DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : BIOLOGY
DPP No. : 8

Topic :- MOLECULAR BASIS OF INHERITANCE

1. (B) Reginald C. Punnet was a British Geneticist.

2. (B) This experiment was conducted by Messelson & Stahl in *E.coli* bacteruim.

3. (D)The lac operon was discovered by Francois Jacob and Jacques Monod.

4. (A) Enhancer is not a part of the operon.

5. (C) Coding sequence (5' - 3') – AGGTATCGCAT
m- RNA (also in 5' - 3') – AGGUAUCGCAU

6. (D) Polytene chromosomes are found in salivary glands of *Drosophila.*

7. (C) Polysome is many ribosomes associated with a single m-RNA

8. (D) Rough Enodplasmic reticulum is involved in protein synthesis and secretion.

9. (A) UGU codes for the same information as UGC as both codes for cystine. UGA and UAG are non-sense codons and UGG codes for tryptophan.

10. (A) *t*RNA has 5 single or unpaired regions, among these one is the amino acid attachment site with 3′ terminal – CCA sequence. It has a clover leaf shape which is 2- dimensional. Codons are recognised by anticodons of *t*RNAs.

11. (D) DNA replication is semi-conservative and discontinuous. Short pieces called okazaki fragments are synthesized. One strand synthesizes a continuous strand and the other okazaki fragments, Both new strands are synthesized in 5′ - 3′ direction. Thus, one strand is synthesized forwards and the other backwards.

12. (B) A A A-lysine is the correctly matched with regard to the codon and the amino acid coded by it. A A A was assigned to lysine and CCC to proline. AUG codes for methionine, UUA for leucine.

13. (C) Nonsense codon is a set of three nucleotides for which there is no corresponding *t*RNA molecule to insert an amino acid into the polypeptide chain. Protein synthesis is hence terminated and the completed polypeptide released from the ribosome. Three stop codons are UAA (ochre), UAG (amber) and UGA (opal).

14. (C) Since a typical green plant is diploid, therefore it has two sets of chromosomes. So the number of genome will be two, because genome is the entire set of gene carried by a gamete or present in the haploid cell of a particular organism.

15. (C) The chromosome complement of *Triticum aestivum* (2n = 26) is similar to that of *Gossypium* whose ploidy level is also 2n = 26. *Zea mays* has ploidy level of 2n = 20. *Secale* and *Aegilops* both have the similar ploidy level of 2n = 14.

16. (C) DNA polymerase canpolymerize nucleotides only in 5′ → 3′ direction on 3′ → 5′ strand because it adds them at the 3′ end. Since the two strands of DNA run in antiparallel directions, the two templates provide different ends for replication. Replication over the two templates thus proceeds in opposite directions. One strand with polarity 3′ → 5′ forms its complementary strand continuously because 3′ end of the latter is open for elongation. It is caled leading strand. Replication is discontinuous on the other template with polarity 5′ → 3′ because only a short segment of DNA strand can be built in 5′ → 3′ direction due to exposure of a small stretch of template at one time. Short segments of replicated DNA are called as Okazaki fragments.

17. (D) The binding site of *t*RNA with *m*RNA is anticodon loop and with amino acid is CCA end. *t*RNA has 5 single or unpaired regions, among these one is the amino acid attachment site with 3′ terminal – CCA sequence. It has a clover leaf shape which is 2- dimensional. Codons are recognised by anticodons of *t*RNAs.

18. (D) 1 map unit or centimorgan is equivalent to 1% recombination between two genes. The frequency of recombination can be used to depict the arrangement of the genes.
Recombination frequency between three genes is

A – B = 9%
A – C = 17% and
B – C = 26%

By manipulating the three possibilities of their arrangements A – B – C, A – C – B and B – A – C, it was found that the three gene must be arranged in the order B – A – C with distance between B – A being 9 cM and A – C being 17 cM and the distance between B – C being 26 cM.

19. (B) There are 64-triplet codons which code for 20 amino acids. This is due to the degeneracy of code as some amino acids are influenced by more than one codon. Only tryptophan and methionine are specified by single codons. All other amino acids are specified by two (*e.g.*, phenylalanine— UUU, UUC) to six (*e.g.*, arginine—CGU, CGC, CGA, CGG, AGA, AGG) codons.

20. (B) hnRNA (heterogeneous nuclear RNA) does not function until it undergoes processing. Post-transcriptional processing converts hnRNA into functional RNA, which then participates in translation (protein synthesis). *m*RNA, *t*RNA and *r*RNA are the functional RNAs which take part in translation.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	B	B	D	A	C	D	C	D	A	A
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	B	C	C	C	C	D	D	B	B