

	<p style="text-align: center;">BCMSCHOOL BASANT AVENUE, DUGRI LUDHIANA XII BIOLOGY ASSIGNMENT ANSWER KEY</p>						
1	<p>Francis Crick postulated tRNA as an adapter molecule. (a) It has amino acid binding site at 3' end. (b) It has anticodon to recognize the codon on mRNA for the amino acid.</p>						
2	<p>(a) Transcription level, Processing level, Transport of mRNA to cytoplasm, Translation level. (b) Gene i.</p>						
3	<p>hnRNA undergoes splicing to remove non-coding sequences, i.e. introns and joins exons. Splicing occurs in the nucleus of the cell.</p>						
4	<p>According to Chargaff's rule $A + G = C + T = 50\%$ \therefore if $A = 31\%$ then $T = 31\%$; $C + T = 50\%$ $\therefore C = 50\% - 31\% = 19\%$</p>						
5	<p>i) DNA replication occurs in small replication fork and not in its entire length because whole DNA cannot be opened in one stretch due to high energy requirement. (ii) DNA replication is continuous and discontinuous in a replication fork because the enzyme DNA polymerase can carry out polymerisation of the nucleotides only in 5-3' direction. On the template strand with 3-5' polarity, DNA replication is continuous. On the template strand with polarity 5-3', the DNA replication occurs in short stretches and is called discontinuous. (iii) Replication of DNA does not initiate randomly, and DNA polymerases on their own cannot initiate replication. So, there is a need of specific sequence, called origin of replication from which the replication starts. DNA polymerase binds to it and continues the process</p>						
6	<p>(i) They worked with bacteriophage, i.e. viruses that infect bacteria. These viruses were used because during infection they transfer their genetic material into bacteria. (ii) They used two types of culture media, containing ^{35}S and ^{32}P, so as to compare that which one out of DNA and proteins gets transferred from virus to bacteria and acts as genetic material. (iii) A blender and centrifuge was used to open up the bacterial cells and viral particles, so, that genetic material could be exposed. (iv) Conclusion DNA is the genetic material.</p>						
7	<p>From the Hershey and Chase experiment, the fact was established that DNA acts as genetic material. But later studies revealed that in some viruses (e.g. Tobacco Mosaic Viruses, QB bacteriophage, etc.) RNA is the genetic material. Following are the criteria that a molecule must fulfil to act as a genetic material. It- should be able to replicate. It should be chemically and structurally stable. It should provide the scope for slow changes (mutation), which are required for evolution. It should be able to express itself in the form of 'Mendelian characters'. According to these criteria, both DNA and RNA have the ability to direct their duplications (because of the rule of base pairing and complementarity). So, both the nucleic acids (DNA and RNA) have the ability to direct their duplications, whereas the other molecules in the living system, fail to fulfil first criteria itself, e.g. protein. The most important criteria of genetic material is the stability as the genetic material should not change with the different stages of life cycle, age or with change in the physiology of an organism. Both DNA and RNA have the ability to mutate. Since, RNA is unstable, it mutates at a faster rate. That is why, those viruses, which have RNA genome and a shorter lifespan, undergo mutation and thus, evolve rapidly.</p>						
8	<p>i) The organism is bacterium <i>Streptococcus pneumoniae</i>. Differences between S-strain and R-strain are as follows</p> <table border="1"> <tr> <td>S-strain</td><td>R-strain</td></tr> <tr> <td>They form smooth colonies protected by a capsule.</td><td>They form rough colonies without a capsule</td></tr> <tr> <td>They are virulent.</td><td>They are non-virulent.</td></tr> </table> <p>(ii) 1 A – Mice died. B – Mice lived. (iii) Frederick Griffith performed these steps. (iv) When DNase was added to the medium, the DNA of the heat-killed cells got denatured and was unable to carry transformation. This indicates that DNA was the transforming component.</p>	S-strain	R-strain	They form smooth colonies protected by a capsule.	They form rough colonies without a capsule	They are virulent.	They are non-virulent.
S-strain	R-strain						
They form smooth colonies protected by a capsule.	They form rough colonies without a capsule						
They are virulent.	They are non-virulent.						