

SECTION 1 - SECTION 1

Question No.1

SDS in PAGE is used for

- Solubilising protein
- Give uniform charge density
- Decrease surface tension
- Stabilizing protein

Question No.2

All of the following statements about Type I topoisomerase are true except

- Topo I is essential for viability in *E. coli*
- Topo I removes DNA supercoils in an ATP-dependent reaction
- Topo I from eukaryotic cells can remove both positive and negative supercoils
- Topo I from *E. coli* can remove only negative supercoils

Question No.3

It takes longer time for sex hormones and other steroid hormones to produce their effect than non-steroid hormones because

- Steroids must relay their messenger by receptor
- Steroids must be carried to long distance
- Steroid are bigger, slower molecules
- Steroids cause target cells to make new proteins

Question No.4

Which of the following term is associated with a cell without cell wall

- Protoplast
- Symplast
- Chloroplast
- Apoplast

Question No.5

Specificity of an enzyme depends upon

- K_m
- active site

- linear sequence
- turn over number

Question No.6

Which of the following peptides is made by non ribosomal synthesis

- Glutathione
- Insulin
- Beta MSH
- Enkaphlin

Question No.7

The type of rRNA that is involved in the formation of 30S ribosome in prokaryotes

- 18S rRNA
- 23S rRNA
- 5.8S rRNA
- 16S rRNA

Question No.8

The chemical structure of 5' cap of Eukaryotic mRNA is

- 5-hydroxy guanosine triphosphate
- 5,7- dimethyl guanosine triphosphate
- 5- methyl guanosine triphosphate
- 7- methyl guanosine triphosphate

Question No.9

α -Amanitin is a fungal toxin which inhibits eukaryotic RNA polymerases. The three eukaryotic RNA polymerases show differential sensitivity to this toxin. Which one of the following order (higher to lower) is correct in respect of sensitivity towards α - amanitin?

- RNA POL III > RNA POL II > RNA POL I
- RNA POL I > RNA POL III > RNA POL II
- RNA POL II > RNA POL III > RNA POL I
- RNA POL II > RNA POL I > RNA POL III

Question No.10

Golden rice is a genetically modified crop plant where the incorporated genes are meant for biosynthesis of

- vitamin C

- vitamin E
- vitamin B
- Beta-carotene

Question No.11

Which of the following classical transcription factors binds first to TATA box?

- TF IIC
- TF IIB
- TF IIA
- TF IID

Question No.12

Which one of the following types of particles is the MOST highly penetrating to biological tissues?

- positrons
- alpha particles
- beta particles
- neutrons

Question No.13

Lamp brush chromosomes are found in

- Diplotene stage of meiosis II
- Leptotene stage of meiosis I
- Diplotene stage of meiosis I
- Zygotene stage of meiosis II

Question No.14

Which of the following are NOT transcribed by RNA polymerase II?

- miRNA and snoRNA
- miRNA and some snRNA
- tRNA and 5S rRNA
- mRNA and snoRNA

Question No.15

Acrosome present on the sperm head is derived from

- Nucleus
- Endoplasmic reticulum
- Golgi apparatus

- Mitochondria

Question No.16

The intestinal absorption of glucose is impaired by the use of ouabain, an inhibitor of Na^+/K^+ ATPase. Indicate the correct explanation.

- The inhibitor has blocked the transport of Na^+ from epithelial cells to interstitial space
- The inhibitor has blocked the transport of Na^+ from epithelial cells to intestinal lumen
- The inhibitor has blocked the transport of Na^+ from interstitial space to epithelial cells
- The inhibitor has blocked the transport of Na^+ from intestinal lumen to epithelial cells

Question No.17

Which of the following statements best describes the mechanism of action of sex hormones

- They bind specific membrane receptors
- They enhance transcription when bound to receptors
- They cause release of second messenger from the cell membrane
- They interact with DNA directly

Question No.18

In Recombinant DNA technology, Somatostatin hormone is expressed as fusion protein along with a structural protein where the two proteins are linked by the amino acid methionine. Somatostatin hormone is released from the fusion protein by treating with

- β -Mercaptoethanol
- Performic acid
- Cyanogen bromide.
- Proteolytic cleavage

Question No.19

Which experiment proved that the two strands in DNA are anti parallel?

- X-Ray crystallography
- Okazaki fragments
- Nearest neighbour base frequency analysis
- Messelson and Stahl Experiment

Question No.20

During generation of an action potential, depolarization is due to

- Na⁺ influx
- K⁺ influx
- K⁺ efflux
- Na⁺ efflux

Question No.21

As blood flows from the aorta to the capillaries of the gastrocnemius, its velocity will

- Not related
- Remains the same
- Decrease
- Increase

Question No.22

The respiratory control centers are located in

- brain
- heart
- lungs
- Diaphragm

Question No.23

Heart is recognised as an endocrine organ. The hormone produced by heart is

- ANF
- CREB
- EGF
- Erythropoietin

Question No.24

If the DNA content of a diploid cell in G1 phase is x, then the DNA content of the same cell at metaphase of meiosis I would be

- 0.25x
- x
- 0.5x
- 2x

Question No.25

In some species, one female will reproduce in a group where the other females have suppressed reproduction and assist the reproductive female. This is an example of

- Group selection
- Reciprocal altruism
- Kin selection
- Sexual selection

Question No.26

The C-value denotes the total number of DNA in a

- Diploid
- Aneuploid
- Polyploid
- Haploid

Question No.27

A copper metalloprotein was found to contain 0.127% by weight copper (atomic weight of Cu = 63.55). The minimum molecular weight of the protein is

- 100 KD
- 50 KD
- 40 KD
- 63.5 KD

Question No.28

Action potentials are conducted more rapidly in

- Large diameter axons than small diameter axons
- Small diameter axons than large diameter axons
- Axons that lack a wrapping of Schwann cells
- Unmyelinated axons than myelinated axons

Question No.29

The molarity of 0.2 N H_2SO_4 is

- 0.2 M
- 0.1 M
- 0.05 M
- 0.4 M

Question No.30

The following pairs are in solution. Which of the following can you separate by low speed centrifugation?

- Plasma membrane and Golgi membrane
- Nuclei and microsomes
- 80S Ribosome and 70S ribosome
- Plasmid DNA and mRNA

Question No.31

The DNA sequence of representative telomeric repeats in Tetrahymena

- 5' TTTGGG 3'
- 5' TTAGGG 3'
- 5' TTGGGG 3'
- 5' TTTAGG 3'

Question No.32

Somatic mutation of immunoglobulin genes accounts for

- Affinity maturation
- Allelic exclusion
- Class switching from IgM to IgG
- Codominant expression

Question No.33

The radiation used to determine vibration spectra of molecules is

- Infra red
- Radiofrequency
- UV – visible
- X-ray

Question No.34

The following statements about boron in plant nutrition are true, EXCEPT

- Involved in sugar transport
- Oppose the functions of calcium
- Functions of boron interrelate with those of nitrogen
- Related to cell wall strength

Question No.35

Swi/SNF complex is involved in

- Transcription factor binding
- Heterochromatinization
- Chromatin remodelling
- Histone modification

Question No.36

Which of the following reaction is accompanied by heat, redness, swelling and pain?

- Inflammation
- B-cell mediated immune response
- Humoral response
- Complement cascade

Question No.37

One of the following class of MHC genes encode glycoproteins expressed on the surface of nearly all nucleated cells

- Class III
- Class II
- Class I
- Class IV

Question No.38

Phenomenon of 'Industrial melanism' demonstrates

- Batesian mimicry
- induced mutation
- natural selection
- reproductive isolation

Question No.39

Blocking action of enzyme through blocking its active site is

- allosteric inhibition
- competitive inhibition
- non-competitive inhibition
- feedback inhibition

Question No.40

Graft rejection does not involve

- Polymorphonuclear leukocytes
- T-cells

- Macrophages
- Erythrocytes

Question No.41

The energy of activation of a reaction can be reduced by

- Removing the products
- Adding a catalyst
- Reducing the temperature
- Adding more reactants

Question No.42

Which part of the neuron receives message from other neurons?

- Axon
- Myelin sheath
- Schwann cells
- Dendrites

Question No.43

Which of the cyclins have essential functions in S-phase of cell cycle?

- A-type
- B-type
- D-type
- CDK

Question No.44

In Southern blotting probe is can be used to identify

- DNA sequence
- Glycoprotein
- RNA sequence
- Protein sequence

Question No.45

How does oil immersion lens enhance the power of resolution of a microscope?

- preventing direct light rays from reaching the eyepiece lens system
- reducing the spherical aberrations of lens systems
- increasing the numerical aperture of the objective

- decreasing the chromatic aberrations of lens systems

Question No.46

Biological Nitrogen Fixation (BNF) occurs when atmospheric nitrogen is converted to ammonia by an enzyme called

- glutamate synthase
- nitrogenase
- ATPase
- ammonia synthase

Question No.47

Which of the following statements about transgenic plants is true?

- All transgenic plants have crown galls
- Transgenic plants require nopaline for their survival
- The Ti plasmid only inserts at one place in the plant chromosomal DNA
- T-DNA is transferred to plant cells upon infection with *Agrobacterium tumefaciens*

Question No.48

A good way to increase total proteome penetration by gel-free LC-MS/MS methods is to

- Use two, orthogonal types of chromatography
- Enrich for phosphopeptides only
- Analyze whole proteins
- Label the proteins with a chemical tag

Question No.49

Conversion of nitrogen to ammonia or nitrogenous compounds is termed as

- Nitrification
- Nitrogen assimilation
- Denitrification
- Nitrogen fixation

Question No.50

A tumour in an endocrine gland caused a person to have weakened bones and unusual high levels of blood calcium. Which of the following was affected?

- Pancreas

- Anterior Pitutary
- Parathyroid glands
- Adrenal glands

Question No.51

E.coli cells were grown in ^{14}N -enriched medium for several generations and then switched to a medium enriched in ^{15}N and grown for 3 generations. What will be the proportion of ^{14}N -labeled (light) DNA strands to ^{15}N -labeled (Heavy) DNA strands?

- L:H in the ratio 1:1
- L:H in the ratio 1:3
- L:H in the ratio 3:1
- L:H in the ratio 1:6

Question No.52

The frequency of allele 'A' and 'a' in a population at Hardy-Weinberg equilibrium are 0.7 and 0.3 respectively. In a random sample of 250 individuals taken from the population, how many individuals will be heterozygous?

- 105
- 81
- 145
- 112

Question No.53

The acidic ceramide-oligosaccharides are

- gangliosides
- globosides
- sulphatides
- cerebroside

Question No.54

The bead like unit of chromatin structure is

- Chromatid
- Nucleosome
- Solenoid
- Scaffold

Question No.55

Abortive cycling is done by

- DNA Pol III
- Topoisomerase II
- ribosome
- RNA pol II

Question No.56

Which of the following is noted in Cushing's syndrome

- Decreased production of norepinephrine
- Decreased production of epinephrine
- Excessive production of cortisol
- Excessive production of vasopressin

Question No.57

Which of the following enzyme is inhibited by mercury?

- Ribonucleases
- Cysteine proteases
- Metalloproteases
- Serine proteases

Question No.58

The transfer of mobile genetic elements is mediated by

- Ribozymes and abzymes
- DNA polymerase and ligase enzymes
- Transposase enzyme
- DNAase and ligase enzymes

Question No.59

Gas evolved during photo respiration

- No gas is evolved
- N₂
- O₂
- CO₂

Question No.60

Absorbance at 280 nm exhibited by protein is due to

- non-polar aminoacids
- aromatic aminoacids

- all aminoacids
- aliphatic aminoacids

Question No.61

The linkage present in cellulose molecule is

- α (1 \rightarrow 6)
- α (1 \rightarrow 4)
- β (1 \rightarrow 4)
- β (1 \rightarrow 6)

Question No.62

Generation of combinatorial diversity among immunoglobulins do not involves

- mRNA splicing
- Recombination signal sequences
- DNA rearrangement
- One-turn/ two-turn joining rule

Question No.63

Nick Translation is done by

- DNA polymerase III
- DNA phosphodiesterase
- DNA ligase
- DNA polymerase I

Question No.64

The area allowed regions in the Ramachandran map will be least for

- L-Ala
- L-Pro
- Gly
- α -methyl L-Val

Question No.65

Michaelis and Menton derived their equation using which of the following assumption?

- rate limiting step in the reaction is the breakdown of ES complex to product and free enzyme
- concentration of substrate can be ignored
- rate limiting step in the reaction is the formation of ES complex

- non-enzymatic degradation of the substrate is the major step

Question No.66

Sodium Dodecyl Sulphate (SDS) is used while separating proteins by polyacrylamide gel electrophoresis because

- decreases surface tension of the buffer used for electrophoresis
- stabilizes the proteins
- it helps in solubilisation of proteins thereby making it easier to separate
- it binds to protein and confers uniform negative charge density thereby making them to move during electrophoresis

Question No.67

Mass spectrometry is used in

- Transcriptome analysis
- Transposon tagging
- Protein separation
- Proteome analysis

Question No.68

In humans, most nutrient molecules are absorbed by

- Stomach
- Liver
- Small intestine
- Large intestine

Question No.69

The inheritance pattern of RAPD is

- Dominant
- Codominant
- Recessive
- Random

Question No.70

Identify a Mendelian disorder from the following

- Klenefilter's syndrome
- Down's syndrome
- Turner's syndrome
- Phenylketonuria

Question No.71

The ability of the component cells of callus to form a whole plant is known as

- Somaclonal variation
- Differentiation
- Redifferentiation
- Dedifferentiation

Question No.72

Contraceptive pills checks

- ovulation
- entry of sperms in vagina
- fertilization
- implantation

Question No.73

Which of the following eukaryotic cellular components carry out intracellular degradation during autophagy?

- Nucleus
- Lysosomes
- Ribosomes
- Golgi bodies

Question No.74

Which one of the following cells generally does not secrete IFN- γ

- TH1 cells
- TH2 cells
- CD8⁺ T cells
- NK cells

Question No.75

Lesch Nyhan syndrome is caused by the deficiency of

- Uricase
- Inosine
- HGPRT
- Xanthine oxidase

Question No.76

In MRI which of the following nuclei is used for imaging?

- ^1H of water
- ^{31}P of phosphate
- ^{19}F of probe molecule
- ^{13}C of protein

Question No.77

Which of the following is not a single gene disorders

- Cystic fibrosis
- Hemophilia
- Marfan syndrome
- Klinefelter syndrome

Question No.78

Which of the following proteins is not part of the replication fork of a prokaryotic DNA

- Ribonuclease
- Helicase
- Primase
- DNA Polymerase III

Question No.79

A person consumes 100 gm protein (16 gm N_2) per day, and loses 13.5 gm N_2 in the urine , 2 gm N_2 in feces and 0.5 gm N_2 through other routes. This person is most likely to be

- Obese person on a high carbohydrate diet
- Normal healthy adult
- Woman in late stage pregnancy
- Growing child

Question No.80

Electron transport system is located in

- cristae
- cytosol
- nucleus
- mitochondrial matrix

Question No.81

Which of the following cannot be used as adsorbent in Column adsorption chromatography?

- Magnesium oxide
- Silica gel
- Potassium permanganate
- Activated alumina

Question No.82

Transducin is found in the disc membrane of rod and cone cells. It regulates which of the following?

- PI 3K
- Phospholipase C
- Adenyl cyclase
- cGMP Phosphodiesterase

Question No.83

Disorder caused by enlargement of thyroid gland is called

- Hypothyroidism
- Goitre
- Hyperthyroidism
- Tetany

Question No.84

The HCl in gastric juice converts

- Disaccharide to monosaccharide
- Polypeptide to peptide
- Prorennin to renin
- Pepsinogen to pepsin

Question No.85

Smoking destroys the cilia in the respiratory passage ways. This

- Slows blood flow through lung blood vessel
- Makes harder to move air in and out of the lungs
- Decreases the surface area for respiration
- Makes it harder to keep the lungs clean

Question No.86

A gene was cloned into a plasmid vector. The plasmid has two restriction

sites , one for ECoR1 and one for Bam H1. A double digest will result in how many fragments?

- 1
- 2
- 4
- 3

Question No.87

Rate of reabsorption of water from nephrons is increased by

- Somatotrophin
- corticosteroids
- Vasopressin
- Oxytocin

Question No.88

K_M of an enzyme is defined as

- Half substrate concentration at maximal velocity
- Half maximal substrate concentration
- Substrate concentration at half maximal velocity
- Half maximal velocity

Question No.89

Cytotoxic T cells kill their target cells by releasing into the target cells

- Perforins
- Interleukens
- TGF beta
- TNF alpha

Question No.90

Somaclonal variations are the ones

- Caused by gamma rays
- Produce during tissue culture
- Induced during sexual embryogeny
- Caused by mutagens

Question No.91

Telomeric sequence is present in

- YAC

- pBR322
- P-element
- BAC

Question No.92

DNA is very long in relation to diameter. If a strand of DNA were 0.1mm in length. What is the ratio of the length to diameter?

- 50000
- 30000
- 60000
- 25000

Question No.93

The only nucleotide with a Base-to-sugar linkage as C-C is found in

- rRNA
- mRNA
- tRNA
- miRNA

Question No.94

In order to find the direction of synthesis of protein chain, an in vitro translation system of globin protein was used. ^{14}C -Leu was added to the medium and the protein synthesis was allowed to continue for one min. The completed globin chains were isolated and sequenced. Which of the following statements is true?

- ^{14}C Leu was at the carboxy terminus
- ^{14}C Leu was not incorporated into the protein
- ^{14}C Leu was at the amino terminus
- ^{14}C Leu was uniformly distributed in the protein

Question No.95

PET scan is done using radioisotopes emitting

- alpha rays
- positrons
- Beta particles
- neutrons

Question No.96

The major chemical messenger involved in hypersensitivity is

- interferons
- interleukins
- histamines
- lymphokines

Question No.97

Si RNA interfere with gene expression at the level of

- Transcription
- Translation
- DNA replication
- Post-transcription

Question No.98

Phagemid vectors are

- Combination of plasmid ,cosmid and phase lamda
- Combination of plasmid and phase lamda
- Combination of plasmid and cosmid
- Combination of cosmidandlamda

Question No.99

On the molar scale which of the following interactions is a non-polar environment that provides highest contribution to the biomolecules.

- Hydrogen bonding
- Salt bridge
- Hydrophobic interaction
- Van der waal's interaction

Question No.100

Which part of the genomic DNA contains the sequence corresponding to the 5' untranslated region (5' UTR) OF mRNA?

- Upstream of the promoter
- First Intron
- First Exon
- Downstream of the transcription start site