

DU PhD in Genetics

Topic:- DU_J18_PHD_GENETICS

1) Pairs of homologous chromosomes: [Question ID = 52759]

1. separate in meiosis II [Option ID = 91031]
2. have genes for the same characters at the same loci [Option ID = 91029]
3. are found in gametes [Option ID = 91030]
4. have identical DNA sequences in their genes [Option ID = 91028]

Correct Answer :-

- have genes for the same characters at the same loci [Option ID = 91029]

2) Which of the following genotypes would produce the greatest variability of gametes if the alleles assorted independently?

[Question ID = 52740]

1. AA Bb Cc Dd [Option ID = 90954]
2. Aa BB CC DD [Option ID = 90953]
3. Aa BB Cc Dd [Option ID = 90952]
4. Aa Bb Cc Dd [Option ID = 90955]

Correct Answer :-

- Aa Bb Cc Dd [Option ID = 90955]

3) A circular DNA of 4.7 Mb (Mb=million base pairs) length is cut with a restriction enzyme whose precise recognition sequence is not known. The digest shows ~75 fragments on a pulsed-field gel. What is the most likely conclusion from this data? [Question ID = 52773]

1. The enzyme is an 8-base cutter. [Option ID = 91086]
2. The enzyme is a 6-base cutter. [Option ID = 91085]
3. The enzyme is a 4-base cutter. [Option ID = 91084]
4. This was a partial digest. [Option ID = 91087]

Correct Answer :-

- The enzyme is an 8-base cutter. [Option ID = 91086]

4) Which of the following techniques CANNOT be utilized to demonstrate Protein:Protein interaction?

[Question ID = 52761]

1. Yeast three hybrid assay [Option ID = 91038]
2. Yeast two hybrid assay [Option ID = 91039]
3. Florescence resonance energy transfer (FRET) [Option ID = 91036]
4. Co-immunoprecipitation [Option ID = 91037]

Correct Answer :-

- Yeast three hybrid assay [Option ID = 91038]

5) Cyclins facilitate progression cell cycle by: [Question ID = 52762]

1. Inducing synthesis of constitutively active forms of growth cell receptors to trigger signalling cascades. [Option ID = 91043]
2. Activating the protein kinases which are critical regulators of cell division. [Option ID = 91040]
3. Increasing the production of DNA polymerases so cells can enter into G2 phase. [Option ID = 91042]
4. Directly activating G proteins which in turn affects the protein kinases [Option ID = 91041]

Correct Answer :-

- Activating the protein kinases which are critical regulators of cell division. [Option ID = 91040]

6) After mutagen treatment, a molecule of 2-aminopurine (an adenine analogue) incorporates into DNA. During replication the 2-AP protonates causing it to base-pair like guanine. The mutational event caused by this will be

[Question ID = 52770]

1. AT to GC [Option ID = 91074]

2. AT to CG [Option ID = 91072]
3. GC to CG [Option ID = 91075]
4. GC to AT [Option ID = 91073]

Correct Answer :-

- AT to GC [Option ID = 91074]

7) Autoradiography of pulse-labelled cells can identify sites of biosynthetic activity and product accumulation. Identify the molecule and site of accumulation when a 5min [³H] uridine pulse followed by a 2-h chase in precursor-free media is given to the cells. [Question ID = 52775]

1. signals will be in only the nucleus because labelled DNA is continuously synthesized and accumulated [Option ID = 91093]
2. signals will be in the cytoplasm because labelled DNA is formed in the nucleus however accumulated in the cytoplasm over a longer period. [Option ID = 91095]
3. signals will be in the cytoplasm because labelled nuclear RNA is formed in the nucleus and then moves to the cytoplasm [Option ID = 91094]
4. signals will be in both nucleus and cytoplasm because labelled nuclear RNA will be continuously formed over 2 hours [Option ID = 91092]

Correct Answer :-

- signals will be in the cytoplasm because labelled nuclear RNA is formed in the nucleus and then moves to the cytoplasm [Option ID = 91094]

8) An individual with the genotype AaBbccddEe can make how many different types of gametes? [Question ID = 52769]

1. two [Option ID = 91068]
2. three [Option ID = 91069]
3. eight [Option ID = 91071]
4. four [Option ID = 91070]

Correct Answer :-

- eight [Option ID = 91071]

9) How do new alleles arise in a population? [Question ID = 52741]

1. Sexual reproduction [Option ID = 90956]
2. Meiosis [Option ID = 90958]
3. Chromosomal aberrations [Option ID = 90959]
4. Mutations of pre-existing alleles [Option ID = 90957]

Correct Answer :-

- Mutations of pre-existing alleles [Option ID = 90957]

10) How many linkage groups will be present in the human beings? [Question ID = 52764]

1. 24 [Option ID = 91049]
2. 48 [Option ID = 91051]
3. 23 [Option ID = 91048]
4. 46 [Option ID = 91050]

Correct Answer :-

- 24 [Option ID = 91049]

11) Depending on the criteria such as quality and content of information, reproducibility and speed of different DNA marker systems, identify the most suitable arrangement in the descending order: [Question ID = 52754]

1. AFLP – SSR – RFLP – RAPD [Option ID = 91008]
2. SSR – RFLP – AFLP – RAPD [Option ID = 91010]
3. RFLP – AFLP – SSR – RAPD [Option ID = 91009]
4. RAPD – SSR – RFLP – AFLP [Option ID = 91011]

Correct Answer :-

- SSR – RFLP – AFLP – RAPD [Option ID = 91010]

12) The unusual property of Taq polymerase that is critical to the PCR is its [Question ID = 52778]

1. ability to use RNA as a template [Option ID = 91107]
2. ability to use dNTPs as substrate [Option ID = 91104]
3. ability to synthesize DNA in the 3' to 5' direction [Option ID = 91106]
4. thermostability [Option ID = 91105]

Correct Answer :-

- thermostability [Option ID = 91105]

13) Access of transcription factors to DNA is usually influenced by: [Question ID = 52782]

1. phosphorylation of CTD of Rpb1 in RNA polymerase II [Option ID = 91123]
2. phosphorylation of histones in the euchromatin [Option ID = 91121]
3. acetylation of histones in the euchromatin [Option ID = 91120]
4. acetylation of DNA in the euchromatin [Option ID = 91122]

Correct Answer :-

- acetylation of histones in the euchromatin [Option ID = 91120]

14) Plasmid vectors used in cloning often contain a gene for the N-terminal 146 amino acids of the enzyme β -galactosidase. What is the purpose of including this gene in the vector? [Question ID = 52774]

1. Allow plasmid conjugation [Option ID = 91091]
2. Allow plasmid replication [Option ID = 91088]
3. Screen for recombinant vectors with inserts [Option ID = 91090]
4. Allow resistant transformants to grow in the selective medium [Option ID = 91089]

Correct Answer :-

- Screen for recombinant vectors with inserts [Option ID = 91090]

15) You have a mixture of three proteins having molecular weights 40kDa, 150kDa and 250kDa respectively. You separate them on a size exclusion column packed in such a manner that proteins greater than 200kDa elute in the void volume. What below best describes the elution order of the three proteins? [Question ID = 52753]

1. 40kDa followed by 150kDa followed by 250kDa [Option ID = 91004]
2. 40kDa and 150kDa in the same fraction followed by 250kDa [Option ID = 91007]
3. 250kDa followed by 40kDa followed by 150kDa [Option ID = 91006]
4. 250kDa followed by 150kDa followed by 40kDa [Option ID = 91005]

Correct Answer :-

- 250kDa followed by 150kDa followed by 40kDa [Option ID = 91005]

16) Occasionally, *Drosophila* flies are born with curly wings. A genetics professor takes several of these unusual flies and crosses them to one another with the following result: 532 curly wings, 266 normal wings. The mutation that causes curly wings is probably :

[Question ID = 52768]

1. recessive and lethal in the homozygous state [Option ID = 91064]
2. recessive and semi-lethal in the homozygous state [Option ID = 91065]
3. dominant and lethal in the homozygous state [Option ID = 91066]
4. dominant and semi-lethal in the homozygous state [Option ID = 91067]

Correct Answer :-

- dominant and lethal in the homozygous state [Option ID = 91066]

17) Receptors of this ligand are NOT present on plasma membrane: [Question ID = 52779]

1. Insulin. [Option ID = 91111]
2. Serotonin. [Option ID = 91110]
3. Steroid hormones. [Option ID = 91109]
4. Peptide. [Option ID = 91108]

Correct Answer :-

- Steroid hormones. [Option ID = 91109]

18) In sexually reproducing organism, association of alleles of different genes leads to gamete formation and subsequent fusion of gametes leads to fertilization. Hence the state of linkage disequilibrium between a pair of genes is due to:

[Question ID = 52756]

1. Random association of the alleles of the two genes and random fusion of the gametes [Option ID = 91019]
2. Random association of the alleles of the two genes and non-random fusion of the gametes [Option ID = 91018]
3. Non-random association of the alleles of the two genes and random fusion of the gametes [Option ID = 91017]
4. Non-random association of alleles of the two genes and non-random fusion of the gametes [Option ID = 91016]

Correct Answer :-

- Non-random association of the alleles of the two genes and random fusion of the gametes [Option ID = 91017]

19) Why is Arabidopsis thaliana widely used as model organism to study plant development?

- i. Short life cycle
- ii. Requires minimal space to cultivate
- iii. Genome has been sequenced [Question ID = 52745]

- 1. (i) and (iii) only [Option ID = 90974]
- 2. (i) only [Option ID = 90972]
- 3. (i), (ii) and (iii) [Option ID = 90975]
- 4. (ii) only [Option ID = 90973]

Correct Answer :-

- (i), (ii) and (iii) [Option ID = 90975]

20) When a culture of bacteria is shifted to high temperatures, the heat shock response is triggered by: [Question ID = 52785]

- 1. a sensor protein on the ribosome. [Option ID = 91132]
- 2. a conversion of a repressor protein to an activator protein. [Option ID = 91135]
- 3. removal of a repressor protein. [Option ID = 91134]
- 4. specific sigma factors. [Option ID = 91133]

Correct Answer :-

- specific sigma factors. [Option ID = 91133]

21) A protective mechanism in eukaryotic cells that destroys mRNA with the same sequence as dsRNA is: [Question ID = 52784]

- 1. Nonsense mediated decay. [Option ID = 91128]
- 2. Proteasome. [Option ID = 91130]
- 3. RNA interference. [Option ID = 91129]
- 4. CRISPR. [Option ID = 91131]

Correct Answer :-

- RNA interference. [Option ID = 91129]

22) A patient has an abnormal karyotype exhibiting 3 copies of chromosome 21. This chromosomal anomaly most likely arose from an error during the following stage of cell cycle: [Question ID = 52766]

- 1. Cytokinesis [Option ID = 91057]
- 2. Meiosis I [Option ID = 91058]
- 3. Mitosis [Option ID = 91056]
- 4. Interphase [Option ID = 91059]

Correct Answer :-

- Meiosis I [Option ID = 91058]

23) This amino acid is NOT yet found in proteins? [Question ID = 52783]

- 1. L-lysine [Option ID = 91124]
- 2. Pyrrolysine [Option ID = 91127]
- 3. Selenocysteine [Option ID = 91125]
- 4. D-lysine [Option ID = 91126]

Correct Answer :-

- D-lysine [Option ID = 91126]

24) Matrix assisted laser desorption ionization time of flight (MALDI-TOF) spectrometry is most useful for predicting which of the following? [Question ID = 52752]

- 1. Molecular mass [Option ID = 91002]
- 2. Three-dimensional structure [Option ID = 91003]
- 3. Secondary structure [Option ID = 91001]
- 4. Isoelectric point [Option ID = 91000]

Correct Answer :-

- Molecular mass [Option ID = 91002]

25) The DNA content of a diploid cell is measured in the G1 phase. After meiosis I, the DNA content of one of the two cells produced would be: [Question ID = 52758]

- 1. equal to that of the G1 cell [Option ID = 91024]

2. one-fourth that of the G1 cell [Option ID = 91027]
3. twice that of the G1 cell [Option ID = 91025]
4. one-half that of the G1 cell [Option ID = 91026]

Correct Answer :-

- equal to that of the G1 cell [Option ID = 91024]

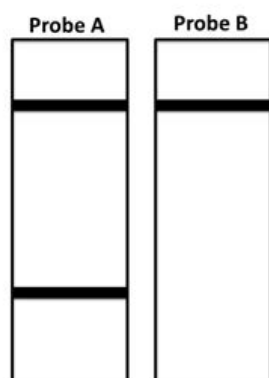
26) A short length of double stranded DNA molecule has 80 thymidine and 80 guanine bases. The total number of nucleotide in the DNA fragment is: [Question ID = 52763]

1. 640 [Option ID = 91047]
2. 40 [Option ID = 91044]
3. 320 [Option ID = 91046]
4. 160 [Option ID = 91045]

Correct Answer :-

- 320 [Option ID = 91046]

27). The autoradiogram below shows the pattern of hybridization following Southern hybridization of human DNA digested with a restriction enzyme. In the figure below the autoradiogram on the left is hybridized to probe A while the one on the right is hybridized to probe B.



If the arrows in the following maps represent the sites of the restriction enzyme, which map best explains the results shown above?

[Question ID = 52739]

1. [Option ID = 90949]
2. [Option ID = 90951]
3. [Option ID = 90950]
4. [Option ID = 90948]

Correct Answer :-



[Option ID = 90949]

28). A hypothetical gene called *genet* was identified in a bacterial strain. The gene is regulated by a chemical compound, PHD. Further it was observed that PHD regulated *genet* through a protein called DU that probably bound to a DNA element DUB (Binding site for DU located near the promoter of *genet*. Two mutant strains were developed:

- DU¹* : the gene encoding DU protein has a nonsense mutation
- Δ DUB : where the probable binding site for the DU protein was deleted.

In an experiment, the wild type and mutant bacterial cells were treated with the chemical PHD and the expression of *genet* gene monitored. Untreated cells were used as controls. The following table summarizes the observed results:

Bacterial Strain	Activity of <i>genet</i> in	
	Control cells	Treated cells
Wild type	100	40
<i>DU¹</i>	05	05
Δ DUB	100	40

Based on the above data which of the following conclusion(s) can we made:

- The *genet* gene is induced by PHD.
- DU is a negative regulator (i.e. represses the activity) of the *genet* gene
- DUB is not the binding site for DU protein.

Which of the above conclusions are correct?

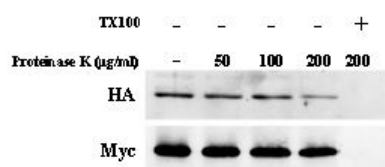
[Question ID = 52737]

- (i), (ii) and (iii) [Option ID = 90943]
- (ii) only [Option ID = 90940]
- (i) and (ii) only [Option ID = 90942]
- (iii) only [Option ID = 90941]

Correct Answer :-

- (iii) only [Option ID = 90941]

29) Shown below are results of protease digestion reaction of sealed membrane vesicles derived from cells expressing membrane bound protein Mtg2p tagged with HA at the N-terminus and with Myc at the C-terminus.



Which statement best describes the localization of Mtg2p?

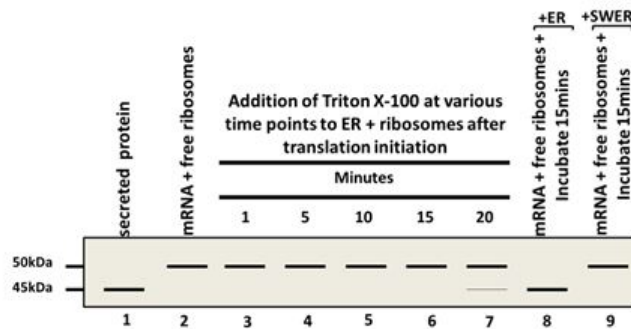
[Question ID = 52751]

- N-terminus faces the cytosol and C-terminus faces the lumen of the membrane vesicle [Option ID = 90996]
- N-terminus and C-terminus both face the cytosol [Option ID = 90999]
- N-terminus and C-terminus both face the lumen of the membrane vesicle [Option ID = 90998]
- C-terminus faces the cytosol and N-terminus faces the lumen of the membrane vesicle [Option ID = 90997]

Correct Answer :-

- N-terminus and C-terminus both face the lumen of the membrane vesicle [Option ID = 90998]

- 30) Shown are results of an in vitro translation experiments using mRNA of a secreted protein with free ribosomes (lane 2), mRNA+ endoplasmic reticulum (ER) + ribosomes followed by addition of Triton X100 at the indicated times after translation initiation (lanes 3-7), mRNA+ free ribosomes followed by addition of ER or salt washed (SW) ER membranes 15 minutes after translation initiation (8,9). As control secreted protein from this specific mRNA is loaded in lane 1. Answer the following question based on this data.



Which statement best describes the protein product encoded by the mRNA ?

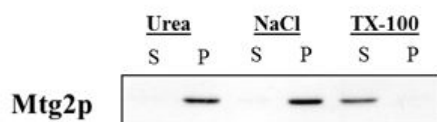
[Question ID = 52747]

1. The mRNA encodes for a precursor protein which is translated in the cytosol and matures within the ER prior to secretion. [Option ID = 90982]
2. The mRNA encodes for a precursor protein which is translated on ER bound ribosomes with maturation taking place co-translationally within the ER. [Option ID = 90983]
3. The mRNA encodes for a protein which is 50kDa in size and requires no processing within the ER [Option ID = 90980]
4. The mRNA encodes for a protein which is 45kDa in size in vivo [Option ID = 90981]

Correct Answer :-

- The mRNA encodes for a precursor protein which is translated in the cytosol and matures within the ER prior to secretion. [Option ID = 90982]

- 31) Mitochondrial membrane fractions were treated with either 6M Urea, 1M NaCl or 1% TX100 (triton X-100). Soluble (S) and pellet (P) fractions were separated by centrifugation and probed for presence of Mtg2p. Shown below are results.



Which statement below best describes the interaction of Mtg2p with the mitochondrial membrane?

[Question ID = 52746]

1. Mtg2p is a tightly associated peripheral membrane protein [Option ID = 90977]
2. Mtg2p is an integral membrane protein of the mitochondria [Option ID = 90976]
3. Mtg2p is a soluble matrix protein [Option ID = 90979]
4. Mtg2p is partially imbedded in the inner mitochondrial membrane [Option ID = 90978]

Correct Answer :-

- Mtg2p is an integral membrane protein of the mitochondria [Option ID = 90976]

- 32) Eukaryotic primary RNA transcripts of protein coding genes:

- i. encode the product of a single gene
- ii. contain only introns
- iii. undergo capping and polyadenylation
- iv. usually contains introns
- v. are translated immediately

Which of the above statements are correct?

[Question ID = 52777]

1. (i) (iv) and (v) [Option ID = 91103]
2. (i) (iii) and (v) [Option ID = 91102]
3. (i) (iii) and (iv) [Option ID = 91100]
4. (ii) (iii) and (v) [Option ID = 91101]

Correct Answer :-

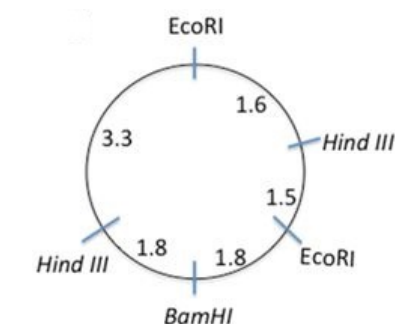
- (i) (iii) and (iv) [Option ID = 91100]

33) On discovery of a virus with a circular dsDNA of approximately 10,000bp, its map was constructed by digesting the DNA with various restriction endonucleases. The following results were obtained:

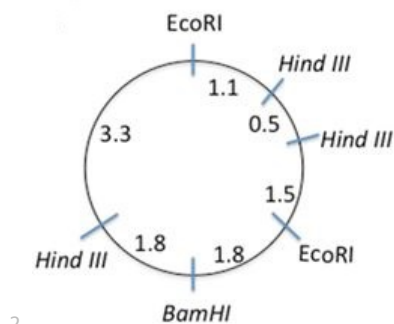
Endonuclease	Length of fragments (kb)
EcoRI	6.9 , 3.1
HindIII	5.1, 4.4, 0.5
BamHI	10.0
EcoRI + HindIII	3.6 , 3.3, 1.5, 1.1, 0.5
EcoRI + BamHI	5.1, 3.1, 1.8
HindIII + BamHI	4.4, 3.3, 1.8, 0.5
EcoRI + HindIII +BamHI	3.3, 1.8, 1.5, 1.1, 0.5

Which of the following maps correctly represents the observations?

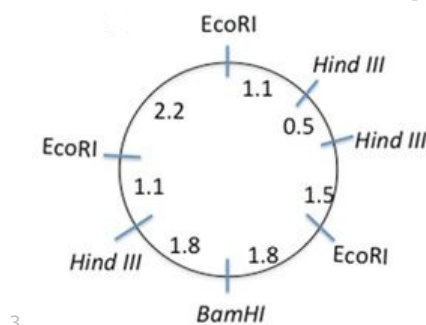
[Question ID = 52786]



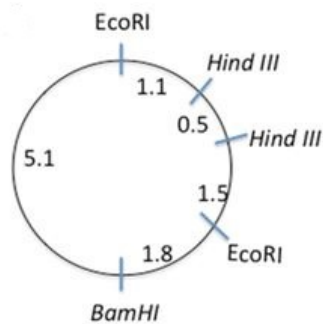
[Option ID = 91137]



[Option ID = 91138]

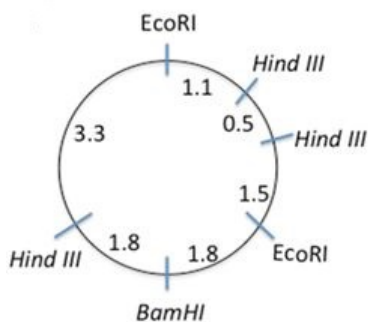


[Option ID = 91139]



4. [Option ID = 91136]

Correct Answer :-



[Option ID = 91138]

34) When transgenic plants are developed, the transgene usually integrates randomly. The transgenic plant can carry one or more copies of the transgenes. In the initial transformant i.e. the T_0 line the transgenes is usually in a hemizygous condition. The number of transgene integrated in a plant can be tested by selfing the T_0 plant and testing the presence and absence of the transgene in the next generation (T_1). When such an experiment was carried out, it was observed that 150 of the 160 T_1 plants showed the presence of the transgene. Based on the above it can be concluded that in the T_0 line the transgene was integrated at:

[Question ID = 52738]

1. Two independent locations in the genome [Option ID = 90945]
2. Three independent locations in the genome [Option ID = 90946]
3. Four independent locations in the genome [Option ID = 90947]
4. A single location in the genome [Option ID = 90944]

Correct Answer :-

1. Two independent locations in the genome [Option ID = 90945]

35) In a study of histidine biosynthesis in yeast, six mutant haploids requiring supplemented histidine (His1-6) in the culture medium for viability were isolated. The mutant haploids were fused in pairwise combinations to form diploids, whose requirement for histidine was tested. The results of the tests are shown below where (+) indicates diploid combination yielding histidine prototrophs.

	His1	His2	His3	His4	His5	His6
His1	-	+	-	+	+	-
His2	+	-	+	-	-	+
His3	-	+	-	+	+	-
His4	+	-	+	-	-	+
His5	+	-	+	-	-	+
His6	-	+	-	+	+	-

How many different His genes are represented among the six mutants?

[Question ID = 52749]

1. One [Option ID = 90988]
2. Three [Option ID = 90990]
3. Four [Option ID = 90991]
4. Two [Option ID = 90989]

Correct Answer :-

- Two [Option ID = 90989]

36) The genotypes of a husband and wife are $I^A I^B \times I^A i$. Among the blood types of their children, how many different genotypes and phenotypes are possible?

[Question ID = 52757]

1. 3 genotypes; 4 phenotypes [Option ID = 91020]
2. 3 genotypes; 3 phenotypes [Option ID = 91022]
3. 4 genotypes; 3 phenotypes [Option ID = 91023]
4. 4 genotypes; 4 phenotypes [Option ID = 91021]

Correct Answer :-

- 4 genotypes; 3 phenotypes [Option ID = 91023]

37) Human beings carrying the dominant allele R can roll their tongue. In a population in which the frequency of this allele is 0.8, what is the probability that a particular individual who can roll his/her tongue is homozygous?

[Question ID = 52776]

1. 0.32 [Option ID = 91097]
2. 0.96 [Option ID = 91098]
3. 0.66 [Option ID = 91099]
4. 0.64 [Option ID = 91096]

Correct Answer :-

- 0.66 [Option ID = 91099]

38) A PCR reaction that continues for 30 cycles will produce approximately how many PCR products from a single template DNA molecule? [Question ID = 52744]

1. ~ 1 billion [Option ID = 90971]
2. ~ 1 million [Option ID = 90970]
3. 128,000 [Option ID = 90969]
4. 64 [Option ID = 90968]

Correct Answer :-

- ~ 1 billion [Option ID = 90971]

39) In a cell undergoing meiosis, the number of copies of a gene at Metaphase I, Anaphase I and Metaphase II would be: [Question ID = 52755]

1. 4, 4, 4 [Option ID = 91012]
2. 4, 4, 2 [Option ID = 91014]
3. 2, 2, 4 [Option ID = 91015]
4. 2, 2, 2 [Option ID = 91013]

Correct Answer :-

- 4, 4, 2 [Option ID = 91014]

40) Which of the following protein maintained at constant levels throughout the cell cycle and requires for cyclin to become catalytically active? [Question ID = 52765]

1. Cyclins [Option ID = 91054]
2. Acetyl transferase [Option ID = 91052]
3. Cyclin dependent kinases (Cdk) [Option ID = 91055]
4. Protein kinase [Option ID = 91053]

Correct Answer :-

- Cyclin dependent kinases (Cdk) [Option ID = 91055]

41) Which of the following is a bypass repair system: [Question ID = 52742]

1. Base excision repair [Option ID = 90960]
2. SOS repair [Option ID = 90962]
3. Nucleotide excision repair [Option ID = 90961]
4. Recombinational repair [Option ID = 90963]

Correct Answer :-

- SOS repair [Option ID = 90962]

42) Which of the following amino acids are incorrectly grouped based on their side chain polarity properties? [Question ID = 52780]

1. Isoleucine, Leucine, Alanine [Option ID = 91115]
2. Methionine, Cysteine, Serine [Option ID = 91112]
3. Phenylalanine, Tyrosine, Tryptophan [Option ID = 91114]
4. Arginine, Lysine, Proline [Option ID = 91113]

Correct Answer :-

43) Which one of the following listed processes below starts from 3' to 5' direction? [Question ID = 52781]

1. Trans-splicing [Option ID = 91118]
2. mRNA editing [Option ID = 91119]
3. Translation [Option ID = 91117]
4. Polyadenylation [Option ID = 91116]

Correct Answer :-

- mRNA editing [Option ID = 91119]

44) The translation of an mRNA encoding a secretory protein using a cell free translation system containing microsomes (ER) lacking signal recognition particles (SRP) is initiated. Shortly afterwards SRP molecules in presence of TX100 are added followed by further incubation. Which of the following outcome is the most likely? [Question ID = 52748]

1. The protein will be fully synthesized but not incorporated into microsomes. [Option ID = 90987]
2. The protein will be fully synthesized and incorporated into microsomes. [Option ID = 90985]
3. The protein will be fully synthesized and its signal sequence will be removed without being incorporated into microsomes [Option ID = 90986]
4. Protein synthesis will begin but will be terminated prematurely leading to shorter products. [Option ID = 90984]

Correct Answer :-

- Protein synthesis will begin but will be terminated prematurely leading to shorter products. [Option ID = 90984]

45) Interference is a common phenomenon during crossing over in meiosis. With the increase in the frequency of double cross over, the coefficient of coincidence will: [Question ID = 52760]

1. No relationship between double cross over and coefficient of coincidence [Option ID = 91035]
2. Decrease [Option ID = 91033]
3. Remain same [Option ID = 91034]
4. Increase [Option ID = 91032]

Correct Answer :-

- Increase [Option ID = 91032]

46) The spatial distribution of mRNA in a cell can be detected by:

[Question ID = 52743]

1. Fluorescent in situ hybridization [Option ID = 90967]
2. Northern blot hybridization [Option ID = 90965]
3. Dot blot hybridization [Option ID = 90966]
4. Immunofluorescence [Option ID = 90964]

Correct Answer :-

- Fluorescent in situ hybridization [Option ID = 90967]

47) The development of the antero-posterior axis of *Drosophila* is initiated when:

[Question ID = 52767]

1. The terminal group protein Torso sets up the anterior and posterior poles of the embryo [Option ID = 91061]
2. The mother contributes and packages bicoid and nanos mRNA into the developing oocyte [Option ID = 91060]
3. The homeotic genes specify the fate of individual segments [Option ID = 91062]
4. The sperm enters the micropile at the anterior end, thus specifying the antero-posterior axis [Option ID = 91063]

Correct Answer :-

- The mother contributes and packages bicoid and nanos mRNA into the developing oocyte [Option ID = 91060]

48) You want to express recombinant human insulin protein in *E. coli*. You are given a clone containing the pig insulin gene and human pancreatic tissue. Listed below are steps that are required.

- a. cDNA library with cloned pig insulin gene
- b. isolate mRNA from human pancreas
- c. express recombinant human insulin in *E. coli*
- d. using reverse transcriptase, make cDNA
- e. select positive clones that hybridize to the cloned pig insulin gene
- f. clone cDNAs into expression vector to make library

Which of the following best describes the correct order?

[Question ID = 52772]

1. aecbdf [Option ID = 91080]
2. bdfaec [Option ID = 91083]
3. bdafeec [Option ID = 91081]
4. abdfec [Option ID = 91082]

Correct Answer :-

- bdfaec [Option ID = 91083]

49) You have five yeast strains each having distinct temperature sensitive allele of *YFG1* named *ts1-ts5* for impaired growth at 42°C. In the laboratory you identify a suppressor to *ts1* named *sup1* which restores growth at 42°C. Using pairwise crossing you combine *ts2-ts5* with *sup1*. It turns out that *sup1* when combined with *ts2-ts5* does not suppress impaired growth at 42°C. Which statement below best describes *sup1* function with respect to *ts1*?

[Question ID = 52750]

1. *sup1* is either a dosage or bypass suppressor of *ts1* [Option ID = 90995]
2. *sup1* is a bypass suppressor of *ts1* [Option ID = 90994]
3. *sup1* is a dosage suppressor of *ts1* [Option ID = 90992]
4. *sup1* is an interaction suppressor of *ts1* [Option ID = 90993]

Correct Answer :-

- *sup1* is an interaction suppressor of *ts1* [Option ID = 90993]

**50) You wish to amplify the region in BOLD CAPS below using PCR.
5'gagatcaggacttaGATTACAGATTACAGATTACAGATTACAggccaagtc3'
Select the correct set of 8bp primer pair:**

[Question ID = 52771]

1. 5'AGGACTTA3' and 5'GGCCAAGT3' [Option ID = 91076]
2. 5'AGGACTTA3' and 5'TGAACCGG3' [Option ID = 91079]
3. 5'AGGACTTA3' and 5'ACTTGGCC3' [Option ID = 91078]
4. 5'TAAGTCCT3' and 5'ACTTGGCC3' [Option ID = 91077]

Correct Answer :-

- 5'AGGACTTA3' and 5'ACTTGGCC3' [Option ID = 91078]