

## DU PhD In Biomedical Sciences

Topic:- DU\_J18\_PHD\_BIOSCI\_Topic01

**1) What fraction of total blood volume is present in the capillaries at any given time?**

[Question ID = 2778]

1. 25% [Option ID = 11112]
2. 5% [Option ID = 11109]
3. 20% [Option ID = 11110]
4. 15% [Option ID = 11111]

**Correct Answer :-**

- 5% [Option ID = 11109]

**2) What is the term used for the automated in vitro testing of large number of compounds using genetically modified cells?**

[Question ID = 2797]

1. The high throughput screening [Option ID = 11186]
2. Robotic testing [Option ID = 11185]
3. Nanotechnology [Option ID = 11188]
4. Multi-screening [Option ID = 11187]

**Correct Answer :-**

- The high throughput screening [Option ID = 11186]

**3) What does quaternary structure of a protein involve?**

[Question ID = 2795]

1. The association of two or more peptide chain [Option ID = 11177]
2. The complete three-dimensional conformation [Option ID = 11178]
3. Partial denaturation [Option ID = 11179]
4. Random coil alternating with alpha helix [Option ID = 11180]

**Correct Answer :-**

- The association of two or more peptide chain [Option ID = 11177]

**4) The Michaelis-Menten constant  $K_m$  is**

[Question ID = 2826]

1. Equivalent to the substrate concentration at which  $V_0$  is one half of  $V_{max}$  [Option ID = 11303]
2. Equivalent to the substrate concentration at which  $V_0$  is equal to  $V_{max}$  [Option ID = 11301]
3. Equivalent to the substrate concentration at which  $V_0$  is one fourth  $V_{max}$  [Option ID = 11304]
4. Equivalent to the substrate concentration at which  $V_0$  is one third  $V_{max}$  [Option ID = 11302]

**Correct Answer :-**

- Equivalent to the substrate concentration at which  $V_0$  is one half of  $V_{max}$  [Option ID = 11303]

**5) The process of correcting bleed over of one flouochrome into the emission spectra of the other flouochrome is called**

[Question ID = 2799]

1. Voltage adjustment [Option ID = 11195]
2. Compensation [Option ID = 11194]
3. Binary correction [Option ID = 11196]
4. Gating [Option ID = 11193]

**Correct Answer :-**

- Compensation [Option ID = 11194]

6) The time-scale for an electronic transition is much shorter than for vibrational transitions, it can be assumed that inter-nuclear distances will not change during the transition. Which of the statement/s correctly represent the Fluorescence phenomena?

[Question ID = 2808]

1. Measurement of the fluorescence from a large number of molecules, following a short pulse excitation, will show an exponential decay [Option ID = 11230]
2. All of these [Option ID = 11232]
3. Fluorescence lifetime is the average time that an electron spends in the excited state before a photon is emitted [Option ID = 11229]
4. Fluorescence lifetime is given by the  $1/e$  point of the decay [Option ID = 11231]

Correct Answer :-

- All of these [Option ID = 11232]

7) The Ramachandran plot illustrates the fact that

[Question ID = 2805]

1. the conformation in which both  $\phi$  and  $\psi$  are 0 is prohibited [Option ID = 11219]
2. the peptide bond is non-planar [Option ID = 11217]
3. each  $\phi$  and  $\psi$  pair can assume two different conformation [Option ID = 11218]
4. each  $\phi$  and  $\psi$  pair can assume any conformation [Option ID = 11220]

Correct Answer :-

- the conformation in which both  $\phi$  and  $\psi$  are 0 is prohibited [Option ID = 11219]

8) Incubating antibodies against the ligand of receptor tyrosine kinase in live cell culture

[Question ID = 2787]

1. none of these [Option ID = 11148]
2. initiate receptor dimerization [Option ID = 11147]
3. inhibits receptor tyrosine kinase activation [Option ID = 11145]
4. activate receptor tyrosine kinase [Option ID = 11146]

Correct Answer :-

- inhibits receptor tyrosine kinase activation [Option ID = 11145]

9) Benzodiazepine receptors are also known as

[Question ID = 2821]

1. serotonin receptors [Option ID = 11283]
2. nicotinic receptors [Option ID = 11282]
3. muscarinic receptors [Option ID = 11281]
4. GABA alpha receptors [Option ID = 11284]

Correct Answer :-

- GABA alpha receptors [Option ID = 11284]

10) There are several sources and methods for discovering new compounds, which of the following is most likely to lead to the discovery of a complex structure which is likely to be different from other previously discovered?

[Question ID = 2798]

1. Screening plant extract [Option ID = 11191]
2. Database mining [Option ID = 11190]
3. Me too drugs [Option ID = 11192]
4. Combinatorial chemistry [Option ID = 11189]

Correct Answer :-

- Screening plant extract [Option ID = 11191]

11) Alpha subunit of heterotrimeric G-protein functions as

[Question ID = 2802]

1. cAMP-specific phosphodiesterase [Option ID = 11208]
2. GTPase [Option ID = 11205]
3. cGMP-specific phosphodiesterase [Option ID = 11207]
4. GDP kinase [Option ID = 11206]

**Correct Answer :-**

- GTPase [Option ID = 11205]

**12) Infrared spectroscopy is one of the best diagnostic tools for analysis of carbonyl groups having a strong C=O absorption peak between**

**[Question ID = 2807]**

1. 2240 - 2360  $\text{cm}^{-1}$  [Option ID = 11226]
2. 1660 - 1770  $\text{cm}^{-1}$  [Option ID = 11228]
3. 1915-2025  $\text{cm}^{-1}$  [Option ID = 11227]
4. 3400 - 3510  $\text{cm}^{-1}$  [Option ID = 11225]

**Correct Answer :-**

- 1660 - 1770  $\text{cm}^{-1}$  [Option ID = 11228]

**13) Butadiene changes to the one of the following molecules in the presence of heat [Question ID = 2816]**

1. methyl cyclopropane [Option ID = 11263]
2. none of these [Option ID = 11264]
3. cyclobutane [Option ID = 11261]
4. cyclobutene [Option ID = 11262]

**Correct Answer :-**

- cyclobutene [Option ID = 11262]

**14) Protein lysates were immunoprecipitated with antibody against human "X". Which was raised in mouse. Immunoprecipitated complex was subjected to SDS-PAGE, following with western blotting with antibodies to human "X" antibody (raised in mouse), then probed with HRP conjugated secondary antibody to mouse, results in appearance of three distinct protein bands. This indicates [Question ID = 2791]**

1. One band is "X" protein and other two protein bands are IgG H chain, and IgG L chain [Option ID = 11162]
2. One band is "X" protein, other two bands are non specific [Option ID = 11161]
3. All three protein bands are of "X" protein [Option ID = 11164]
4. Degradation product of Protein "X" [Option ID = 11163]

**Correct Answer :-**

- One band is "X" protein and other two protein bands are IgG H chain, and IgG L chain [Option ID = 11162]

**15) Under which of the following conditions Lac operon will be functional?**

**[Question ID = 2782]**

1. All these condition [Option ID = 11128]
2. When lactose and glucose both are present in the media [Option ID = 11126]
3. When glucose + lactose + galactose are provided in the medium together [Option ID = 11125]
4. only lactose is present [Option ID = 11127]

**Correct Answer :-**

- only lactose is present [Option ID = 11127]

**16) Sulphur trioxide is a [Question ID = 2819]**

1. nucleophile [Option ID = 11273]
2. a protic acid [Option ID = 11275]
3. electrophile [Option ID = 11274]
4. a base [Option ID = 11276]

**Correct Answer :-**

- electrophile [Option ID = 11274]

**17) Cisplatin acts as an anti-cancer drug by**

[Question ID = 2817]

1. DNA Cleavage [Option ID = 11265]
2. Formation of hydroxyl radicals [Option ID = 11266]
3. Formation of GG adducts [Option ID = 11267]
4. Formation of AA adducts [Option ID = 11268]

**Correct Answer :-**

- Formation of GG adducts [Option ID = 11267]

**18) What you mean by a lead compound in drug discovery? [Question ID = 2796]**

1. A compound that acts as the starting point for drug design [Option ID = 11183]
2. A drug which is normally the first to be prescribed for a particular ailment [Option ID = 11184]
3. A drug containing the element lead [Option ID = 11181]
4. A leading drug in a particular area of medicine [Option ID = 11182]

**Correct Answer :-**

- A compound that acts as the starting point for drug design [Option ID = 11183]

**19) Canscora decussata is more commonly known as [Question ID = 2824]**

1. shankhpushpi [Option ID = 11295]
2. hibiscus [Option ID = 11294]
3. bel [Option ID = 11296]
4. amla [Option ID = 11293]

**Correct Answer :-**

- shankhpushpi [Option ID = 11295]

**20) Histone deacetylase (HDAC) catalysis the removal of acetyl group from N-terminal of histones. Which amino acid of histone is involved in acetylation?**

[Question ID = 2789]

1. Arginine [Option ID = 11154]
2. Asparagine [Option ID = 11155]
3. Histidine [Option ID = 11156]
4. Lysine [Option ID = 11153]

**Correct Answer :-**

- Lysine [Option ID = 11153]

**21) A stronger than normal stimulus can cause excitation of nerve or muscle during**

[Question ID = 2780]

1. spike potential [Option ID = 11119]
2. absolute refractory period [Option ID = 11117]
3. overshoot [Option ID = 11120]
4. relative refractory period [Option ID = 11118]

**Correct Answer :-**

- relative refractory period [Option ID = 11118]

**22) Pluripotency in the cell is maintained by three transcription factors. Which one of the following is correct?**

[Question ID = 2801]

1. Sox2, CDX2, Nanog [Option ID = 11204]
2. Oct4, CDX2, Nanog [Option ID = 11203]
3. Oct4, Sox2, CDX2 [Option ID = 11202]
4. Oct4, Sox2, Nanog [Option ID = 11201]

**Correct Answer :-**

- Oct4, Sox2, Nanog [Option ID = 11201]

**23) Thallium-208 has a half life of 3.1 minutes and decays by beta emission to form a stable isotope. What mass of a 2.08 g sample of Tl-208 will remain unchanged after 9.3 minutes? [Question ID = 2891]**

1. 0.13 [Option ID = 11233]
2. 0.39 [Option ID = 11235]
3. 0.52 [Option ID = 11236]
4. 0.26 [Option ID = 11234]

**Correct Answer :-**

- 0.26 [Option ID = 11234]

**24) White matter in brain lacks [Question ID = 2825]**

1. Both Axons and Oligodendrocytes [Option ID = 11300]
2. Axons [Option ID = 11297]
3. Neuronal cell bodies [Option ID = 11299]
4. Oligodendrocytes [Option ID = 11298]

**Correct Answer :-**

- Neuronal cell bodies [Option ID = 11299]

**25) Xist is a non-coding RNA mapping on the X chromosome in the mouse, and is necessary for X chromosome inactivation and dosage compensation. An XX cell, has a deletion of the Xist locus in one of the X chromosomes. What is the pattern of X-inactivation you expect in these cells? [Question ID = 2803]**

1. there will not be any X chromosome inactivation. [Option ID = 11209]
2. it will be random, either the deleted or the normal X chromosome will be inactivated. [Option ID = 11212]
3. the Xist-deleted chromosome will always be inactivated. [Option ID = 11210]
4. the Xist-deleted chromosome will always be active. [Option ID = 11211]

**Correct Answer :-**

- the Xist-deleted chromosome will always be active. [Option ID = 11211]

**26) Difference between systemic and glomerular capillaries is**

**[Question ID = 2779]**

1. blood pressure in systemic capillary is higher than glomerular [Option ID = 11114]
2. blood pressure in Glomerular capillaries is higher than systemic capillary [Option ID = 11116]
3. filtration rate is low in Glomerular capillaries [Option ID = 11115]
4. surface area of glomerular capillary is more [Option ID = 11113]

**Correct Answer :-**

- blood pressure in Glomerular capillaries is higher than systemic capillary [Option ID = 11116]

**27) A protein undergoes posttranslational modification. In an experiment to identify the nature of modification, following experimental results were obtained:**

- 1. Protein moved more slowly on SDS PAGE**
- 2. Isoelectric Focusing (IEF) showed that there was no change in the PI**
- 3. Mass spectrometric analysis showed that the modification was on serine**

**The modification that the protein undergoes is likely to be**

**[Question ID = 2788]**

1. Ubiquitination [Option ID = 11151]
2. Glycosylation [Option ID = 11150]
3. Phosphorylation [Option ID = 11149]
4. ADP-ribosylation [Option ID = 11152]

**Correct Answer :-**

- Glycosylation [Option ID = 11150]

**28) Esperamicin is an**

**[Question ID = 2813]**

1. an anti-tumor antibiotic [Option ID = 11251]
2. anti-hypertensive drug [Option ID = 11249]
3. anti-hypercholesterolemic drug [Option ID = 11250]
4. anti- HIV drug [Option ID = 11252]

**Correct Answer :-**

- an anti-tumor antibiotic [Option ID = 11251]

**29) 5g of benzaldehyde will yield x g of benzoic acid upon oxidation**

**[Question ID = 2810]**

1. x = 6.00g [Option ID = 11240]
2. x = 5.30g [Option ID = 11237]
3. x = 5.50g [Option ID = 11238]
4. x = 5.75g [Option ID = 11239]

**Correct Answer :-**

- x = 5.75g [Option ID = 11239]

**30) Ashwagandha is a natural product with**

**[Question ID = 2823]**

1. none of these [Option ID = 11292]
2. the property of preventing gastric ulcers [Option ID = 11290]
3. the property of preventing amoebic infections [Option ID = 11291]
4. anti-stress and anti-cancer activity [Option ID = 11289]

**Correct Answer :-**

- anti-stress and anti-cancer activity [Option ID = 11289]

**31) BH3 domain containing protein is**

**[Question ID = 2786]**

1. receptor tyrosine kinase [Option ID = 11143]
2. src kinase [Option ID = 11144]
3. apoptotic protein [Option ID = 11141]
4. anti-apoptotic protein [Option ID = 11142]

**Correct Answer :-**

- apoptotic protein [Option ID = 11141]

**32) Radiolabelling of DNA with P<sup>32</sup> radioisotope takes place at**

**[Question ID = 2784]**

1. phosphodiester bonds [Option ID = 11135]
2. none of these [Option ID = 11136]
3. 3' end of DNA [Option ID = 11134]
4. 5' end of DNA [Option ID = 11133]

**Correct Answer :-**

- 5' end of DNA [Option ID = 11133]

**33) Tendency of cells to form colonies is increased by**

**[Question ID = 2783]**

1. incubation with calcium chelators [Option ID = 11132]
2. inhibiting intracellular calcium [Option ID = 11131]
3. inhibiting extracellular calcium [Option ID = 11129]
4. increasing extracellular calcium [Option ID = 11130]

**Correct Answer :-**

- increasing extracellular calcium [Option ID = 11130]

**34) The enzyme lactate dehydrogenase converts [Question ID = 2812]**

1. lactate to acetaldehyde [Option ID = 11246]
2. pyruvate to lactate [Option ID = 11245]

3. pyruvate to acetaldehyde [Option ID = 11247]
4. acetaldehyde to acetic acid [Option ID = 11248]

**Correct Answer :-**

- pyruvate to lactate [Option ID = 11245]

**35) How many pi molecular orbitals are present in hexatriene?**

[Question ID = 2815]

1. 5 [Option ID = 11258]
2. 4 [Option ID = 11257]
3. 12 [Option ID = 11260]
4. 6 [Option ID = 11259]

**Correct Answer :-**

- 6 [Option ID = 11259]

**36) How many molecular orbitals are formed by combining 4 atomic orbitals?**

[Question ID = 2820]

1. 4 [Option ID = 11279]
2. 2 [Option ID = 11277]
3. 3 [Option ID = 11278]
4. 8 [Option ID = 11280]

**Correct Answer :-**

- 4 [Option ID = 11279]

**37) To determine the stability of protein "A" under stimulus of hormone to cells, which of the following experiments should be carried out?**

[Question ID = 2781]

1. Cell should be grown in the presence and absence of hormone. After different time intervals, protein is isolated and fractionated on SDS-PAGE and western blot performed [Option ID = 11122]
2. Purified protein A should be incubated with hormone for different time intervals. Do SDS-PAGE followed by western to see how much protein is present [Option ID = 11124]
3. Extract total protein from the cell. In one tube add hormone and in another tube add buffer. Carry out western blotting for the protein A, using specific antibodies at different time intervals. [Option ID = 11121]
4. Culture the cells in the presence and absence of hormones for 48hrs. Now add cyclohexamide and incubate cells again for different times (2-4 hrs etc). Isolate the total protein and do western blot for the protein A. [Option ID = 11123]

**Correct Answer :-**

- Culture the cells in the presence and absence of hormones for 48hrs. Now add cyclohexamide and incubate cells again for different times (2-4 hrs etc). Isolate the total protein and do western blot for the protein A. [Option ID = 11123]

**38) In an experiment to detect DNA methylation in regulatory region of globin gene, which of the following method is recommended?**

[Question ID = 2790]

1. PCR amplification and sequencing [Option ID = 11157]
2. Restriction enzyme digestion and southern hybridization [Option ID = 11160]
3. Digestion with methylated sensitive restriction enzyme and electrophoresis [Option ID = 11158]
4. Digestion with methylation sensitive restriction enzyme and southern hybridization [Option ID = 11159]

**Correct Answer :-**

- Digestion with methylation sensitive restriction enzyme and southern hybridization [Option ID = 11159]

**39) In a population from a recently discovered island in the Indian ocean, most of the people were of blood group O. This indicates that**

[Question ID = 2804]

1. This a case of pseudo-genes [Option ID = 11215]
2. This is a case of pseudo-dominance [Option ID = 11216]
3. This is due to high rate of mutation [Option ID = 11214]
4. Blood group O is a truly dominant allele [Option ID = 11213]

Correct Answer :-

- This is a case of pseudo-dominance [Option ID = 11216]

40) Which phospholipid inhibits the release of Cytochrome c from the mitochondria?

[Question ID = 2785]

1. Cardiolipin [Option ID = 11139]
2. Phosphatidyl serine [Option ID = 11137]
3. Phosphatidyl choline [Option ID = 11138]
4. None of these [Option ID = 11140]

Correct Answer :-

- Cardiolipin [Option ID = 11139]

41) Which cytokine is primarily responsible for auto immune response?

[Question ID = 2800]

1. IL-1 [Option ID = 11199]
2. IL-17 [Option ID = 11200]
3. IL-10 [Option ID = 11197]
4. IL-5 [Option ID = 11198]

Correct Answer :-

- IL-17 [Option ID = 11200]

42) Which of the following is true, if carbonyl (C=O) group of  $i^{\text{th}}$  residue in a polypeptide chain hydrogen bonds with  $i+n$  residue, where

[Question ID = 2806]

1.  $n=4$  is a  $\pi$ - helix [Option ID = 11222]
2.  $n=3$  is an alpha helix [Option ID = 11223]
3.  $n=2$ , peptide degenerates to a non chiral, 2, 2<sub>7</sub> helical ribbon [Option ID = 11221]
4.  $n=5$  is a 3.6<sub>13</sub> helix [Option ID = 11224]

Correct Answer :-

- $n=2$ , peptide degenerates to a non chiral, 2, 2<sub>7</sub> helical ribbon [Option ID = 11221]

43) Which of the following is NOT a part of the primary proteins structure?

[Question ID = 2794]

1. The disulphide linkages [Option ID = 11174]
2. The amino acid sequences [Option ID = 11173]
3. The conformation of the polypeptide backbone [Option ID = 11176]
4. The planar nature of the amide linkage [Option ID = 11175]

Correct Answer :-

- The disulphide linkages [Option ID = 11174]

44) Which of the following metal ions is used for the treatment of arthritis?

[Question ID = 2818]

1. Magnesium [Option ID = 11272]
2. Copper [Option ID = 11270]
3. Gold [Option ID = 11271]
4. Silver [Option ID = 11269]

Correct Answer :-

- Gold [Option ID = 11271]

45) Which of the following statements is correct?

[Question ID = 2814]

1. DNA polymerase is DNA alkylator [Option ID = 11256]
2. Netropsin is a major groove binder [Option ID = 11255]
3. Ethidium bromide is a minor groove binder [Option ID = 11253]
4. Ethidium bromide intercalates with DNA [Option ID = 11254]

**Correct Answer :-**

- Ethidium bromide intercalates with DNA [Option ID = 11254]

**46) Which of the following statements is false about the NMR experiment?**

[Question ID = 2792]

1. The energy required to flip the spin of a system is in the infrared region of the electromagnetic spectrum [Option ID = 11165]
2. The energy difference between two spin states depends on the strength of the magnetic field [Option ID = 11166]
3. When energy absorption occurs, the nuclei are said to be in resonance with the electromagnetic radiation [Option ID = 11167]
4. When a proton is aligned with the magnetic field, its energy is lower than when its is aligned against the magnetic field [Option ID = 11168]

**Correct Answer :-**

- The energy required to flip the spin of a system is in the infrared region of the electromagnetic spectrum [Option ID = 11165]

**47) Which of the following compounds has the most de-shielded proton?**

[Question ID = 2793]

1.  $\text{CH}_3\text{I}$  [Option ID = 11170]
2.  $\text{CH}_3\text{F}$  [Option ID = 11172]
3.  $\text{CH}_3\text{Cl}$  [Option ID = 11169]
4.  $\text{CH}_3\text{Br}$  [Option ID = 11171]

**Correct Answer :-**

- $\text{CH}_3\text{F}$  [Option ID = 11172]

**48) Which of the following symmetry element is present in chloroform?**

[Question ID = 2822]

1.  $\text{C}_2$  axis of symmetry [Option ID = 11286]
2.  $\text{C}_3$  axis of symmetry [Option ID = 11285]
3.  $\text{S}_2$  axis of symmetry [Option ID = 11287]
4. Center of symmetry [Option ID = 11288]

**Correct Answer :-**

- $\text{C}_3$  axis of symmetry [Option ID = 11285]

**49) Which of these can not pass through the glomerular capillaries under normal condition?**

[Question ID = 2777]

1. Albumin [Option ID = 11108]
2. Water [Option ID = 11105]
3. Sodium [Option ID = 11106]
4. Potassium [Option ID = 11107]

**Correct Answer :-**

- Albumin [Option ID = 11108]

**50) Benzotriazole contains [Question ID = 2811]**

1. two nitrogen and one oxygen atom [Option ID = 11241]
2. three nitrogen atoms [Option ID = 11243]
3. three nitro groups [Option ID = 11244]
4. two oxygen and one nitrogen atom [Option ID = 11242]

**Correct Answer :-**

- three nitrogen atoms [Option ID = 11243]