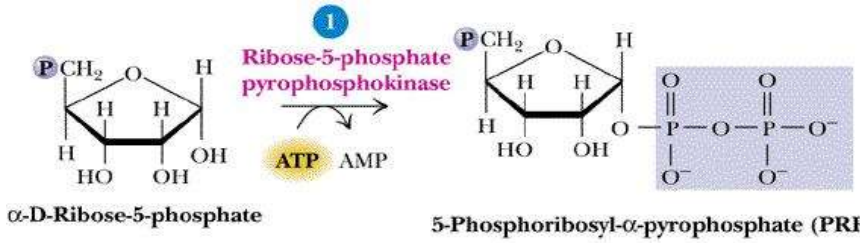
pyruvate+ HCO^-_3 + ATP → oxaloacetate + ADP + P

iii) β - Ketoacyl ACP reductase

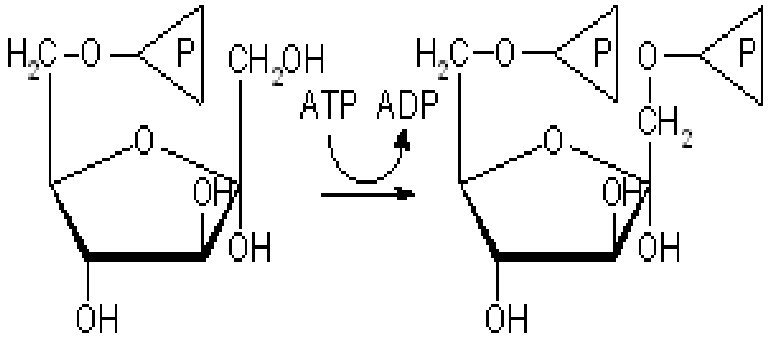


b) Write structures of given substrate and product with name of the enzyme catalysing the reaction (any 2)

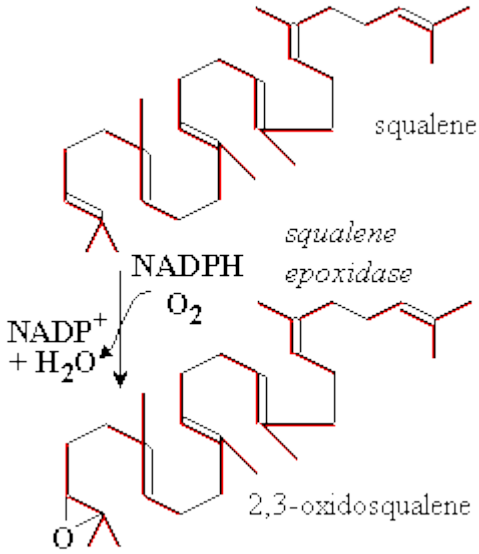
i) α -D- ribose-5- phosphate to 5-PRPP



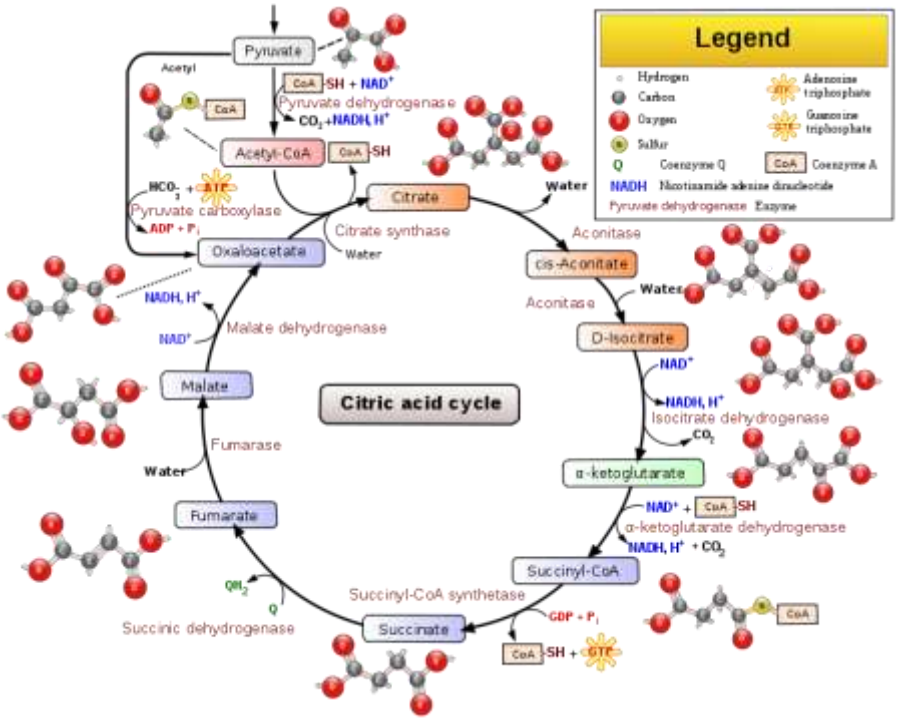
ii) Fructose-6-phosphate to Fructose-1,6-bisphosphate: Phosphofructo kinase I



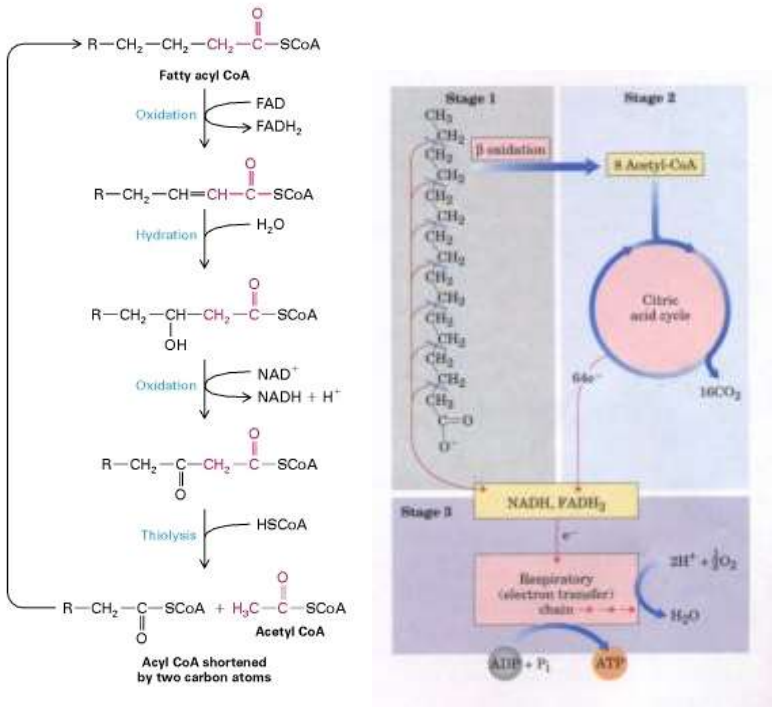
iii) Squalene to Squalene- 2,3-epoxide



3.a)Outline series of reaction involved in Kreb's cycle



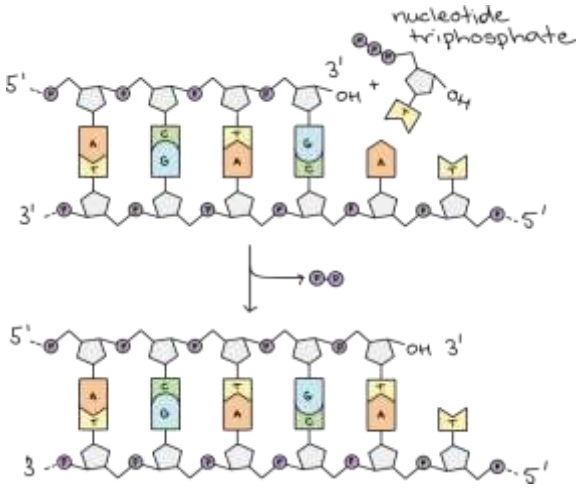
b)Write reactions for actual β -oxidation of palmitic acid with net ATP yield



c)

Write note on telomere and telomerase

the primers of the Okazaki fragments can be easily replaced with DNA and the fragments connected to form an unbroken strand. When the replication fork reaches the end of the chromosome, however, there is (in many species, including humans) a short stretch of DNA that does not get covered by an Okazaki fragment—essentially, there's no way to get the fragment started because the primer would fall beyond the chromosome end^11start superscript, 1, end superscript. Also, the primer of the last Okazaki fragment that *does* get made can't be replaced with DNA like other primers.



Thanks to these problems, part of the DNA at the end of a eukaryotic chromosome goes uncopied in each round of replication, leaving a single-stranded overhang. Over multiple rounds of cell division, the chromosome will get shorter and shorter as this process repeats.

Telomeres

To prevent the loss of genes as chromosome ends wear down, the tips of eukaryotic chromosomes have specialized DNA “caps” called **telomeres**. Telomeres consist of hundreds or thousands of repeats of the same short DNA sequence, which varies between organisms but is 5'-TTAGGG-3' in humans and other mammals.

4. a)

Discuss post transcriptional modifications

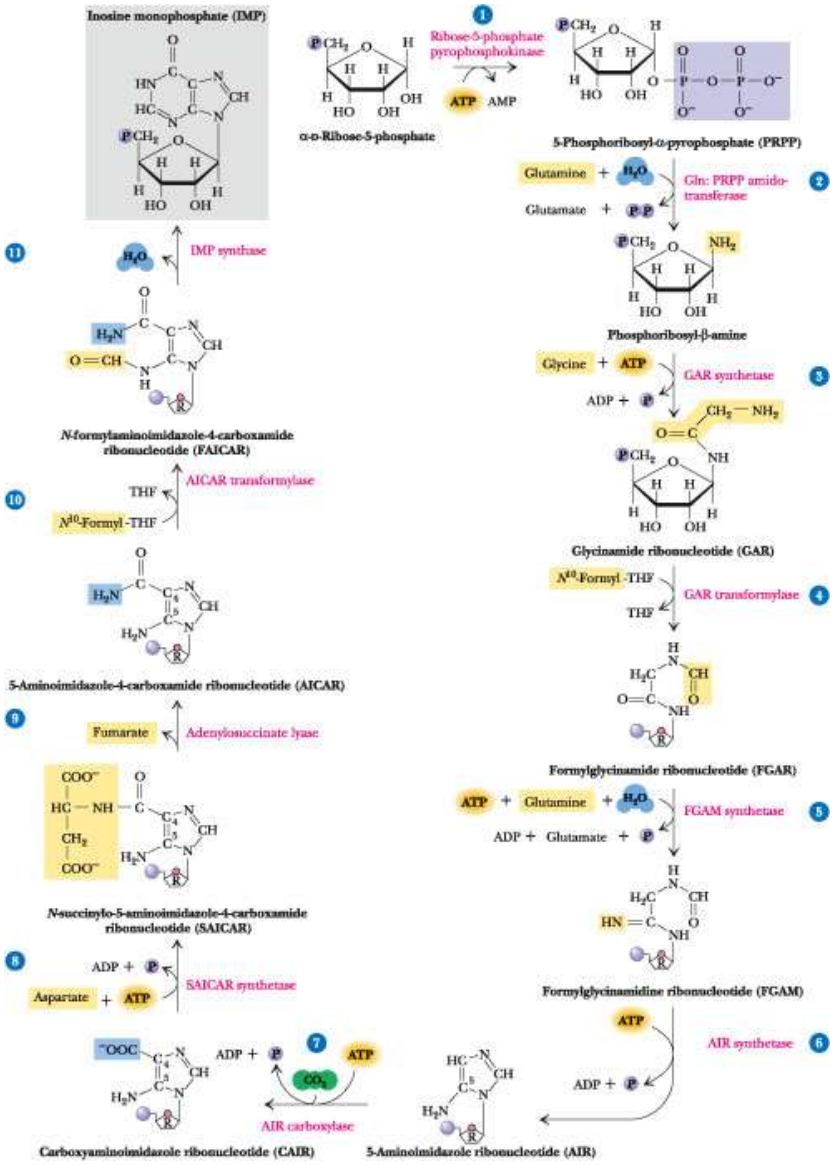
Post-Transcriptional RNA Processing

DNA transcription occurs in a cell's nucleus. The RNA that is synthesized in this process is then transferred to the cell's cytoplasm where it is translated into a protein. In prokaryotes, the RNA that is synthesized during DNA transcription is ready for translation into a protein. Eukaryotic RNA from DNA transcription, however, is not immediately ready for translation.

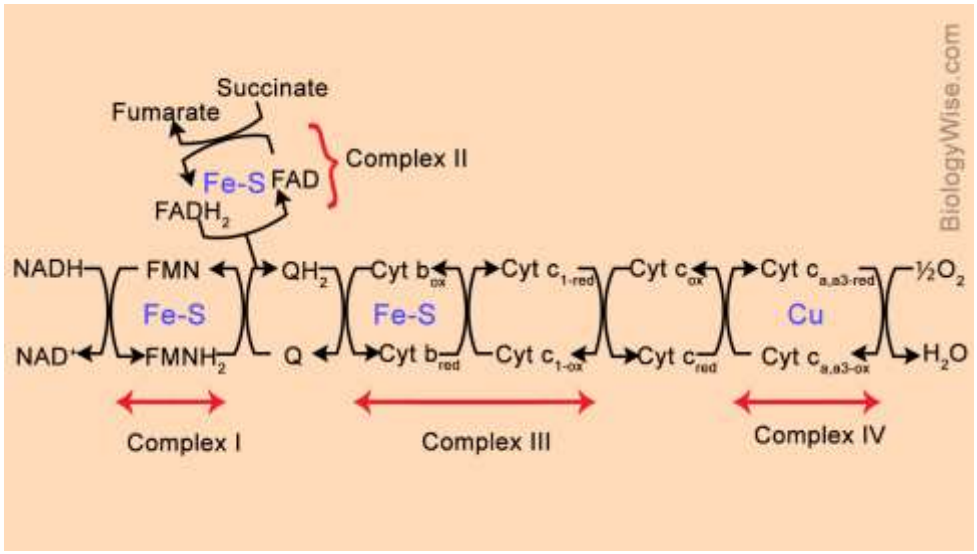
Post-transcriptional modifications OF RNA accomplish two things: 1) Modifications help the RNA molecule to be recognized by molecules that mediate RNA translation into proteins; 2) During post-transcriptional processing, portions of the RNA chain that are not supposed to be translated into proteins are cut out of the sequence. In this way, post-transcriptional processing helps increase the efficiency of protein synthesis by allowing only specific protein- coding RNA to go on to be translated. Without post-transcriptional processing, protein synthesis could be significantly slowed, since it would take longer for translation machinery to recognize RNA molecules and significantly more RNA would have to be unnecessarily translated to achieve the same results.

In this section, we will discuss the three processes that make up these post- transcriptional modifications: 5' capping, addition of the poly A tail, and splicing. The 5' capping reaction replaces the triphosphate group at the 5' end of the RNA chain with a special nucleotide that is referred to as the 5' cap. It is thought to help with mRNA recognition by the ribosome during translation. A modification also takes place at the opposite end of the RNA transcript. To the 3' end of the RNA chain 30-500 adenines are added in what is called a poly A tail.

b)Describe de novo synthesis of IMP



c) Draw schematic representation of ETC



Q.P. Code :02231 biochemistry II (credit based) Answer key

5. a) Discuss translation in detail
Reference: Lehninger principles of biochemistry, fourth edition page no. 1044-1045, 1054-1060

b) Write reactions for oxidative phase of pentose phosphate pathway
Reference: Lehninger principles of biochemistry, fourth edition page no. 550

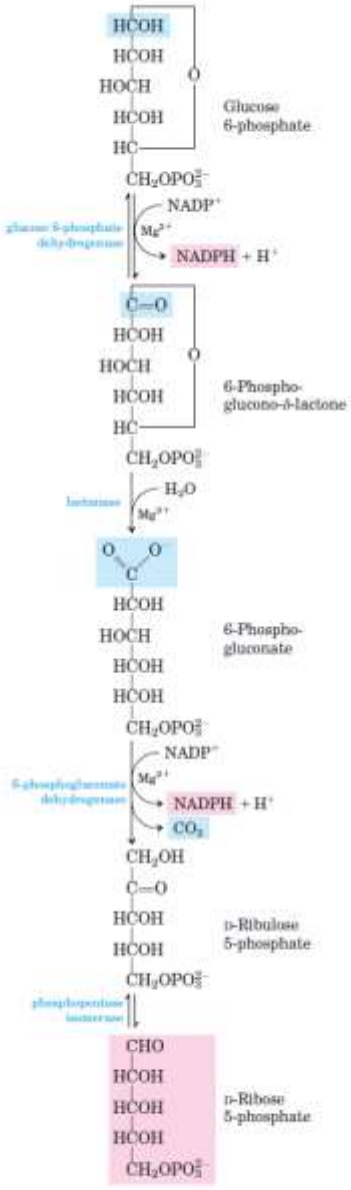
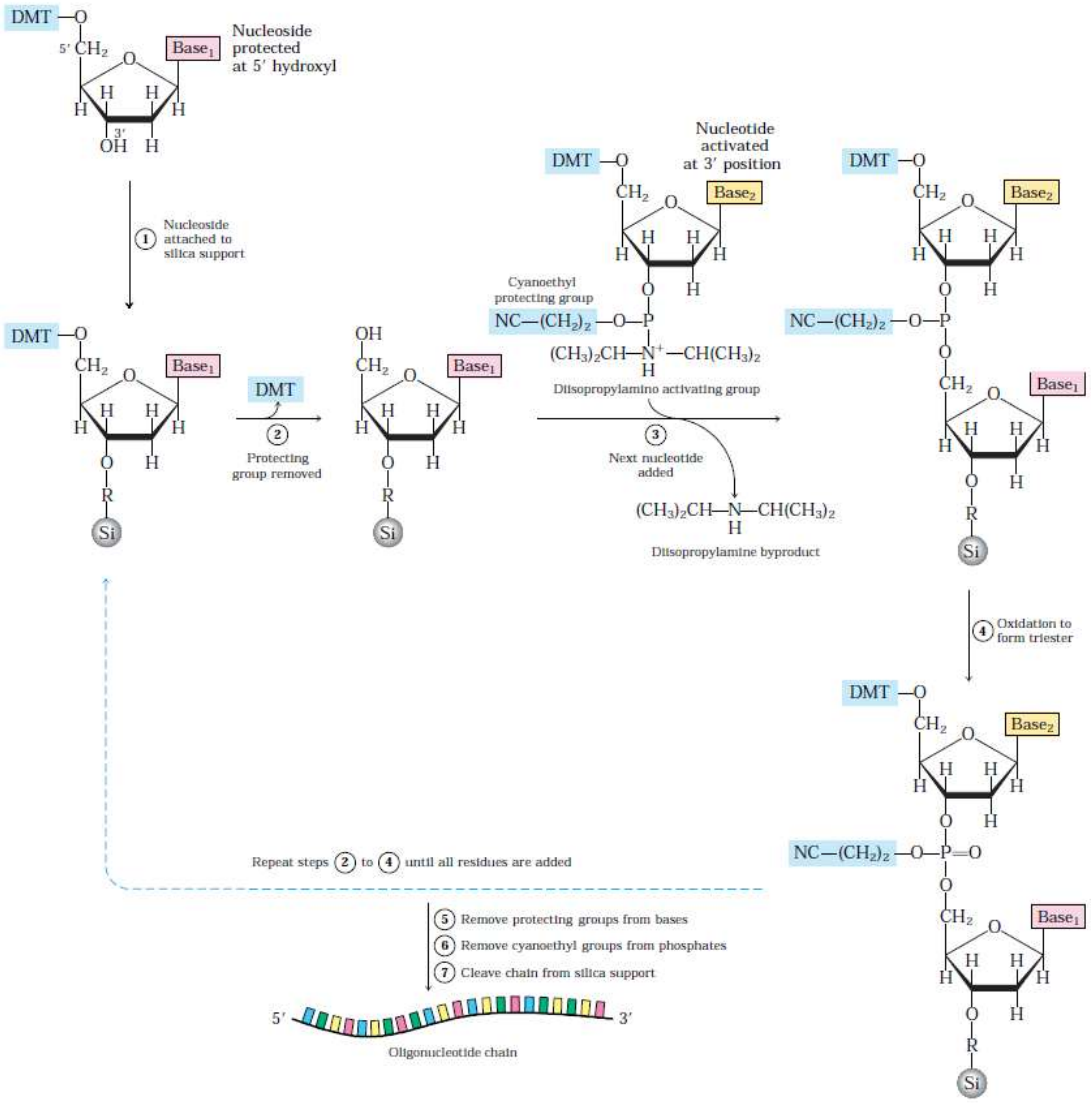


FIGURE 14–21 Oxidative reactions of the pentose phosphate pathway. The end products are ribose 5-phosphate, CO_2, and NADPH.

c) Explain any one method for DNA sequencing
Reference: Lehninger principles of biochemistry, fourth edition page no. 297-298

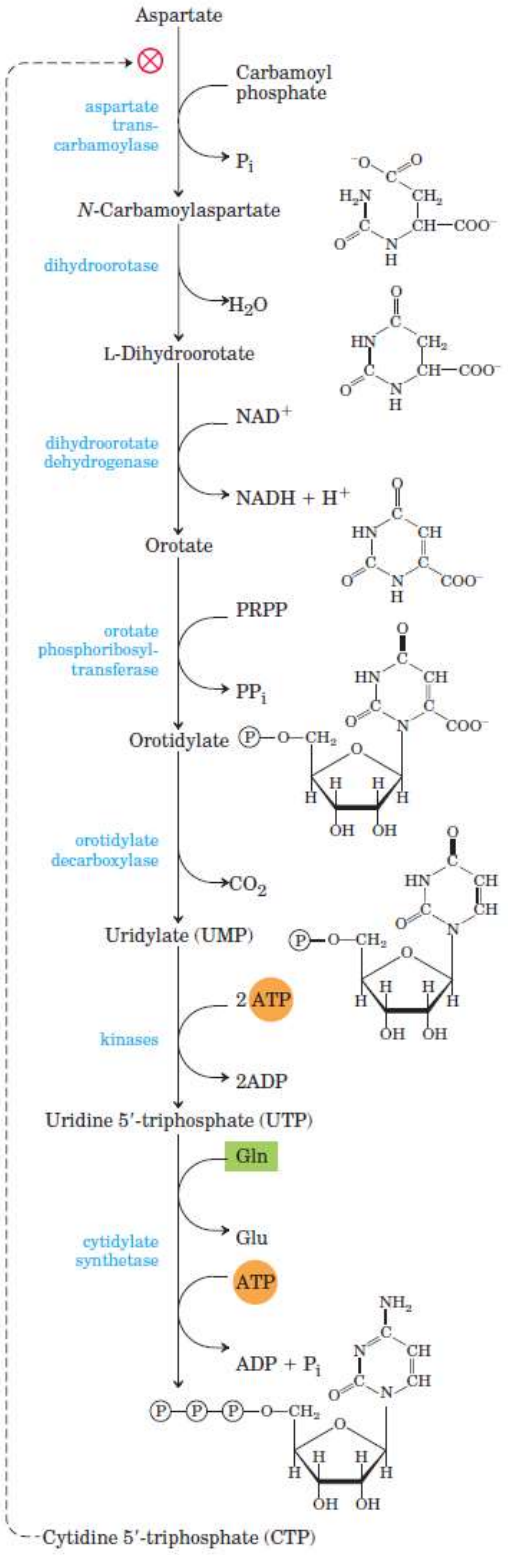
6. a) Discuss solid phase DNA synthesis
Reference: Lehninger principles of biochemistry, fourth edition page no. 298-299



Reference: Mc Murry Organic chemistry , eighth edition page no. 1142-1144

b) Give the biosynthesis of CTP

Reference: Lehninger principles of biochemistry, fourth edition page no. 867-868



c) Compare enzymatic biosynthesis against chemical synthesis of peptide

Reference: Lehninger principles of biochemistry, fourth edition page no. 105,1044-1045, 1054-1060

d) Describe role of proteases and peptidases in peptide sequencing
Reference: Lehninger principles of biochemistry, fourth edition page no. 99-100