

JNUEE PHD Molecular Medicine

1) Nobel prize in 'Physiology or Medicine' during the year 2020 was awarded for the[Question ID = 32712][Question Description = S1_CMMH_905_PhD_Q001]

1. discovery of Hepatitis C virus [Option ID = 166000]
2. development of a method for genome editing [Option ID = 166001]
3. directed evolution of enzymes [Option ID = 166002]
4. phage display of peptides and antibodies [Option ID = 166003]

2) A hormone known to regulate the basal metabolism of our body is secreted from[Question ID = 32713][Question Description = S1_CMMH_905_PhD_Q002]

1. adrenal cortex [Option ID = 166004]
2. pancreas [Option ID = 166005]
3. pituitary gland [Option ID = 166006]
4. thyroid gland [Option ID = 166007]

3) Which of the following is a phase-I component of the liver xenobiotic metabolism and detoxification machinery?

[Question ID = 32714][Question Description = S1_CMMH_905_PhD_Q003]

1. Cytochrome P - 450
[Option ID = 166008]
2. Glutathione S-transferase
[Option ID = 166009]
3. Sulphotransferase
[Option ID = 166010]
4. MDR-1
[Option ID = 166011]

4) An example of a transcription factor having a 'ligand binding domain' in its modular structure is[Question ID = 32715][Question Description = S1_CMMH_905_PhD_Q004]

1. Nuclear factor kappa B [Option ID = 166012]
2. Insulin receptor [Option ID = 166013]
3. Estrogen receptor [Option ID = 166014]
4. Monoamine oxygenase [Option ID = 166015]

5) Conn's syndrome is a health problem that is characterized by the over-secretion of[Question ID = 32716][Question Description = S1_CMMH_905_PhD_Q005]

1. Aldosterone [Option ID = 166016]
2. Progesterone [Option ID = 166017]
3. ADH [Option ID = 166018]
4. Glucagon [Option ID = 166019]

6) From the list below, identify the nuclear receptor that functions as a heterodimer with several other receptors?[Question ID = 32717][Question Description = S1_CMMH_905_PhD_Q006]

1. Androgen receptor (AR) [Option ID = 166020]
2. Retinoid X receptor (RXR) [Option ID = 166021]
3. Progesterone receptor (PR) [Option ID = 166022]
4. Glucocorticoid receptor (GR) [Option ID = 166023]

7) A classical 'Nuclear Export Signal' (NES) is characterized by

[Question ID = 32718][Question Description = S1_CMMH_905_PhD_Q007]

1. a small stretch of sequence of hydrophobic amino acid residues
[Option ID = 166024]
2. a small stretch of sequence enriched with leucine and isoleucine residues
[Option ID = 166025]
3. a small stretch of sequences enriched with arginine and lysine residues
[Option ID = 166026]
4. a cleavable sequence located at the N-terminal or C-terminal of the protein
[Option ID = 166027]

8) Which of the following statements is true regarding the magnesium present in the porphyrin ring and the phytol chain of a chlorophyll molecule?[Question ID = 32719][Question Description = S1_CMMH_905_PhD_Q008]

1. Magnesium porphyrin ring is hydrophilic whereas phytol chain is lipophilic [Option ID = 166028]
2. Magnesium porphyrin ring is lipophilic whereas phytol chain is hydrophilic [Option ID = 166029]
3. Both magnesium porphyrin and phytol chain is hydrophilic [Option ID = 166030]
4. Both magnesium porphyrin and phytol chain is lipophilic [Option ID = 166031]

9) Euglena like organism shows dual mode of nutrition such as?[Question ID = 32720][Question Description = S1_CMMH_905_PhD_Q009]

1. parasitic and holozoic [Option ID = 166032]
2. photosynthetic and ingestive [Option ID = 166033]
3. photosynthetic and holozoic [Option ID = 166034]
4. photosynthetic and saprophytic [Option ID = 166035]

10) Both thallus and prothallus are undifferentiated gametophytic structures. Their differences are

A. Thallus is filamentous whereas prothallus is heart-shaped

B. Thallus is photosynthetic, prothallus is not

C. Thallus reproduces both sexually and asexually while prothallus undergoes only sexual reproduction

D. Prothallus is always multicellular whereas thallus may not be

Choose the correct answer

[Question ID = 32721][Question Description = S1_CMMH_905_PhD_Q010]

1. A, B, C but NOT D is correct [Option ID = 166036]
2. A, B, D but NOT C is correct [Option ID = 166037]
3. A, C, D but NOT B is correct [Option ID = 166038]
4. B, C, D but NOT A is correct [Option ID = 166039]

11) To match the following between Column A and B, choose the correct answer:

COLUMN A	COLUMN B
Micronucleus and Macronucleus	Protozoa, Algae, Fungi
Independent sporophytic and gametophytic phase	Cholorophyceae
Protists	Pteridophytes
Spirogyra	Vorticella and Paramaecium

[Question ID = 32722][Question Description = S1_CMMH_905_PhD_Q011]

1. Micronucleus and Macronucleus - Vorticella and Paramaecium; Independent sporophytic and gametophytic phase - Pteridophytes; Protists - Protozoa, Algae, Fungi; Spirogyra - Cholorophyceae
[Option ID = 166040]
2. Micronucleus and Macronucleus - Vorticella and Paramaecium; Independent sporophytic and gametophytic phase - Protozoa, Algae, Fungi; Protists - Cholorophyceae; Spirogyra - Pteridophytes
[Option ID = 166041]
3. Micronucleus and Macronucleus - Pteridophytes; Independent sporophytic and gametophytic phase - Protozoa, Algae, Fungi; Protists - Cholorophyceae ; Spirogyra - Vorticella and Paramaecium
[Option ID = 166042]
4. Micronucleus and Macronucleus - Cholorophyceae ; Independent sporophytic and gametophytic phase - Pteridophytes; Protists - Protozoa, Algae, Fungi; Spirogyra - Vorticella and Paramaecium
[Option ID = 166043]

12) When exposed to light, a green plant bends towards the source of light only on one side. Which of the following is the best explanation of the phenomenon?[Question ID = 32723][Question Description = S1_CMMH_905_PhD_Q012]

1. The heat from the light evaporates the water causing drying of the side facing the light. [Option ID = 166044]
2. Cytokinin reduces cell division on the side facing away from the light. [Option ID = 166045]
3. The apices of the stem are attracted towards the light. [Option ID = 166046]
4. Auxin accumulates on the shaded side to induce greater cell elongation on the side. [Option ID = 166047]

13) The process of bulk flow transports fluids in a plant. What are the two main bulk flow processes?

[Question ID = 32724][Question Description = S1_CMMH_905_PhD_Q013]

1. Movement of water up the phloem and movement of solutes up and down the xylem.
[Option ID = 166048]
2. Movement of water up and down the xylem and movement of solutes up the phloem.
[Option ID = 166049]
3. Movement of water up the xylem and movement of solutes up and down the phloem.
[Option ID = 166050]

4. Movement of solutes up the xylem and movement of water up and down the phloem.

[Option ID = 166051]

14) Stomata closure reduce bacterial infection and is primarily orchestrated by the function of a specific hormon. Select the correct answer from below:

[Question ID = 32725][Question Description = S1_CMMH_905_PhD_Q014]

1. It restricts pathogen entry and involves gibberellin functions.

[Option ID = 166052]

2. It reduces release of CO₂ and involves abscisic acid functions.

[Option ID = 166053]

3. It prevents O₂ exchange and involves auxin functions.

[Option ID = 166054]

4. It prevents pathogen entry and involves abscisic acid functions.

[Option ID = 166055]

15) Statement: Many species of plants have developed mechanisms to prevent self-pollination:

Mechanism 1: In monoecious plants, the timing of pollen shed is before or after the stigma becomes receptive.

Mechanism 2: Flowers are dioecious with some as staminate and others as pistillate.

In the light of the statement and mechanisms stated above, choose the most appropriate answer from the options below:

[Question ID = 32726][Question Description = S1_CMMH_905_PhD_Q015]

1. Both mechanisms are correct

[Option ID = 166056]

2. Mechanism 1 is correct; Mechanism 2 is NOT correct

[Option ID = 166057]

3. Mechanism 1 is NOT correct; Mechanism 2 is correct

[Option ID = 166058]

4. Both mechanisms are NOT correct

[Option ID = 166059]

16) Plant-pathogen interactions can be categorized as ‘compatible’ or ‘incompatible’. The main difference between them is

[Question ID = 32727][Question Description = S1_CMMH_905_PhD_Q016]

1. Compatible interactions result in disease whereas incompatible interactions result in resistance.

[Option ID = 166060]

2. Compatible interactions result in resistance whereas incompatible interactions result in disease.

[Option ID = 166061]

3. Compatible interactions benefit both plant and the pathogen whereas incompatible interactions does not benefit either.

[Option ID = 166062]

4. Compatible interactions does not benefit either the plant or the pathogen whereas incompatible interactions benefits both.

[Option ID = 166063]

17) Which one of the following is not a plasmid?[Question ID = 32728][Question Description = S1_CMMH_905_PhD_Q017]

1. RK2 [Option ID = 166064]

2. RP4 [Option ID = 166065]

3. pBR322 [Option ID = 166066]

4. M13 [Option ID = 166067]

18) Reverse transcriptase, which is found in retro viruses, is a type of

[Question ID = 32729][Question Description = S1_CMMH_905_PhD_Q018]

1. DNA polymerase

[Option ID = 166068]

2. RNA polymerase

[Option ID = 166069]

3. Nuclease

[Option ID = 166070]

4. Protease

[Option ID = 166071]

19) Under which condition semi-conservative DNA replication is NOT possible in *E. coli* without killing the *E. coli*?[Question ID = 32730][Question Description = S1_CMMH_905_PhD_Q019]

1. When bacteria is treated with EDTA solution [Option ID = 166072]
2. When bacteria is treated with Triton X-100 detergent [Option ID = 166073]
3. When 10 mM $MgSO_4$ solution is added to the growth medium [Option ID = 166074]
4. When proteinase K is added to the growth medium [Option ID = 166075]

20) Which one among the following statements is NOT true about antibodies?[Question ID = 24124][Question Description = S1_CMMH_905_PhD_Q020]

1. Antibodies can be used as drug candidates [Option ID = 166076]
2. Antibodies are high molecular weight proteins [Option ID = 166077]
3. Antibodies are produced by B cells [Option ID = 166078]
4. Antibodies are protective enzymes [Option ID = 166079]

21) In a DNA-Protein complex, the length of DNA associated with a protein can be determined by which of the following techniques?[Question ID = 24125][Question Description = S1_CMMH_905_PhD_Q021]

1. SDS PAGE [Option ID = 166080]
2. DNA finger-printing [Option ID = 166081]
3. Northern blotting [Option ID = 166082]
4. DNA foot-printing [Option ID = 166083]

22) Study the enzyme kinetics record given below to identify the type of inhibition

[Substrate]	Velocity (micro moles/minute)	Velocity (micro moles/min)
(micro moles)	No Inhibitor	Inhibitor
3	10.4	4.1
5	14.5	6.4
10	22.5	11.3
30	33.8	22.6
90	40.5	33.8

[Question ID = 24126][Question Description = S1_CMMH_905_PhD_Q022]

1. Competitive
[Option ID = 166084]
2. Non-competitive
[Option ID = 166085]
3. Mixed
[Option ID = 166086]
4. Insufficient Data
[Option ID = 166087]

23) Which of the following inorganic ions serve as cofactor for cytochrome oxidase enzyme?[Question ID = 24127][Question Description = S1_CMMH_905_PhD_Q023]

1. Cu^{2+} [Option ID = 166088]
2. K^+ [Option ID = 166089]
3. Zn^{2+} [Option ID = 166090]
4. Fe^{3+} [Option ID = 166091]

24) Which amino acid can stabilize protein structures by forming covalent cross-links between polypeptide chains?[Question ID = 24128][Question Description = S1_CMMH_905_PhD_Q024]

1. Cys [Option ID = 166092]
2. Ser [Option ID = 166093]
3. Gly [Option ID = 166094]
4. Met [Option ID = 166095]

25) Approximate mass of a polypeptide of 400 amino acid residues?[Question ID = 24129][Question Description = S1_CMMH_905_PhD_Q025]

1. 11,000 daltons [Option ID = 166096]
2. 44,000 daltons [Option ID = 166097]
3. 22,000 daltons [Option ID = 166098]
4. 88,000 daltons [Option ID = 166099]

26) Which of the following vitamin deficiency will cause excessive bleeding during injury?

[Question ID = 24130][Question Description = S1_CMMH_905_PhD_Q026]

1. Vitamin A
[Option ID = 166100]
2. Vitamin B

[Option ID = 166101]

3. Vitamin K

[Option ID = 166102]

4. Vitamin C

[Option ID = 166103]

27) A 10 kilobase circular plasmid has two sites for *EcoRI* and only one site for *BamHI*. Digestion of the plasmid with *EcoRI* and *BamHI* will generate how many fragments?[Question ID = 24131][Question Description = S1_CMMH_905_PhD_Q027]

1. One [Option ID = 166104]

2. Two [Option ID = 166105]

3. Three [Option ID = 166106]

4. Four [Option ID = 166107]

28) Which of the following property is used for separation of volatile compounds in gas chromatography?[Question ID = 24132][Question Description = S1_CMMH_905_PhD_Q028]

1. Molarity [Option ID = 166108]

2. Partition coefficient [Option ID = 166109]

3. Molecular weight [Option ID = 166110]

4. Charge [Option ID = 166111]

29) Which one of the following is not a requirement for PCR?[Question ID = 24133][Question Description = S1_CMMH_905_PhD_Q029]

1. DNA template [Option ID = 166112]

2. Primers [Option ID = 166113]

3. Nucleotide triphosphates [Option ID = 166114]

4. Polymerase [Option ID = 166115]

30) Which of the following is true for mono-specific polyclonal antibodies?[Question ID = 24134][Question Description = S1_CMMH_905_PhD_Q030]

1. They specifically recognize a single protein [Option ID = 166116]

2. They specifically recognize only one epitope of a protein [Option ID = 166117]

3. They are specific to only one organism [Option ID = 166118]

4. They are specific to only one species [Option ID = 166119]

31) A single stranded DNA has 150 adenines and 120 cytosines. What is the total number of nucleotides in helical form of DNA fragment?[Question ID = 24135][Question Description = S1_CMMH_905_PhD_Q031]

1. 540 [Option ID = 166120]

2. 270 [Option ID = 166121]

3. 300 [Option ID = 166122]

4. 420 [Option ID = 166123]

32) Which one of the following will promote the emergence of drug resistance in pathogens?[Question ID = 24136][Question Description = S1_CMMH_905_PhD_Q032]

1. Inbreeding [Option ID = 166124]

2. Migration of population [Option ID = 166125]

3. Intermittent use of antibiotics [Option ID = 166126]

4. Dietary changes of infected population [Option ID = 166127]

33) Which one of the following sequences has only purine nucleotides?[Question ID = 24137][Question Description = S1_CMMH_905_PhD_Q033]

1. GGAAGAAGGA [Option ID = 166128]

2. CCTTCTCTCTC [Option ID = 166129]

3. GCGGCCGCCGCGC [Option ID = 166130]

4. TATTATTTAAAA [Option ID = 166131]

34) The activity of an enzyme is controlled by its phosphorylation. In this regard, which of the following statements will be correct? [Question ID = 24138][Question Description = S1_CMMH_905_PhD_Q034]

1. Phosphorylation causes a conformational change in an enzyme. [Option ID = 166132]

2. Phosphorylation occurs only at a specific tyrosine residue. [Option ID = 166133]

3. Phosphorylation is done by phosphoprotein phosphatases. [Option ID = 166134]

4. Phosphorylation causes irreversible activation of enzyme. [Option ID = 166135]

35) The function of the enzyme glucose-6-phosphatase is related with which one of the followings[Question ID = 24139][Question Description = S1_CMMH_905_PhD_Q035]

1. Glucose break down by glycolysis [Option ID = 166136]

2. Glucose release by liver [Option ID = 166137]

3. Glucose uptake by liver [Option ID = 166138]

4. Glucose utilization in glycogen synthesis [Option ID = 166139]

36) Which one of the following enzymes is NOT a part of main glycolysis pathway?[Question ID = 24140][Question Description = S1_CMMH_905_PhD_Q036]

1. Hexokinase [Option ID = 166140]

2. Aldolase [Option ID = 166141]
3. Phosphofructokinase-2 [Option ID = 166142]
4. Pyruvate kinase [Option ID = 166143]

37) Which one of the following coenzymes/cofactors is involved in carboxylation reactions?[Question ID = 24141][Question Description = S1_CMMH_905_PhD_Q037]

1. Biotin [Option ID = 166144]
2. Thiamine pyrophosphate [Option ID = 166145]
3. NAD [Option ID = 166146]
4. Coenzyme A [Option ID = 166147]

38) Which of the followings is true characteristic of detergents?[Question ID = 24142][Question Description = S1_CMMH_905_PhD_Q038]

1. Salt of weak acid and strong base [Option ID = 166148]
2. Salt of strong acid and weak base [Option ID = 166149]
3. Salt of weak acid and weak base [Option ID = 166150]
4. Salt of strong acid and strong base [Option ID = 166151]

39) Which one of the following enzyme is rate limiting in Urea cycle? [Question ID = 24143][Question Description = S1_CMMH_905_PhD_Q039]

1. Arginase [Option ID = 166152]
2. Arginosuccinase [Option ID = 166153]
3. Carbamoyl phosphate synthetase 1 [Option ID = 166154]
4. Urease [Option ID = 166155]

40) For separation of the proteins by SDS-PAGE, sodium dodecyl sulfate (SDS) is used for [Question ID = 24144][Question Description = S1_CMMH_905_PhD_Q040]

1. contributing net positive charge to the proteins [Option ID = 166156]
2. contributing net negative charge to the proteins [Option ID = 166157]
3. contributing net neutral charge to the proteins [Option ID = 166158]
4. contributing zwitter ions to the proteins [Option ID = 166159]

41) Identify the method/technique from the following statement:

“The protein is placed in a light-absorbing matrix, and with a short pulse of laser light the protein is ionized and desorbed from matrix into a vacuum system.”

Choose the most appropriate option from below:

[Question ID = 24145][Question Description = S1_CMMH_905_PhD_Q041]

1. ESI MS [Option ID = 166160]
2. MALDI MS [Option ID = 166161]
3. MS/MS [Option ID = 166162]
4. FPLC [Option ID = 166163]

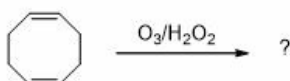
42) Match list I and List II, and choose the correct option given below

List I	List II
A. Western blotting	I. DNA-DNA
B. Northern blotting	II. RNA-DNA
C. Southern blotting	III. DNA-Protein
D. South Western blotting	IV. Protein-Antibodies

[Question ID = 24146][Question Description = S1_CMMH_905_PhD_Q042]

1. A-IV; B-II; C-III; D-I
[Option ID = 166164]
2. A-IV; B-III; C-II; D-I
[Option ID = 166165]
3. A-IV; B-II; C-I; D-III
[Option ID = 166166]
4. A-III; B-IV; C-II; D-I
[Option ID = 166167]

43) In the following ozonolysis reaction, the product is



[Question ID = 24147][Question Description = S1_CMMH_905_PhD_Q043]

1. Maleic acid

[Option ID = 166168]

2. Pyruvic acid

[Option ID = 166169]

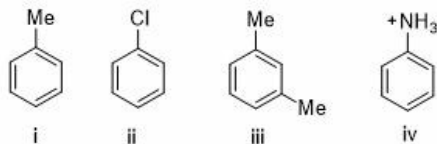
3. Succinic acid

[Option ID = 166170]

4. Oxaloacetic acid

[Option ID = 166171]

44) Order of the Electrophilic substitution in the given compounds will be



[Question ID = 24148][Question Description = S1_CMMH_905_PhD_Q044]

1. i > ii > iii > iv

[Option ID = 166172]

2. iii > ii > i > iv

[Option ID = 166173]

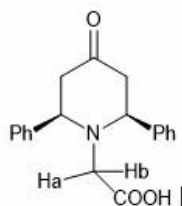
3. iii > i > ii > iv

[Option ID = 166174]

4. iv > iii > ii > i

[Option ID = 166175]

45) In the compound given below the hydrogens marked Ha and Hb are



[Question ID = 24149][Question Description = S1_CMMH_905_PhD_Q045]

1. Homotopic

[Option ID = 166176]

2. Isotopic

[Option ID = 166177]

3. Enantiotopic

[Option ID = 166178]

4. Diastereotopic

[Option ID = 166179]

46) All of the following are used as spraying reagent in TLC method, except

[Question ID = 24150][Question Description = S1_CMMH_905_PhD_Q046]

1. Iodine

[Option ID = 166180]

2. Calcium sulfate

[Option ID = 166181]

3. Sulfuric acid

[Option ID = 166182]

4. Ninhydrin

[Option ID = 166183]

47) Hemocyanin nucleus contains[Question ID = 24151][Question Description = S1_CMMH_905_PhD_Q047]

1. a dinuclear copper core and it binds dioxygen in the cuprous state. [Option ID = 166184]

2. a dinuclear copper core and it binds dioxygen in the cupric state. [Option ID = 166185]

3. a mononuclear copper core and it binds dioxygen in the cuprous state [Option ID = 166186]

4. a mononuclear copper core and it binds dioxygen in the cupric state. [Option ID = 166187]

48) Two organic components A & B are being separated using a normal phase column chromatography. Component A elutes faster than component B in an isocratic eluting solvent. Identify the true statement[Question ID = 24152][Question

Description = S1_CMMH_905_PhD_Q048]

1. Retention factor of A is lower than B [Option ID = 166188]
2. Retention factor of B is equal to A [Option ID = 166189]
3. Retention factor of A is higher than B [Option ID = 166190]
4. A does not get absorbed in the stationary phase [Option ID = 166191]

49) The mid-point of the line segment joining the points A (-3, 4) and B (- 5, - 6) is [Question ID = 24153][Question Description = S1_CMMH_905_PhD_Q049]

1. (-4,-1) [Option ID = 166192]
2. (1, 5) [Option ID = 166193]
3. (-4, 0) [Option ID = 166194]
4. (-1,5) [Option ID = 166195]

50) If the arithmetic mean of x, x + 3, x + 6, x + 9 and x + 12 is 10, then x = [Question ID = 24154][Question Description = S1_CMMH_905_PhD_Q050]

1. 1 [Option ID = 166196]
2. 2 [Option ID = 166197]
3. 6 [Option ID = 166198]
4. 4 [Option ID = 166199]

51) The enzyme that induces double strand breaks in DNA and rejoins them is called [Question ID = 24155][Question Description = S1_CMMH_905_PhD_Q051]

1. Restriction endonuclease [Option ID = 166200]
2. DNA gyrase [Option ID = 166201]
3. DNA Ligase [Option ID = 166202]
4. DNA Polymerase [Option ID = 166203]

52) Von Gierke's Disease, Andersen's Disease, McArdle's Disease and Pompe's Disease: these are genetic diseases and commonly known as

[Question ID = 24156][Question Description = S1_CMMH_905_PhD_Q052]

1. Diabetes
[Option ID = 166204]
2. Phenylketonuria diseases
[Option ID = 166205]
3. Glycogen storage diseases
[Option ID = 166206]
4. Gluconeogenesis
[Option ID = 166207]

53) Which of the following is NOT true regarding the Blood-Brain barrier?

[Question ID = 24157][Question Description = S1_CMMH_905_PhD_Q053]

1. It is constituted by tight junctions between the endothelial cells of brain capillaries and glial tissue.
[Option ID = 166208]
2. It allows the passage of lipid soluble drugs into the brain.
[Option ID = 166209]
3. It limits the entry of highly polar and ionized drugs into the brain.
[Option ID = 166210]
4. It regulates the passage of substances from brain into the blood.
[Option ID = 166211]

54) If the effect of the combination of two drugs is more than the sum of their individual effects, the two drugs are exhibiting the following phenomenon [Question ID = 24158][Question Description = S1_CMMH_905_PhD_Q054]

1. Potentiation [Option ID = 166212]
2. Synergism [Option ID = 166213]
3. Cross tolerance [Option ID = 166214]
4. Antagonism [Option ID = 166215]

55) What is the type of drug-to-drug interaction which is connected with processes of absorption, biotransformation, distribution and excretion? [Question ID = 24159][Question Description = S1_CMMH_905_PhD_Q055]

1. Pharmacodynamic interaction [Option ID = 166216]
2. Physical and chemical interaction [Option ID = 166217]
3. Pharmaceutical interaction [Option ID = 166218]
4. Pharmacokinetic interaction [Option ID = 166219]

56) Pharmacodynamics is a drug related phenomenon, which involves the study of following EXCEPT: [Question ID = 24160][Question Description = S1_CMMH_905_PhD_Q056]

1. Biological and therapeutic effects of drugs [Option ID = 166220]
2. Absorption and distribution of drugs [Option ID = 166221]

3. Mechanisms of drug action [Option ID = 166222]
4. Drug interactions [Option ID = 166223]

57) What are the properties of cancer stem cells?[Question ID = 24161][Question Description = S1_CMMH_905_PhD_Q057]

1. Enhanced proliferation, enhanced differentiation, self-renewal [Option ID = 166224]
2. Enhanced proliferation, impaired differentiation, self-renewal [Option ID = 166225]
3. Decreased proliferation, increased differentiation no self-renewal [Option ID = 166226]
4. Decreased proliferation, no differentiation and no self-renewal [Option ID = 166227]

58) Which of the following statements is NOT correct

[Question ID = 24162][Question Description = S1_CMMH_905_PhD_Q058]

1. The Wnt pathway is important for normal and cancer stem cell
[Option ID = 166228]
2. According to stochastic model of cancer, it is particularly important to target only rare population of cancer initiating cells
[Option ID = 166229]
3. Embryonic stem cells are pluripotent and adult stem cells are multipotent
[Option ID = 166230]
4. By symmetric cell division the stem cells pool is increased
[Option ID = 166231]

59) Which of the following statements about 5-azacytidine is NOT correct?

[Question ID = 24163][Question Description = S1_CMMH_905_PhD_Q059]

1. It is a chemical analogue of the cytosine nucleoside
[Option ID = 166232]
2. Treatment with 5-azacytidine induces hypermethylation
[Option ID = 166233]
3. It is incorporated into RNA
[Option ID = 166234]
4. It is used to treat cancer
[Option ID = 166235]

60) The structure of Triple helical DNA is specifically characterized by:[Question ID = 24164][Question Description = S1_CMMH_905_PhD_Q060]

1. Watson-Crick hydrogen bonding [Option ID = 166236]
2. Van der waal forces [Option ID = 166237]
3. Tautomerism [Option ID = 166238]
4. Hoogsteen base pairing [Option ID = 166239]

61) miRNAs are NOT characterized by[Question ID = 24165][Question Description = S1_CMMH_905_PhD_Q061]

1. Single stranded structure [Option ID = 166240]
2. Gene silencing function [Option ID = 166241]
3. Small size (~22 bases) [Option ID = 166242]
4. Non genomic origin [Option ID = 166243]

62) In the glycolytic pathway, the enzyme that catalyzes reversible reaction is[Question ID = 24166][Question Description = S1_CMMH_905_PhD_Q062]

1. Hexokinase [Option ID = 166244]
2. Phosphofructokinase [Option ID = 166245]
3. Phosphoglyceratekinase [Option ID = 166246]
4. Pyruvate kinase [Option ID = 166247]

63) Match the cofactor/prosthetic group in left column with the enzymes on the right and choose the correct option from those given below.

A. Succinate dehydrogenase	a. NAD ⁺
B. Alcohol dehydrogenase	b. Tetrahydrofolate
C. NADH:Coenzyme Q oxidoreductase	c. FMN
D. Serine hydroxymethyltransferase	d. FADH ₂

[Question ID = 24167][Question Description = S1_CMMH_905_PhD_Q063]

1. A:d; B:a; C:c; D:b
[Option ID = 166248]
2. A:c; B:d; C:a; D:b
[Option ID = 166249]
3. A:a; B:b; C:d; D:c
[Option ID = 166250]
4. A:b; B:c; C:a; D:d

[Option ID = 166251]

64) Identify the correct sequence of adding the reagents for the isolation of plasmids from bacterial suspension.[Question ID = 24168][Question Description = S1_CMMH_905_PhD_Q064]

1. Potassium acetate solution, Alkali lysis buffer, 70% ethanol, isopropanol. [Option ID = 166252]
2. Potassium acetate solution, Alkali lysis buffer, isopropanol, 70% ethanol. [Option ID = 166253]
3. Alkali lysis buffer, Potassium acetate solution, 70% ethanol, isopropanol. [Option ID = 166254]
4. Alkali lysis buffer, Potassium acetate solution, isopropanol, 70% ethanol. [Option ID = 166255]

65) You have 5 microgram of a double stranded twenty base pair long oligonucleotide. The average formula weight of each base is 300. How many nanomoles are present in the sample?[Question ID = 24169][Question Description = S1_CMMH_905_PhD_Q065]

1. -4.0 [Option ID = 166256]
2. -0.4 [Option ID = 166257]
3. -0.04 [Option ID = 166258]
4. -0.004 [Option ID = 166259]

66) Bacteria resistant to penicillin produce beta-lactamase that inactivates the antimicrobial agent by

[Question ID = 24170][Question Description = S1_CMMH_905_PhD_Q066]

1. hydrolysing the side chain
[Option ID = 166260]
2. oxidising S-atom
[Option ID = 166261]
3. esterification of the carboxyl group
[Option ID = 166262]
4. hydrolysing the C-N bonds
[Option ID = 166263]

67) Ampicillin does not control mycoplasma because the latter

[Question ID = 24171][Question Description = S1_CMMH_905_PhD_Q067]

1. produces lactamase
[Option ID = 166264]
2. is Gram-negative
[Option ID = 166265]
3. is Gram-positive
[Option ID = 166266]
4. lacks cell wall
[Option ID = 166267]

68) Which of the following is not a characteristic feature of secondary immune response[Question ID = 24172][Question Description = S1_CMMH_905_PhD_Q068]

1. IgA isotype [Option ID = 166268]
2. IgM isotype [Option ID = 166269]
3. Class switching [Option ID = 166270]
4. Affinity maturation [Option ID = 166271]

69) Antigenic peptides presented by the endogenous pathway are generated in[Question ID = 24173][Question Description = S1_CMMH_905_PhD_Q069]

1. Golgi complex [Option ID = 166272]
2. Endoplasmic reticulum [Option ID = 166273]
3. Cytosol [Option ID = 166274]
4. Lysosome [Option ID = 166275]

70) IgG molecule has a molecular mass of 150 kDa. After binding to the specific antigen the molecular mass of the complex was found to be 300 kDa. The molecular mass of the antigen is.[Question ID = 24174][Question Description = S1_CMMH_905_PhD_Q070]

1. 150 kDa [Option ID = 166276]
2. 75 kDa [Option ID = 166277]
3. 50 kDa [Option ID = 166278]
4. 25 kDa [Option ID = 166279]

71) Cytosine deamination generates a nucleotide which is not usually found in the DNA. This mistake is rectified by[Question ID = 24175][Question Description = S1_CMMH_905_PhD_Q071]

1. Mismatch repair system [Option ID = 166280]
2. Exonuclease activity [Option ID = 166281]
3. DNA polymerase [Option ID = 166282]
4. Uracil-DNA glycosylase [Option ID = 166283]

72) A human female is diagnosed with Down's syndrome. The number of Barr bodies in the patient will be

[Question ID = 24176][Question Description = S1_CMMH_905_PhD_Q072]

1. 0
[Option ID = 166284]
2. 1
[Option ID = 166285]
3. 2
[Option ID = 166286]
4. 3
[Option ID = 166287]

73) Galapagos finches have different shapes of beaks. This is an example of [Question ID = 24177][Question Description = S1_CMMH_905_PhD_Q073]

1. Parallel evolution [Option ID = 166288]
2. Adaptive radiation [Option ID = 166289]
3. Genetic drift [Option ID = 166290]
4. Co-adaptation [Option ID = 166291]

74) Why do you need to add NaOH to make 100 ml 0.5 M EDTA solution?[Question ID = 24178][Question Description = S1_CMMH_905_PhD_Q074]

1. To dissolve EDTA in water. [Option ID = 166292]
2. To make pH 8.0. [Option ID = 166293]
3. To complete sodium salt formation. [Option ID = 166294]
4. To neutralize di-amine moiety. [Option ID = 166295]

75) A solution of 0.3 M sodium acetate is used to precipitate DNA from aqueous solution using ethanol

[Question ID = 24179][Question Description = S1_CMMH_905_PhD_Q075]

1. Because sodium ions neutralize negative charge of DNA
[Option ID = 166296]
2. Because it reduces dielectric constant of the aqueous medium.
[Option ID = 166297]
3. Because acetate ions help to distract DNA molecules.
[Option ID = 166298]
4. Because it helps to remove protein from DNA.
[Option ID = 166299]

76) Hyperphosphorylation of the TAU protein is a hallmark of [Question ID = 28239][Question Description = S1_CMMH_905_PhD_Q076]

1. Spinal muscular atrophy [Option ID = 166300]
2. Parkinson's disease [Option ID = 166301]
3. Multiple sclerosis [Option ID = 166302]
4. Cerebral Malaria [Option ID = 166303]

77) Why is it needed to pre-treat glass or silica membrane with suitable buffer for binding of DNA or RNA to the membrane?

[Question ID = 28240][Question Description = S1_CMMH_905_PhD_Q077]

1. To make them hydrophilic.
[Option ID = 166304]
2. To reduce hydrophobicity of the material.
[Option ID = 166305]
3. To impart charge to the material.
[Option ID = 166306]
4. To remove water from the material.
[Option ID = 166307]

78) In a 25 µl PCR reaction mixture you have used required buffer, 10 µM of dNTPs mixture, 10 pico moles of desired primer pair, 18 µl of template DNA (50 ng) in TE buffer, 1 unit of Phusion polymerase (NEB) as recommended by the vendor. When analyzed you observed no product. But in the control experiment where you used an already tested DNA (1 µl in TE) under identical set up you observed product. What would be your explanation for the result?

[Question ID = 28241][Question Description = S1_CMMH_905_PhD_Q078]

1. There could be problem in the dNTPs mixture.
[Option ID = 166308]
2. Cycle parameters were not right.
[Option ID = 166309]
3. There could be problem in primer annealing.

[Option ID = 166310]

4. There was less availability of Mg^{2+} ions.

[Option ID = 166311]

79) RNA used in RNA vaccine are produced[Question ID = 28242][Question Description = S1_CMMH_905_PhD_Q079]

1. synthetically. [Option ID = 166312]
2. from live virus. [Option ID = 166313]
3. from inactive virus. [Option ID = 166314]
4. by *in vitro* transcription. [Option ID = 166315]

80) A stretch of 'A' or 'T' in a double stranded DNA indicates that

[Question ID = 28243][Question Description = S1_CMMH_905_PhD_Q080]

1. It will form cruciform structure.

[Option ID = 166316]

2. It will bend.

[Option ID = 166317]

3. It means nothing.

[Option ID = 166318]

4. It will form bubble.

[Option ID = 166319]

81) Physics of sound is utilized in biochemical research to[Question ID = 28244][Question Description = S1_CMMH_905_PhD_Q081]

1. Degrade RNA. [Option ID = 166320]
2. Re-suspend precipitated cells. [Option ID = 166321]
3. Disrupt cells structure. [Option ID = 166322]
4. Thaw frozen biological samples. [Option ID = 166323]

82) Glucose is used in the plasmid purification methods to[Question ID = 28245][Question Description = S1_CMMH_905_PhD_Q082]

1. lyse the bacterial cells. [Option ID = 166324]
2. make cells stable. [Option ID = 166325]
3. keep the suspended cells in proper size and shape. [Option ID = 166326]
4. make pore in the suspended cells. [Option ID = 166327]

83) 'A' buys an old car at a cost of Rs. 100,000 and spends Rs. 10,000 on its repair. If he sells the same car for Rs. 150,000, how much would be his gain in percent?[Question ID = 28246][Question Description = S1_CMMH_905_PhD_Q083]

1. 36.40% [Option ID = 166328]
2. 26.70% [Option ID = 166329]
3. 33.30% [Option ID = 166330]
4. 66.70% [Option ID = 166331]

84) A LED lamp rated 240 V and 50 W when operated at 110 volts and 60 Hz (with transformer), the power consumption per hour would be[Question ID = 28247][Question Description = S1_CMMH_905_PhD_Q084]

1. 50 W [Option ID = 166332]
2. 22 W [Option ID = 166333]
3. 100 W [Option ID = 166334]
4. 25 W [Option ID = 166335]

85) What is the pOH of a 0.005 M H_2SO_4 solution?[Question ID = 28248][Question Description = S1_CMMH_905_PhD_Q085]

1. 2 [Option ID = 166336]
2. 12 [Option ID = 166337]
3. 11 [Option ID = 166338]
4. 10 [Option ID = 166339]

86) The pI of a polypeptide is 5.0. It is mixed with another protein of similar mass. Which one of the following chromatography technique may be used for its purification at pH 6.0?[Question ID = 28249][Question Description = S1_CMMH_905_PhD_Q086]

1. Cation exchange chromatography [Option ID = 166340]
2. Anion exchange chromatography [Option ID = 166341]
3. Gel filtration chromatography [Option ID = 166342]
4. Thin layer chromatography [Option ID = 166343]

87) The outcome of Pentose Phosphate Pathway (PPP) is the production of the following:[Question ID = 28250][Question Description = S1_CMMH_905_PhD_Q087]

1. 5-C sugar and NADPH [Option ID = 166344]
2. 5-C sugar and NADH [Option ID = 166345]
3. NADH and NADPH [Option ID = 166346]
4. 5-C sugar and FADH₂ [Option ID = 166347]

- 88) Match the name of the enzyme in the list 1 and the metabolic pathway it is linked with as it is mentioned in the List 2

List 1	List 2
Name of the enzyme	Metabolic pathway
A. Glucose 6 phosphate dehydrogenase	I. Pentose phosphate pathway
B. Citrate synthase	II. TCA Cycle
C. Hexokinase	III. Glycolysis
D. Carbamoyl phosphate synthetase I	IV. Urea cycle

[Question ID = 28251][Question Description = S1_CMMH_905_PhD_Q088]

1. A-I, B-II, C-III, D-IV
[Option ID = 166348]
2. A-II, B-III, C-IV, D-I
[Option ID = 166349]
3. A-IV, B-II, C-I, D-III
[Option ID = 166350]
4. A-II, B-IV, C-III, D-I
[Option ID = 166351]

89) Statin, a drug that can be used to block cholesterol synthesis, is an inhibitor of [Question ID = 28252][Question Description = S1_CMMH_905_PhD_Q089]

1. Carnitine acyl transferase I [Option ID = 166352]
2. HMG CoA reductase [Option ID = 166353]
3. Acetyl CoA carboxylase [Option ID = 166354]
4. Carnitine acyl transferase II [Option ID = 166355]

90) The membranes of archaea differ in composition from those of eukaryotes or bacteria. The nonpolar chains of lipids in archaea membrane are joined to glycerol backbone

[Question ID = 28253][Question Description = S1_CMMH_905_PhD_Q090]

1. by ether bond
[Option ID = 166356]
2. by ester bond
[Option ID = 166357]
3. alternate ether and ester bond
[Option ID = 166358]
4. phosphodiester bond
[Option ID = 166359]

91) A dialysis tubing contains 5.85% (w/v) NaCl solution in a beaker containing 0.1M NaCl solution. What will be the direction of Na⁺ movement?

[Question ID = 28254][Question Description = S1_CMMH_905_PhD_Q091]

1. From dialysis tubing to the solution in beaker
[Option ID = 166360]
2. From beaker to the solution in dialysis tubing
[Option ID = 166361]
3. In the opposite direction of the Cl⁻ ion movement
[Option ID = 166362]
4. No net movement of Na⁺ ions
[Option ID = 166363]

92) Given below are two statements:

Statement I: Glucagon (peptide hormone) and epinephrine (small molecule) inhibit acetyl CoA carboxylase and fatty acid synthesis

Statement II: Glucagon (peptide hormone) and epinephrine (small molecule) activate lipases and beta oxidation.

In the light of the above statements, choose the *most appropriate* answer from the options given below

[Question ID = 28255][Question Description = S1_CMMH_905_PhD_Q092]

1. Both statements I and II are correct

[Option ID = 166364]

2. Both statement I and II are incorrect

[Option ID = 166365]

3. Statement I is correct and statement II is incorrect

[Option ID = 166366]

4. Statement I is incorrect and statement II is correct

[Option ID = 166367]

93) Cytochalasin D is a cell permeable drug that blocks G1-S phase transition of the cell cycle. It does so by inhibiting[Question ID = 28256][Question Description = S1_CMMH_905_PhD_Q093]

1. actin polymerization [Option ID = 166368]
2. microtubule polymerization [Option ID = 166369]
3. actin depolymerization [Option ID = 166370]
4. microtubule depolymerization [Option ID = 166371]

94) A student dissolves 2.5 g of NaCl in water to make a final volume of 125 ml. What is the molarity of the solution? [Question ID = 28257][Question Description = S1_CMMH_905_PhD_Q094]

1. 0.21 M [Option ID = 166372]
2. 0.34 M [Option ID = 166373]
3. 0.42 M [Option ID = 166374]
4. 1 M [Option ID = 166375]

95) A student homogenizes a tissue and then performs differential centrifugation in 0.25 M sucrose solution at 600xg for 10 minutes. Which organelle will pellet in the first fraction?[Question ID = 28258][Question Description = S1_CMMH_905_PhD_Q095]

1. Nucleus [Option ID = 166376]
2. Mitochondria [Option ID = 166377]
3. Golgi [Option ID = 166378]
4. Endoplasmic reticulum [Option ID = 166379]

96) If Green Fluorescent Protein ($\lambda_{\text{ex(max)}}$ = 395 nm and $\lambda_{\text{em (max)}}$ = 509 nm) is excited at 410 nm, then at what wavelength maximum intensity of emission will be observed?[Question ID = 24180][Question Description = S1_CMMH_905_PhD_Q096]

1. 509 nm [Option ID = 166380]
2. 524 nm [Option ID = 166381]
3. 494 nm [Option ID = 166382]
4. No emission will be observed [Option ID = 166383]

97) $^{14}\text{C}_6$ B-decay rate (dN/dt) are measured for live and dead animals and the results show[Question ID = 24181][Question Description = S1_CMMH_905_PhD_Q097]

1. Rate for both are same [Option ID = 166384]
2. Rate for dead animal is higher [Option ID = 166385]
3. Rate for dead animal is lower [Option ID = 166386]
4. No decay for live animal [Option ID = 166387]

98) Which of the following aqueous solutions will have lowest freezing point?

[Question ID = 24182][Question Description = S1_CMMH_905_PhD_Q098]

1. 1.0 M KOH

[Option ID = 166388]

2. 1.0 M NH_4NO_3

[Option ID = 166389]

3. 1.0 M K_2SO_4

[Option ID = 166390]

4. 1.0 M KNO_3

[Option ID = 166391]

99) Four friends at JNU (AR, GD, SS and DG) are sitting on a wall. Seen from the front AR is sitting next to GD, while SS is sitting somewhere to the left of DG. How many possible seating arrangements are consistent with this information?[Question ID = 24183][Question Description = S1_CMMH_905_PhD_Q099]

1. 6 [Option ID = 166392]
2. 8 [Option ID = 166393]
3. 10 [Option ID = 166394]
4. 2 [Option ID = 166395]

100) Which among the following is NOT a statistical technique?[Question ID = 24184][Question Description = S1_CMMH_905_PhD_Q100]

1. Correlation analysis [Option ID = 166396]

2. Partial Differential Equations [Option ID = 166397]
3. Partial Least Square Regression [Option ID = 166398]
4. Partial Least Square Discrimination Analysis [Option ID = 166399]

