Sample Paper 7

ANSWER KEYS																			
1	(c)	**7**	(c)	**13**	(d)	**19**	(b)	**25**	(c)	**31**	(c)	**37**	(b)	**43**	(a)	**49**	(c)	**55**	(a)
2	(b)	**8**	(a)	**14**	(a)	**20**	(c)	**26**	(a)	**32**	(c)	**38**	(b)	**44**	(d)	**50**	(d)	**56**	(a)
3	(a)	**9**	(d)	**15**	(a)	**21**	(b)	**27**	(c)	**33**	(d)	**39**	(b)	**45**	(d)	**51**	(c)	**57**	(a)
4	(d)	**10**	(b)	**16**	(c)	**22**	(b)	**28**	(b)	**34**	(c)	**40**	(b)	**46**	(d)	**52**	(c)	**58**	(c)
5	(b)	**11**	(a)	**17**	(b)	**23**	(a)	**29**	(a)	**35**	(a)	**41**	(c)	**47**	(b)	**53**	(a)	**59**	(a)
6	(a)	**12**	(c)	**18**	(d)	**24**	(a)	**30**	(b)	**36**	(b)	**42**	(b)	**48**	(d)	**54**	(a)	**60**	(b)

SOLUTIONS

1. (c) 2. (b)

3. (a) Cross pollination leads to hybrid vigour or superiority.

4. (d) 5. (b)

6. (a) LH surge usually occurs around day 14 of a 28 day menstrual cycle.

7. (c) 8. (a) 9. (d) 10. (b)

11. (a) Geitonogamy is the transfer of pollen grains from the anther to the stigma of another flower of the same plant. Although geitonogamy is functionally crosspollination involving a pollinating agent, genetically it is similar to autogamy since the pollen grains come from the same plant.

12. (c) The most common cause of variations is recombination in the organism which are reproduced by sexual way.

13. (d) Linkage is the inheritance of genes of same chromosome together and capacity of these genes to retain their parental combination in subsequent generation. The strength of linkage between two genes is inversely proportional to the distance between the two. This means, two linked genes show higher frequency of recombination if the distance between them is higher and lower frequency if the distance is smaller.

14. (a) 15. (a) 16. (c) 17. (b)

18. (d) Sickle cell disease is inherited in an autosomal recessive pattern.

19. (b) Haemophilia is sex linked recessive disease in which a simple protein that is a part of protein cascade involved in clotting of blood is affected. Due to this, in an affected individual a simple cut will result in non stop bleeding.

20. (c) In transition substitution a purine is replaced by another purine base (A with G or vice versa). In transversion substitution a purine is replaced by a pyrimidine base or vice versa. Frameshift mutation is a type of mutation where the reading of codons is changed due to insertion or deletion of nucleotides. Transition is the formation of RNA over the template of DNA.

21. (b) Crossing over occurs between non–sister chromatids of two homologous chromosomes. Homologous chromosomes form bivalent. Crossing over occurs between chromosomes in a nucleus.

22. (b) Protein synthesis is a two-step process involving transcription in the cell nucleus followed by translation in the cytoplasm. All the other choices are either factually inaccurate or, if accurate, need not necessarily take place for protein synthesis to occur.

23. (a)

24. (a) AUG is initiating codon. UCG codes for serine, UUU codes for phenylalanine, UGU codes for cysteine.

25. (c) Assertion is correct but Reason is incorrect.
The number of linkage groups corresponds to the haploid number of chromosomes.

26. (a) Assertion and Reason are correct and the Reason is a correct explanation of Assertion.
Crossing over takes place in pachytene stage of prophase I of meiotic division.

27. (c) Assertion is true but Reason is false.
The first mestruation begins at puberty (12-13 years in girls) and is called menarche. Mestruation occurs in every 28 or 29 days in human females. Mestrual cycle stops in women around 50 years of age. This is known as menopause.

28. (b) Assertion and Reason are correct but Reason is not a correction explanation of Assertion.
The okazaki fragments are finally joined by the enzyme DNA ligase.

29. (a) 30. (b) 31. (c) 32. (c) 33. (d)

34. **(c)** Permanent method of birth control in which testes are surgically removed, is called castration.

35. **(a)**

36. **(b)** Independent assortment of genes takes place only when they are located on separate non-homologus chromosomes. Where two or more than two genes are located on same chromosome, independent assortment will not be possible.

37. **(b)** **38.** **(b)** **39.** **(b)**

40. **(b)** In grasshopper the males lack a Y-sex chromosome and have only an X-chromosome. They produce sperm cells that contain either an X chromosome or no sex chromosome, which is designated as O.

41. **(c)** Seven pairs of contrasting characters were selected in pea plant and studied by Mendel in his experiment.

42. **(b)** Hemophilia A and hemophilia B are inherited in an X-linked recessive pattern. The genes associated with these conditions are located on the X chromosome, which is one of the two sex chromosomes. In males (who have only one X chromosome), one altered copy of the gene in each cell is sufficient to cause the condition. In females (who have two X chromosomes), a mutation would have to occur in both copies of the gene to cause the disorder. Because it is unlikely that females will have two altered copies of this gene, it is very rare for females to have hemophilia. A characteristic of X-linked inheritance is that fathers cannot pass X-linked traits to their sons.

43. **(a)**

44. **(d)** The given flowchart shows the process of spermatogenesis. The marked steps A to D are respectively mitosis differentiation, Ist meiotic division, 2nd meiotic division and 23.

45. **(d)** All of these are ways that gene expression can be regulated, but transcriptional control is clearly the most common mechanism.

46. **(d)** **47.** **(b)**

48. **(d)** The implant is inserted under the skin of upper arm to prevent pregnancy. The implant releases hormones that keep ovaries from releasing eggs and thicken cervical mucus, which helps to block sperm from getting to the egg in the first place.

49. **(c)** **50.** **(d)** **51.** **(c)** **52.** **(c)** **53.** **(a)** **54.** **(a)**

55. **(a)** Down's syndrome is also known as Mongolian idiocy or mongolism. In Langdon Down of England (1866) studied the Mongolian idiocy and described the trisomic condition of their chromosomes. Down's syndrome, a very common congenital abnormality arises due to the failure of separation of 21st pair of autosomes during meiosis. Thus, an egg is produced with 24 chromosomes instead of 23. A Down's syndrome has 3 autosomes in 21st pair instead of 2. Total number of chromosome in this case is 2n + 1 (21st) =47.

56. **(a)** In males, Luteinizing hormone (LH) stimulates Leydig cell to produce ardogen testosterone hormone.

57. **(a)** **58.** **(c)** **59.** **(a)**

60. **(b)** The splice site is found in the borders between intron and exon. They are marked by specific nucleotide sequences and are found on the borders of the intron that is the 3' and 5' end. They are known as 3' splice site and 5' splice site respectively.