

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



- (a) 2. (b) 3. (a)
- (a) Geitonogamy is the transfer of pollen grains from the anther to the stigma of another flower of the same plant.
- (a) 6. (c) 7. (d)
- (a) The sperms and ovum fuses together to form a diploid zygote. As the zygote moves through the isthmus of the oviduct towards the uterus, the mitotic division (cleavage) starts and forms 2, 4, 8, 16 daughter cells called blastomeres. The embryo containing 8-16 blastomeres is called a morula. The morula further divides and transforms into blastocyst, further gets embedded in the endometrium of the uterus. This is called implantation.
- (a) 10. (d)
- (b) Water absorption and gaseous exchange stop due to wax.
- (b)
- (c) Males have only one X - chromosome. Hence any gene present on the one X - chromosome expresses itself in males. Females have two X- chromosomes. The mutant allele must be present on both the X-Chromosomes to express itself phenotypically. If only one copy of allele present, then the female only becomes a carrier showing no external manifestation of the gene. Sublethal condition can never arise in males.
- (c)
- (a) Change in genetic locus, changes the gene and in turn the amino acid it codes for. This alters the nature of protein synthesized which produces change in the organism.
- (c) 17. (a)
- (a) Prokaryotic chromosomes are circular and contain termination sequences.
- (c) Okazaki fragments in DNA are linked up by the enzyme DNA *ligase*. Replication always occur in 5' - 3' direction. Okazaki fragments synthesized on 3' - 5' DNA template, join to form lagging strand which grows in 3' - 5' direction.
- (c) Reverse transcriptase (RNA dependent DNA polymerase) is present in some retroviruses e.g. HIV virus.
- (d) In the DNA molecule, there are two strands which run anti-parallel one is 5' - 3' direction and other in 3' -5' direction, the two chains are held together by hydrogen bonds between their bases. Adenine (A), a purine of one chain is exactly opposite thymine (T), a pyrimidine of the other chain. Similarly, cytosine (C), a pyrimidine lies opposite guanine (G), a purine. This allows a sort of lock & key arrangement between large sized purine & small sized pyrimidine. It is strengthened by the appearance of hydrogen bonds between the two.
- (a)
- (a) A nucleosome is defined as a core region of histones plus one stretch of linker DNA. The nucleosomes contains a DNA wrapped histone octamer in the core region & in linker DNA region. The histone octamer has 2 each of H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub> & H<sub>4</sub> histones. The linker DNA has an H<sub>1</sub> histone.
- (c)
- (c) Assertion is true but Reason is false. Family planning was initiated in India in 1951. It increased awareness regarding prevention of unwanted pregnancies by adopting safe methods.

26. (d) Both Assertion and Reason are incorrect. Statutory raising of marriageable age of the female is 18 years and that of males is 21 years and incentives given to couples with small families are two of the other measures taken to tackle this process. India's population growth rate is about 2% a year and china's 1.4%.
27. (c) Assertion is true but Reason is false. The testes of human males are situated outside the abdominal cavity within a pouch called scrotum. It is connected to the abdomen via inguinal canal.
28. (a) Assertion and Reason are correct and the Reason is a correct explanation of Assertion. When a gene control number of phenotypes that are mostly unrelated, it is said to exhibit pleiotropy.
29. (b)
30. (b) Cleavage is a series of rapid mitotic divisions of the zygote which convert the single celled zygote into a multicellular structure called blastula or blastocyst. This process is not characterised by cell growth, hence, number of cells increases but their size decreases and hence no enlargement of the embryo is observed.
31. (a) Entomophily is a type of pollination where insects acts as pollinating agents and distribute the pollen of plants & flowering plants.
32. (a)
33. (c) Reproductive health in society can be improved by creating awareness among people about various reproduction related aspects and providing facilities and support for building up a reproductively health society.
34. (b) Medical termination of pregnancy is considered safe up to twelve weeks of pregnancy.
35. (b) Starting from the innermost part, the correct sequence of parts in an ovule is egg, embryo sac, nucellus, integument.
36. (c) This disease is due to an X-linked recessive mutation. Males suffer from this disorder since they have only one X chromosome and hence express any trait on this chromosome.
37. (c) Down's syndrome is trisomy 21. i.e. presence of chromosome 21 in three copies. The gene for Down's syndrome is not present on X or Y chromosomes, Non-disjunction of these chromosomes do not produce down syndrome.
38. (d) Thomas Hunt Morgan won the Nobel Prize (1933) in physiology or medicine for the function of chromosomes in heredity.
39. (d)
40. (b) Pedigree is a chart showing the record of inheritance of certain genetic traits for two or more ancestral generations of an individual, abnormality or disease.
41. (d)
42. (a) Ribosomes are the sites of protein synthesis. Mitochondria being a semi autonomous organelle has its own protein synthesizing machinery.
43. (c) According to Chargaff purines and pyrimidines are in equal amounts. Purine (adenine) is equimolar with pyrimidine (thymine) and purine (guanine) is equimolar with pyrimidine (cytosine). Base ratio is specific for species.
44. (b)
45. (a) Parent :  $RRTt \times rrtt$   
Gametes : , ,  
Offspring:  $RrTt$                        $Rrtt$   
                 tall with                      tall with  
Ratio = 1 : 1 red fruit              yellow fruit
46. (d) 47. (c) 48. (b) 49. (c) 50. (a) 51. (b)
52. (c) 53. (b)
54. (b) The action of the enzyme protease helps lactose to enter into the cell. But this can be achieved only if a low-level expression of the *lac* operon is present inside the cell. Otherwise, lactose cannot enter the cell.
55. (a) The figure shows the process of tubectomy. This is a surgical method to prevent pregnancy in women. In tubectomy small part of the fallopian tube is removed or tied through a small cut in the abdomen or through vagina.
56. (c) Inability of an individual to inseminate the female or due to very low sperm counts in ejaculates leads to infertility. It could be corrected by artificial technique. In artificial technique the semen is collected and artificially introduced either into the vagina or into the uterus (IUI - intra-uterine insemination) of the female.
57. (d) The marked structure A, B, C and D are respectively called as seminal vesicles, urinary bladder, ejaculatory duct and bulbourethral gland. Bulbourethral gland, also called Cowper's gland is a pea sized gland that lies beneath the prostate gland and whose secretion neutralizes the acidity of the urine in the urethra.
58. (c) The given figure shows that ovum is surrounded by many sperms. These two gametes (ovum and sperms) were going to take part in fertilization. During fertilization, a sperm comes in contact with the zona pellucida layer of ovum and induces the changes in membrane that blocks the entry of additional sperm.
59. (b) 'B' are the secondary spermatocytes which further undergoes meiosis II to produce two haploid spermatids.
60. (a) A polysome or polyribosome is a complex of an mRNA molecule and two or more ribosomes, which is formed during the active translation process. They were initially named as ergosomes in 1963. However, further research by Jonathan Warner and Alex Rich characterized polysome.