

## DU MSc Genetics

Topic:- GENETICS MSC

1) During an epidemic or pandemic, the  $R_0$  value reflects[Question ID = 6422]

1. The rate at which the virus multiplies in individuals [Option ID = 25685]
2. The number of viruses that can infect a cell at a time [Option ID = 25686]
3. The number of individuals that can be infected by one carrier [Option ID = 25687]
4. The number of people observed to be infected per million population [Option ID = 25688]

2) The mutant variant of the SARS CoV virus prevalent in India and thought to be the cause of the second wave is[Question ID = 6423]

1. B.1.617 [Option ID = 25689]
2. P.1 [Option ID = 25690]
3. B.1.1.7 [Option ID = 25691]
4. B.1.351 [Option ID = 25692]

3) The average of A, B, and C is 50. If D is 10, then what is the average of A, B, C, and D?[Question ID = 6424]

1. 15 [Option ID = 25693]
2. 30 [Option ID = 25694]
3. 40 [Option ID = 25695]
4. 60 [Option ID = 25696]

4) The value of  $(A + C)/(G + T)$  is always[Question ID = 6425]

1. equal to one if the DNA is single-stranded. [Option ID = 25697]
2. equal to one if the DNA is double-stranded. [Option ID = 25698]
3. larger in DNA samples having a higher melting point. [Option ID = 25699]
4. lower in DNA samples having a higher melting point. [Option ID = 25700]

5) Genomic DNA was denatured and then allowed to renature. Of the following, which class of DNA is expected to renature the fastest?[Question ID = 6426]

1. Single-copy DNA [Option ID = 25701]
2. Pseudogenes [Option ID = 25702]
3. Simple sequence repeats [Option ID = 25703]
4. Small multigene families [Option ID = 25704]

6) The concept of recon was proposed by Seymour Benzer by studying recombination between:

[Question ID = 6427]

1. lysis mutants of bacteriophage T4  
[Option ID = 25705]
2. white eye mutants of *Drosophila melanogaster*  
[Option ID = 25706]
3. biochemical mutants of *Neurospora crassa*  
[Option ID = 25707]
4. auxotrophic mutants of *Escherichia coli*  
[Option ID = 25708]

7) "Amber" in genetics refer to[Question ID = 6428]

1. resinous substance in which fossils have been preserved [Option ID = 25709]
2. kind of mutation that changes one amino acid in a protein [Option ID = 25710]
3. dye used for DNA staining [Option ID = 25711]
4. stop codon [Option ID = 25712]

8) In genetics, suppression of a mutation refers to[Question ID = 6429]

1. Restoration of the original phenotype due to a second mutation [Option ID = 25713]
2. Restoration of the original DNA sequence by a mutation [Option ID = 25714]
3. Prevention of the expression of the mutant gene by metabolic regulation [Option ID = 25715]
4. Inactivation of the gene by methylation [Option ID = 25716]

9) The distances between bacterial genes as determined by interrupted mating experiments are measured in units of[Question ID = 6430]

1. Recombination [Option ID = 25717]
2. Base pairs [Option ID = 25718]
3. Minutes [Option ID = 25719]
4. cM [Option ID = 25720]

10) The genetic map for three genes X, Y and Z is as follows: X-Y = 10 map units, Y-Z = 5 map units and X-Z = 15 map units

units. In an individual of genotype  $XyZ/xYz$ , the percentage of XYZ gametes is expected to be (assuming no interference)

[Question ID = 6431]

1. 0.25 [Option ID = 25721]
2. 0.5 [Option ID = 25722]
3. 2.5 [Option ID = 25723]
4. 5.0 [Option ID = 25724]

11) Infections by *Staphylococcus aureus* were effectively treated using methicillin in a community. However, within six months, infections again occurred in the community due to a methicillin-resistant *S. aureus* (MRSA) strain. How can this be BEST explained?

[Question ID = 6432]

1. a patient must have become infected with MRSA from another community  
[Option ID = 25725]
2. in response to the drug, *S. aureus* synthesized a drug-resistant version of the targeted protein  
[Option ID = 25726]
3. some drug-resistant bacteria were present in the community and natural selection increased their frequency after the methicillin treatment was initiated  
[Option ID = 25727]
4. In response to the drug, *S. aureus* evolved a mechanism to degrade methicillin  
[Option ID = 25728]

12) If the DNA content of a diploid cell in the G1 phase of the cell cycle is 'C', then the DNA content at the same cell at metaphase of Meiosis I would be:[Question ID = 6433]

1. 0.25C [Option ID = 25729]
2. 0.5C [Option ID = 25730]
3. C [Option ID = 25731]
4. 2C [Option ID = 25732]

13) A cross was carried out between two stocks with genotypes *aabbcc* and *AABBCC*. The three genes are linked. The  $F_1$  progeny was test-crossed. In the progeny from the test-cross, one of the genotypes was *Aabbcc*, which resulted from a double-crossover event. Based on this information, if possible, predict the gene which lies in the middle.

[Question ID = 6434]

1. a  
[Option ID = 25733]
2. b  
[Option ID = 25734]
3. c  
[Option ID = 25735]
4. cannot be predicted.  
[Option ID = 25736]

14) A plant heterozygous for three unlinked genes (*Aa Bb Dd*) is selfed. What proportion of the progeny would have the genotype *A\_ B\_ dd* ?

[Question ID = 6435]

1. 9/16  
[Option ID = 25737]
2. 10/16  
[Option ID = 25738]
3. 9/64  
[Option ID = 25739]
4. 10/64  
[Option ID = 25740]

15) Which of the following observations will be true if the two mutations are allelic?[Question ID = 6436]

1. Lack of recombination between the two mutations [Option ID = 25741]
2. The two mutants do not complement each other [Option ID = 25742]
3. Suppression of one mutation by the other [Option ID = 25743]
4. Co-segregation of the two mutations [Option ID = 25744]

16) A brown eye pigment in *Drosophila* is produced by the dominant gene  $st^+$  located on chromosome 2. A scarlet eye pigment is produced by a dominant gene  $bw^+$  located on chromosome 3. The recessive alleles of these two genes produce no pigments. When the homozygous scarlet fly is mated to homozygous brown fly, the  $F_1$  flies exhibit red eyes. Sib-mating of the  $F_1$  flies results in progeny with white, brown, scarlet, and red eyes. In what ratio would the white: brown: scarlet: red progenies occur?

[Question ID = 6437]

1. 1:1:1:1

[Option ID = 25745]

2. 1:3:3:9

[Option ID = 25746]

3. 9:3:3:1

[Option ID = 25747]

4. 3:9:3:1

[Option ID = 25748]

**17) Fruit flies have a diploid number of 8 and honey bee have a diploid number of 32 chromosomes. Assuming no crossing over taking place in these two species, which species will show more genetic variation in the F<sub>2</sub>:[Question ID = 6438]**

1. Same in both species [Option ID = 25749]
2. Fruit flies [Option ID = 25750]
3. Honey bees [Option ID = 25751]
4. Cannot be determined from the given information [Option ID = 25752]

**18) Which of the following is NOT TRUE for the maternal effect genes?[Question ID = 6439]**

1. Located in the nuclear genome [Option ID = 25753]
2. Maternal effect genes affect the offspring phenotype [Option ID = 25754]
3. Establishes the initial polarity in developing oocytes [Option ID = 25755]
4. Must be located on the X chromosome [Option ID = 25756]

**19) Which of the following mutational changes would you predict to be the most deleterious to gene function:[Question ID = 6440]**

1. Insertion of a single nucleotide near the end of the coding sequence [Option ID = 25757]
2. Removal of a single nucleotide near the beginning of the coding sequence [Option ID = 25758]
3. Deletion of 3 consecutive nucleotides in the middle of the coding gene [Option ID = 25759]
4. Deletion of 4 consecutive nucleotides in the middle of the coding sequence [Option ID = 25760]

**20) A child and his grandmother have a disorder governed by a dominant autosomal allele. However, the parents of the child do not have the disorder. This could be best explained by:[Question ID = 6441]**

1. Incomplete penetrance [Option ID = 25761]
2. Variable expressivity [Option ID = 25762]
3. Genetic mosaicism [Option ID = 25763]
4. Genetic heterogeneity [Option ID = 25764]

**21) An isolated population, with approximately an equal number of black-haired individuals and blonds, was killed due to the tsunami. Only a few blond people remained to form the next generation. This kind of change in the gene pool is called[Question ID = 6442]**

1. Founder effect [Option ID = 25765]
2. Bottleneck effect [Option ID = 25766]
3. Hardy-Weinberg equilibrium [Option ID = 25767]
4. Gene flow [Option ID = 25768]

**22) In humans, parent-specific differential expression of the same gene can be best explained by:[Question ID = 6443]**

1. Paramutation [Option ID = 25769]
2. Epistasis [Option ID = 25770]
3. Interference [Option ID = 25771]
4. Imprinting [Option ID = 25772]

**23) In a family with three children, what is the probability that two are boys and one is a girl?[Question ID = 6444]**

1. 1/2 [Option ID = 25773]
2. 2/3 [Option ID = 25774]
3. 3/8 [Option ID = 25775]
4. 1/3 [Option ID = 25776]

**24) In which type of marker system, polymorphism arises due to replication slippage?[Question ID = 6445]**

1. SSR [Option ID = 25777]
2. RFLP [Option ID = 25778]
3. RAPD [Option ID = 25779]
4. AFLP [Option ID = 25780]

**25) A newly identified operon (*xyl*) is involved in the xylose metabolism. The transcription of this *xyl* operon begins when xylose enters the cell and binds to a regulator protein (X). Nonsense mutation of the regulatory protein results in activation of *xyl* operon even in the absence of xylose. Based on the above description which of the following is the best explanation of the regulation of this operon :**

**[Question ID = 6446]**

1. Inducible operon using a negative regulator  
[Option ID = 25781]
2. Repressible operon using a negative regulator

[Option ID = 25782]

3. Inducible operon using a positive regulator

[Option ID = 25783]

4. Repressible operon using a positive regulator

[Option ID = 25784]

26) A genetic cross is made between two individuals with genotypes  $AaBb$  and  $aabb$ . The following genotypes are observed in the progeny. The percentage of the progeny represented by each genotype is mentioned below:

Genotype of the progeny	% of the total progeny
$AaBb$	35
$aabb$	35
$Aabb$	15
$aaBb$	15

Which one of the following options is a correct interpretation of the above results?

[Question ID = 6447]

1. Gene A and B are linked in cis (coupling phase) and the genetic distance between the two genes is 15cM [Option ID = 25785]
2. Gene A and B are linked in trans (repulsion phase) and the genetic distance between the two genes is 15cM [Option ID = 25786]
3. Gene A and B are linked in cis (coupling phase) and the genetic distance between the two genes is 30cM [Option ID = 25787]
4. Gene A and B are linked in trans (repulsion phase) and the genetic distance between the two genes is 30cM [Option ID = 25788]

27) Frequency of a recessive allele is 0.4. What is the number of heterozygote carriers in a population of 200? [Question ID = 6448]

1. 48 [Option ID = 25789]
2. 94 [Option ID = 25790]
3. 96 [Option ID = 25791]
4. 196 [Option ID = 25792]

28) Sex limited genes refer to genes: [Question ID = 6449]

1. Present in only one sex [Option ID = 25793]
2. Present on the sex chromosomes [Option ID = 25794]
3. Involved in development of sexual organs [Option ID = 25795]
4. Present in both the sexes but expressed in only one sex [Option ID = 25796]

29) Heterosis can be fixed by [Question ID = 6450]

1. Vegetative propagation [Option ID = 25797]
2. Outbreeding [Option ID = 25798]
3. Inbreeding [Option ID = 25799]
4. Backcrossing [Option ID = 25800]

30) There are three alleles for a gene:  $A^1$ ,  $A^2$  and  $A^3$  present on chromosome 21. A child with Down syndrome is born to a mother with the genotype  $A^1A^2$ . The genotype of the father was  $A^3A^3$ . The child with Down syndrome had the genotype  $A^1A^1A^3$ . Based on above information, where and when did the non-disjunction event most likely occur? [Question ID = 6451]

1. Maternal meiosis I [Option ID = 25801]
2. Maternal meiosis II [Option ID = 25802]
3. Paternal meiosis I [Option ID = 25803]
4. Paternal meiosis II [Option ID = 25804]

31) Mendel found that the inflated pods were dominant over constricted pods. A cross was made between two pure breeding lines having constricted and inflated pods. In the  $F_2$  generation, 650 plants with inflated pod were observed. If the trait is governed by one gene, approximately how many constricted-pod plants would you expect in  $F_2$ ? [Question ID = 6452]

1. 600 [Option ID = 25805]
2. 165 [Option ID = 25806]
3. 217 [Option ID = 25807]
4. 468 [Option ID = 25808]

32) You are given a diploid plant with genotype  $Rr Ll MM Nn Oo$  wherein the alleles show dominant and recessive relationship. If the plant undergoes selfing what is the maximum number of gametes, phenotype, and genotypes that can be formed respectively are:

[Question ID = 6453]

1. 8, 16, 64

[Option ID = 25809]

2. 8, 8, 27

[Option ID = 25810]

3. 4, 4, 16

[Option ID = 25811]

4. 5, 10, 15

[Option ID = 25812]

**33) When recessive epistasis is operative between the two loci, the classical dihybrid ratio of 9:3:3:1 is modified to :**

**[Question ID = 6454]**

1. 9:3:4 [Option ID = 25813]
2. 12:3:1 [Option ID = 25814]
3. 9:6:1 [Option ID = 25815]
4. 9:7 [Option ID = 25816]

**34) Which one of the following assumptions is NOT TRUE for explaining the 3:1 ratio according to Mendel's law of segregation?[Question ID = 6455]**

1. Production of only one type of gametes in F1 [Option ID = 25817]
2. Random union of male and female gametes [Option ID = 25818]
3. Equal survival of all the gametes [Option ID = 25819]
4. Equal survival of the different zygotes thus produced [Option ID = 25820]

**35) A double-stranded genomic DNA sample with mostly unique sequences is heated to complete denaturation, followed by cooling to 60° C. It will lead to:[Question ID = 6456]**

1. Rapid annealing of two strands [Option ID = 25821]
2. Slow annealing of two strands [Option ID = 25822]
3. Folding and intrastrand pairing of the single strands [Option ID = 25823]
4. Degradation of denatured DNA [Option ID = 25824]

**36) RNA can be quantified by measuring its absorbance at 260 nm. It has been calculated that 1 O.D. of RNA is equal to 40µg of RNA/mL. If 1mL of an RNA sample has an O.D. of 0.6 what will be the O.D of 0.5mL of the same sample?[Question ID = 6457]**

1. 0.6 [Option ID = 25825]
2. 0.3 [Option ID = 25826]
3. 0.15 [Option ID = 25827]
4. 0.03 [Option ID = 25828]

**37) DNA can be quantified by measuring its absorbance at 260 nm. It has been calculated that 10.D. of DNA is equal to 50µg of DNA/mL. If 1mL of a DNA sample has an O.D. of 0.5 what will be the amount of DNA in 0.2mL of the same sample? [Question ID = 6458]**

1. 25 µg [Option ID = 25829]
2. 10 µg [Option ID = 25830]
3. 5 µg [Option ID = 25831]
4. 50 ng [Option ID = 25832]

**38) During the process of replication, the DNA polymerase**

**[Question ID = 6459]**

1. Reads the template strand from 3' to 5' direction and synthesizes from 5' to 3' direction  
[Option ID = 25833]
2. Reads the template strand from 5' to 3' direction and synthesizes from 5' to 3' direction  
[Option ID = 25834]
3. Reads the template strand from 5' to 3' direction and synthesizes from 3' to 5' direction  
[Option ID = 25835]
4. Reads the template strand from 3' to 5' direction and synthesizes from 3' to 5' direction  
[Option ID = 25836]

**39) The complementary strand of the sequence 5' - GTACGTTGTCATG -3' is[Question ID = 6460]**

1. 5' - CATGCAACACGTAC - 3' [Option ID = 25837]
2. 5' - CATGCACAACGTAC - 3' [Option ID = 25838]
3. 5' - GTACGTTGTCATG - 3' [Option ID = 25839]
4. 5' - GTACGTTGTCATG - 3' [Option ID = 25840]

**40) Under which of the following circumstances will the herd immunity NOT develop?[Question ID = 6461]**

1. When a substantial percentage of a population gets infected and recovers [Option ID = 25841]
2. By vaccinating a substantial percentage of the population [Option ID = 25842]
3. If the virus is not evolving to evade immune response [Option ID = 25843]
4. If the virus is rapidly evolving to evade immune response [Option ID = 25844]

**41) During post replication DNA packaging : [Question ID = 6462]**

1. The old histones are redistributed in the newly formed nucleosomes [Option ID = 25845]
2. Only new histones are incorporated in the newly formed nucleosomes [Option ID = 25846]
3. Only new H3 histones are incorporated in the newly formed nucleosomes [Option ID = 25847]
4. Only new H2A and H2B histones are incorporated in the newly formed nucleosomes [Option ID = 25848]

**42) Which of the following amino acid is NOT directly charged on tRNA?[Question ID = 6463]**

1. Methionine [Option ID = 25849]
2. Serine [Option ID = 25850]
3. Pyrrolysine [Option ID = 25851]
4. Selenocysteine [Option ID = 25852]

**43) During transcription of a gene, the RNA polymerase transcribes:**

**[Question ID = 6464]**

1. Both strands but only coding RNA will be translated  
[Option ID = 25853]
2. By moving in a 3' to 5' direction with respect to the template strand  
[Option ID = 25854]
3. By moving in a 5' to 3' direction with respect to the template strand  
[Option ID = 25855]
4. By changing different sigma factors for efficient initiation  
[Option ID = 25856]

**44) Multi-exonic eukaryotic mRNA is modified before translation by:**

**[Question ID = 6465]**

1. addition of 5' cap and addition of a 3' poly-A tail  
[Option ID = 25857]
2. splicing of exons and addition of the 3' poly-A tail  
[Option ID = 25858]
3. addition of the 3' poly-A tail only  
[Option ID = 25859]
4. addition of a 5' cap, splicing of exons and addition of a 3' poly-A tail  
[Option ID = 25860]

**45) Generation of antibody diversity in vertebrates takes place because of:[Question ID = 6466]**

1. the presence of as many genes in the germ line as there are possible types of antibodies [Option ID = 25861]
2. infection with bacteria/viruses carrying antibody genes [Option ID = 25862]
3. horizontal transfer of genes [Option ID = 25863]
4. rearrangement of DNA in tissues that produce antibodies [Option ID = 25864]

**46) Which of the following statements best describe the function of the rough Endoplasmic Reticulum when compared to smooth Endoplasmic Reticulum? [Question ID = 6467]**

1. Specific transport system [Option ID = 25865]
2. Synthesis of proteins [Option ID = 25866]
3. Harvesting energy during photosynthesis [Option ID = 25867]
4. Processing of membrane and secreted proteins including glycosylation [Option ID = 25868]

**47) The proteinaceous complex that forms between non-sister chromatids of the homologous pairs of chromosomes during prophase I is called:[Question ID = 6468]**

1. Histone complex [Option ID = 25869]
2. Synaptonemal complex [Option ID = 25870]
3. Chiasmata [Option ID = 25871]
4. Kinetochore [Option ID = 25872]

**48) A group of blastomeres of the amphibian blastula that can induce gastrulation when placed at an ectopic site is called as:[Question ID = 6469]**

1. Hensen's node [Option ID = 25873]
2. Henle's loop [Option ID = 25874]
3. Spemann's organizer [Option ID = 25875]
4. Zone of polarizing activity [Option ID = 25876]

**49) A Barr body is normally found in the nucleus of :[Question ID = 6470]**

1. an unfertilized egg cell [Option ID = 25877]
2. somatic cell of a female [Option ID = 25878]
3. somatic cell of a male [Option ID = 25879]
4. both male and female somatic cells [Option ID = 25880]

**50) The major difference between hormones that have intracellular receptors and those that have cell membrane receptors is that the former tend to be:[Question ID = 6471]**

1. charged [Option ID = 25881]
2. hydrophobic [Option ID = 25882]
3. a peptide [Option ID = 25883]
4. hydrophilic [Option ID = 25884]

51) Which one of the following is not a distinctive characteristic of non-chordates?[Question ID = 6472]

1. Ventrally located heart [Option ID = 25885]
2. Absence of notochord [Option ID = 25886]
3. Cold blooded [Option ID = 25887]
4. Absence of post-anal tail [Option ID = 25888]

52) Which one of the following is the most abundant cell type in human brain?[Question ID = 6473]

1. Multipolar neuron [Option ID = 25889]
2. Astrocytes [Option ID = 25890]
3. Purkinje neurons [Option ID = 25891]
4. Oligodendrocytes [Option ID = 25892]

53) Adipose tissue belongs to which one of the following categories?[Question ID = 6474]

1. Epithelial [Option ID = 25893]
2. Muscular [Option ID = 25894]
3. Connective [Option ID = 25895]
4. Neural [Option ID = 25896]

54) Which one of the following sentences correctly represent the information about a person with 45, XO karyotype?  
[Question ID = 6475]

1. Their cells will have one Barr body [Option ID = 25897]
2. X chromosome will be hyperactivated in such individuals [Option ID = 25898]
3. There will be no Barr bodies in the cells [Option ID = 25899]
4. The individual has Klinefelter syndrome [Option ID = 25900]

55) A couple both carriers for a genetically inherited recessive disease decide to become parents. What will be the odds that their children will also be carriers?[Question ID = 6476]

1. 1 out of 4 [Option ID = 25901]
2. 2 out of 4 [Option ID = 25902]
3. 3 out of 4 [Option ID = 25903]
4. 4 out of 4 [Option ID = 25904]

56) Balancing selection is concerned with the successful reproduction of[Question ID = 6477]

1. homozygous recessive individuals [Option ID = 25905]
2. homozygous individuals [Option ID = 25906]
3. heterozygous individuals [Option ID = 25907]
4. homozygous dominant individuals [Option ID = 25908]

57) Which one of the following banding techniques may help in establishing a t(9;22)(q34;q11.2) translocation event between the chromosomes?[Question ID = 6478]

1. C banding [Option ID = 25909]
2. G banding [Option ID = 25910]
3. NOR banding [Option ID = 25911]
4. T banding [Option ID = 25912]

58) Which one of the following lights will produce best resolution?[Question ID = 6479]

1. Yellow [Option ID = 25913]
2. Red [Option ID = 25914]
3. Green [Option ID = 25915]
4. Blue [Option ID = 25916]

59) Bisulfite sequencing is generally performed to determine:[Question ID = 6480]

1. Presence of Alu sequences [Option ID = 25917]
2. Pattern of methylation [Option ID = 25918]
3. Pattern of acetylation [Option ID = 25919]
4. Presence of pseudogenes [Option ID = 25920]

60) Which one of the following method can be used to determine the 5' end of transcripts the most reliable method is [Question ID = 6481]

1. Primer extension [Option ID = 25921]
2. Gene tagging [Option ID = 25922]
3. Chromosome jumping [Option ID = 25923]
4. Chromosome walking [Option ID = 25924]

61) Gel retardation assay is commonly used to monitor interactions between[Question ID = 6482]

1. proteins [Option ID = 25925]
2. nucleic acids [Option ID = 25926]
3. protein and nucleic acids [Option ID = 25927]
4. drug and nucleic acid [Option ID = 25928]

62) Shifting the *Arabidopsis* plant from a long day photoperiod to a short-day photoperiod, increased the transcription of three genes involved in circadian rhythm. Which of the following techniques would be the most appropriate to demonstrate the increased transcript levels of these genes?

[Question ID = 6483]

1. Southern Hybridization

[Option ID = 25929]

2. Northern hybridization

[Option ID = 25930]

3. Western hybridization

[Option ID = 25931]

4. Fluorescence in situ hybridization

[Option ID = 25932]

63) Native PAGE separates proteins based on:[Question ID = 6484]

1. Molecular weight [Option ID = 25933]

2. Length of the protein [Option ID = 25934]

3. Secondary structure [Option ID = 25935]

4. Three-dimensional structure [Option ID = 25936]

64) Which one of the following will travel fastest through the gel if the amount of DNA present is same in all?[Question ID = 6485]

1. Circular [Option ID = 25937]

2. Supercoiled [Option ID = 25938]

3. Nicked [Option ID = 25939]

4. Supercoiled and circular will move at the same speed and faster than nicked [Option ID = 25940]

65) mRNA can be isolated by passing the cell lysate through a column of oligo (dT)-cellulose. This method is an example of : [Question ID = 6486]

1. partition chromatography [Option ID = 25941]

2. ion-exchange chromatography [Option ID = 25942]

3. affinity chromatography [Option ID = 25943]

4. adsorption chromatography [Option ID = 25944]

66) The sticky overhangs produced by Pst1: CTGCA/G can be converted into blunt ends by:[Question ID = 6487]

1. filling in the 5' overhang using a terminal transferase [Option ID = 25945]

2. filling in using Klenow fragment of DNA polymerase I [Option ID = 25946]

3. removal of the overhang with Endonuclease V [Option ID = 25947]

4. removal of the overhang with Klenow fragment [Option ID = 25948]

67) Isocaudomers are restriction enzymes which recognize different sequence but generate the same restriction ends.

Which of the following pairs of enzymes can be termed as isocaudomers? (The '/' denotes the cleavage site of the enzyme.)

[Question ID = 6488]

1. DpnI (GA/TC) and MboI (N/GATCN) [Option ID = 25949]

2. BamHI (G/GATCC) and MboI (N/GATCN) [Option ID = 25950]

3. DpnI (GA/TC) and BglII (A/GATCT) [Option ID = 25951]

4. XbaI (T/CTAGA) and BamHI (G/GATCC) [Option ID = 25952]

68) The basic unit of radioactive decay is Curie (Ci). 1Ci is equivalent to  $2.22 \times 10^{12}$  dpm (disintegrations per minute). The disintegrations actually detected by an instrument are referred to as counts per minute (cpm).  $\text{cpm} = \text{efficiency of the machine} \times \text{detection efficiency}$ . For example if an instrument has 25% efficiency,  $1\text{dpm} = (2.22 \times 10^{12} \times 0.25) \text{cpm} = 0.555 \times 10^{12} \text{cpm}$ .

Radioactive material has a half-life of 15 days. If on day one a sample has radioactivity equivalent to 1mCi and the half-life of the radioactive material is 15 days, what will be the cpm of the sample after 15 days when measured in an instrument having 50% efficiency?

[Question ID = 6489]

1.  $0.555 \times 10^{10} \text{cpm}$

[Option ID = 25953]

2.  $1.11 \times 10^{12} \text{cpm}$

[Option ID = 25954]

3.  $2.22 \times 10^{12} \text{cpm}$

[Option ID = 25955]

4.  $5.55 \times 10^{10} \text{cpm}$

[Option ID = 25956]

69) Which one of the following is most variable histone across species?[Question ID = 6490]

1. H1 [Option ID = 25957]

2. H2A [Option ID = 25958]

3. H3 [Option ID = 25959]

4. H4 [Option ID = 25960]

70) The most common cause of pleiotropic effect of a gene is due to:[Question ID = 6491]



1. the same product of the given gene being involved in different metabolic pathways [Option ID = 25961]
2. the gene making very different products in different cell types [Option ID = 25962]
3. the DNA sequence of the gene getting changed in cell-specific manner [Option ID = 25963]
4. the gene not functioning in some cells [Option ID = 25964]

**71) Which one of the following is not considered as a component of the endomembrane system?[Question ID = 6492]**

1. Golgi complex [Option ID = 25965]
2. Vacuole [Option ID = 25966]
3. Peroxisome [Option ID = 25967]
4. Lysosome [Option ID = 25968]

**72) The telomeres of eukaryotic chromosomes are composed of short sequence of:[Question ID = 6493]**

1. Adenine rich repeats [Option ID = 25969]
2. Thymine rich repeats [Option ID = 25970]
3. Guanine rich repeats [Option ID = 25971]
4. Cytosine rich repeats [Option ID = 25972]

**73) The dynamics of actin polymerization can be studied in vitro. What are the three phases of in vitro G-actin polymerization in the order of their occurrence?[Question ID = 6494]**

1. Nucleation, steady state, elongation [Option ID = 25973]
2. Elongation, nucleation, steady state [Option ID = 25974]
3. Nucleation, elongation, steady state [Option ID = 25975]
4. Steady state, nucleation, elongation [Option ID = 25976]

**74) Which of the following bodies is not a part of the nuclear bodies?[Question ID = 6495]**

1. Centrioles [Option ID = 25977]
2. P- bodies [Option ID = 25978]
3. Nuclear speckles [Option ID = 25979]
4. Cajal bodies [Option ID = 25980]

**75) Which of the following drug acts by binding to the beta tubulin monomers and inhibiting their assembly?[Question ID = 6496]**

1. Latrunculin A [Option ID = 25981]
2. Cytochalasin B [Option ID = 25982]
3. Colchicine [Option ID = 25983]
4. Phalloidin [Option ID = 25984]

**76) All the following statements about the plant embryogenesis are correct EXCEPT:[Question ID = 6497]**

1. The suspensor is derived from the basal cell [Option ID = 25985]
2. Cotyledons are derived from the apical cell [Option ID = 25986]
3. Shoot apical meristem formation occurs after seed formation [Option ID = 25987]
4. Precursor of all three plant tissue system are formed during embryogenesis [Option ID = 25988]

**77) Which of the phytohormones are overproduced in the plant tumors caused by *Agrobacterium tumefaciens*:**

**[Question ID = 6498]**

1. Ethylene and Auxins  
[Option ID = 25989]
2. Cytokinin and Gibberellic acid  
[Option ID = 25990]
3. Cytokinin and Auxins  
[Option ID = 25991]
4. Gibberellic acid and Auxins  
[Option ID = 25992]

**78) Phytomer is referred to[Question ID = 6499]**

1. The time between the emergence of the two successive leaves on the same shoot [Option ID = 25993]
2. The time between the emergence of two floral buds on an inflorescence [Option ID = 25994]
3. Repetitive unit of vegetative growth comprising of node, leaf, internode, and axillary bud [Option ID = 25995]
4. The order in which the leaves are borne around the shoot apical meristem [Option ID = 25996]

**79) Grafting is not possible in monocots because**

**[Question ID = 6500]**

1. They are herbaceous  
[Option ID = 25997]
2. They lack a vascular cambium  
[Option ID = 25998]
3. They have parallel venation  
[Option ID = 25999]
4. They have scattered vascular bundle

[Option ID = 26000]

**80) When a researcher provides a night break (i.e. shining a flash of light) during a long dark period (12 hrs), it may promote flowering in which of the following plants?[Question ID = 6501]**

1. Short day plants [Option ID = 26001]
2. Long day plants [Option ID = 26002]
3. Day-neutral plants [Option ID = 26003]
4. Both long day as well as the short-day plants [Option ID = 26004]

**81) Which one of the following is connecting link between photosystem I and photosystem II:[Question ID = 6502]**

1. Ferredoxin [Option ID = 26005]
2. Blastocyanin [Option ID = 26006]
3. Cytochrome c [Option ID = 26007]
4. Cytochrome b<sub>6</sub>/complex [Option ID = 26008]

**82) The endomycorrhizas are also called as[Question ID = 6503]**

1. Vesicular Arbuscular Mycorrhiza [Option ID = 26009]
2. Intracellular mycorrhizas [Option ID = 26010]
3. Hartig net [Option ID = 26011]
4. Mat forming mycorrhiza [Option ID = 26012]

**83) In sporophytic self-incompatibility system, the pollen produced from a plant with genotype S<sub>1</sub>S<sub>2</sub> can germinate and form pollen tubes on the stigmatic surface of a plant with genotype:[Question ID = 6504]**

1. S<sub>1</sub>S<sub>2</sub> [Option ID = 26013]
2. S<sub>1</sub>S<sub>3</sub> [Option ID = 26014]
3. S<sub>3</sub>S<sub>4</sub> [Option ID = 26015]
4. S<sub>2</sub>S<sub>3</sub> [Option ID = 26016]

**84) A new *E. coli* mutant was tested for auxotrophy. The table below summarizes the growth pattern of the mutant on different media.**

S. No.	Media for Growth	Growth status
1	Minimal medium (MM)	NO
2	MM + Arginine (A) + Proline (P) + Histidine (H)	YES
3	MM + P +H	YES
4	MM + A+P	YES
5	MM +A + H	NO

**Based on the above observations the mutant requires:**

**[Question ID = 6505]**

1. Arginine [Option ID = 26017]
2. Histidine and proline [Option ID = 26018]
3. Arginine and proline [Option ID = 26019]
4. Proline [Option ID = 26020]

**85) During the conversion of an F<sup>+</sup> strain to an Hfr strain, the F factor integrates into the bacterial chromosome:**

**[Question ID = 6506]**

1. Before the *leu* locus  
[Option ID = 26021]
2. Between the *gal* and *thy* locus  
[Option ID = 26022]
3. Randomly with respect to the orientation and location  
[Option ID = 26023]
4. Always oriented in the clockwise direction  
[Option ID = 26024]

**86) In a given culture dilution there are 200 bacterial cells whose doubling time is 20 minutes. How many cells are present after 2 hours?[Question ID = 6507]**

1. 128000 [Option ID = 26025]
2. 12800 [Option ID = 26026]
3. 10000 [Option ID = 26027]
4. 5000 [Option ID = 26028]

**87) The tryptophan (*trp*) operon is transcribed when:[Question ID = 6508]**

1. Tryptophan concentration is high in the cell [Option ID = 26029]
2. The *trp* repressor is bound to the tryptophan or the similarly shaped molecule [Option ID = 26030]

3. Tryptophan is bound to its apo-repressor [Option ID = 26031]
4. The appropriate co-repressor is present in low levels [Option ID = 26032]

88) In a batch culture of *Penicillium chryogenum*, the maximum penicillin synthesis will occur during the

[Question ID = 6509]

1. Lag phase  
[Option ID = 26033]
2. Log phase  
[Option ID = 26034]
3. Stationary phase  
[Option ID = 26035]
4. Death phase  
[Option ID = 26036]

89) A starter bacterial culture is sensitive to Kanamycin. It develops an infection from a bacteriophage derived from the lyses of kanamycin-resistant bacteria. Most of the bacterial progeny of the original culture is found to have become resistant to kanamycin. Which of the following phenomenon might have occurred here?[Question ID = 6510]

1. Transformation [Option ID = 26037]
2. Vertical gene transfer [Option ID = 26038]
3. Conjugation [Option ID = 26039]
4. Transduction [Option ID = 26040]

90) Eukaryotic cells and their organelles are disrupted by sonication. A centrifuge is used to separate soluble and insoluble components. Protein X is found in the insoluble fraction following centrifugation. The insoluble fraction is treated with 0.5 M NaCl and centrifugation is repeated. Protein X is now found in the soluble fraction. Protein X would be best described as[Question ID = 6511]

1. an integral membrane protein in an organelle [Option ID = 26041]
2. a peripheral membrane protein [Option ID = 26042]
3. a soluble cytoplasmic protein [Option ID = 26043]
4. a soluble nuclear protein [Option ID = 26044]

91) Which of the following is LEAST soluble in an aqueous solution?[Question ID = 6512]

1. Sucrose [Option ID = 26045]
2. Ethanol [Option ID = 26046]
3. Palmitic acid [Option ID = 26047]
4. Oxaloacetic acid [Option ID = 26048]

92) How many grams of  $MgCl_2$  are required to prepare one liter of a 10-millimolar  $MgCl_2$  solution? (Atomic weight of Mg = 24.3 g; atomic weight of Cl = 35.5 g.)[Question ID = 6513]

1. 0.59 g [Option ID = 26049]
2. 0.953 g [Option ID = 26050]
3. 95.3 g [Option ID = 26051]
4. 953g [Option ID = 26052]

93) Which of the following database provides the information on the sequence of those proteins whose 3D structure is known?[Question ID = 6514]

1. PIR [Option ID = 26053]
2. PDB [Option ID = 26054]
3. SWISSPROT [Option ID = 26055]
4. Gene Bank [Option ID = 26056]

94) Which of the following pairs of molecules would form a hydrogen bond?

- A.  $CH_4$  and  $H_2O$
- B.  $NH_4^+$  and  $H_2O$
- C. alkyl-SH and  $H_2O$
- D.  $H_2O$  and  $H_2O$

Choose the correct answer from the options given below:

[Question ID = 6515]

1. B only  
[Option ID = 26057]
2. D only  
[Option ID = 26058]
3. A and B only  
[Option ID = 26059]
4. B, C and D only  
[Option ID = 26060]

95) For the equilibrium below which of the following statement most accurately describes what occurs when pH is increased?  $\text{CH}_3\text{COOH} + \text{H}_2\text{O} \rightleftharpoons \text{CH}_3\text{COO}^- + \text{H}_3\text{O}^+$  [Question ID = 6516]

1. The equilibrium constant  $K_{\text{eq}}$  is altered. [Option ID = 26061]
2. A new equilibrium is established that favors the products. [Option ID = 26062]
3. The position of equilibrium remains the same. [Option ID = 26063]
4. A new equilibrium is established that favors the reactants. [Option ID = 26064]

96) Increasing the concentration of citrate inhibits the glycolytic pathway by:[Question ID = 6517]

1. Inhibiting the uptake of glucose [Option ID = 26065]
2. Inhibiting phosphofructokinase-1 [Option ID = 26066]
3. Preventing the release of water molecules [Option ID = 26067]
4. Decreasing the pH [Option ID = 26068]

97) The macromolecules that are composed of carbon, hydrogen, and oxygen in an approximate ratio of 1:2:1 is:[Question ID = 6518]

1. Proteins [Option ID = 26069]
2. Lipids [Option ID = 26070]
3. Carbohydrates [Option ID = 26071]
4. Nucleic acids [Option ID = 26072]

98) AB is a substrate for enzyme D which converts AB to AC. In the presence of a competitive inhibitor E in place of substrate AB, the enzyme's,[Question ID = 6519]

1.  $K_m$  increases and  $V_{\text{max}}$  remains same [Option ID = 26073]
2.  $K_m$  increases and  $V_{\text{max}}$  decreases [Option ID = 26074]
3.  $K_m$  decreases and  $V_{\text{max}}$  increase [Option ID = 26075]
4.  $K_m$  and  $V_{\text{max}}$  both remains same [Option ID = 26076]

99) Which of the following represents the most reduced form of carbon?[Question ID = 6520]

1.  $\text{R-CH}_3$  [Option ID = 26077]
2.  $\text{R-COOH}$  [Option ID = 26078]
3.  $\text{R-CHO}$  [Option ID = 26079]
4.  $\text{R-CH}_2\text{OH}$  [Option ID = 26080]

100) Allosteric inhibition of an enzyme involves which of the following?[Question ID = 6521]

1. Binding of an inhibitor to a site other than the substrate binding site [Option ID = 26081]
2. Binding of an inhibitor competitively to the substrate-binding site [Option ID = 26082]
3. Binding of an inhibitor non-competitively to the substrate-binding site [Option ID = 26083]
4. Cooperative binding of substrate to an enzyme with four or more subunits [Option ID = 26084]