BYJU'S EXAM PREP

CSIR- NET 2022 Life Science

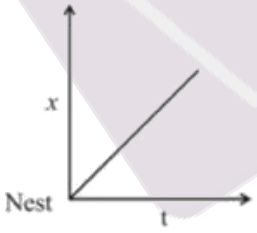
MOCK

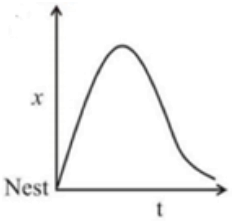
1.A series is given, with one number missing. Choose the correct alternative from the given ones that will complete the series.
-7.5, 15, -30, 60, ? , 240
A. 120
B. -240
C. -120
D. 240

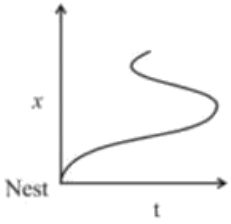
2.If $\tan^2 \theta + \cot^2 \theta = 2$, then what is the value of $2^{\sec\theta.\text{cosec}\theta}$?
A. 0
B. 1
C. 2
D. 4

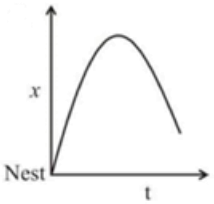
3.Suppose there are X gloves of different colours in a box. If you take out one glove at a time, what is the maximum number of gloves that you have to take out before a matching pair is found? Assume X is an even number.
A. X/2
B. X - 1
C. X + 1
D. X

4.A bird leaves its nest and flies away. Its distance x from the nest is plotted as a function of time t.
Which o the following plots cannot be right?

A. 

B. 

C. 

D. 

5.A boy eats 50 mangoes in 5 days. Each day, he eats 3 mangoes more than the previous day. How many mangoes does he eat on 3rd day?
A. 15
B. 20
C. 25
D. 10

6.From a group of 40 players, a cricket team of 11 players is chosen. Then, one of the eleven is chosen as the captain of the team. The total number of ways this can be done is (m/n) below means the number of ways n objects can be chosen from m objects]
A. (40/11)
B. 11 (40/11)
C. 29 (40/11)
D. (39/11)

7.ABC is an equilateral triangle and AD is perpendicular to BC . If AB = 12 cm, then AD is equal to:
A. 6 cm
B. $6\sqrt{2}$ cm
C. $6\sqrt{3}$ cm
D. 8 cm

8.The average weight of a family of 25 persons reduced by 1 kg when the weight of a child is added to it. If the average weight of the family after adding the weight of the child is 27 kg, what will be the weight of the child?
A. 19 Kg
B. 1 Kg
C. 2 Kg
D. 3 Kg

9.In a 300m race A runs at a speed of 9 km/hr. He gives a start of 30m to B and still defeats him by 15 sec. What is the speed of B?
A. 6.3 km/hr
B. 8.1 km/he
C. 7.2 km/hr
D. 8 km/hr

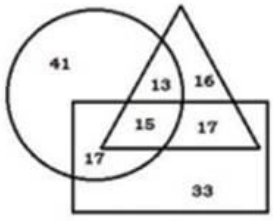
10.A person walks a certain distance with a speed of 6 km/hr in 5 hrs 45 min. If the person covers the same distance by bicycle with speed of 15 km/hr, how much time will he take?
A. 3 hrs. 30 min.
B. 3 hrs.
C. 2 hrs. 18 min.
D. 2 hrs. 30 min.

11.If 9 @ 3=12; 15 @ 4=22; 16 @ 14=4; then what is the value of 6 @ 2=?
A. 26
B. 1
C. 30
D. 8

12.At each corner of a triangular field of sides.26 m, 28 m and 30 m a cow is tethered by a rope of length of 7 m. the area (in m^2) ungrazed by the cows is:
A. 336
B. 259
C. 154
D. 77

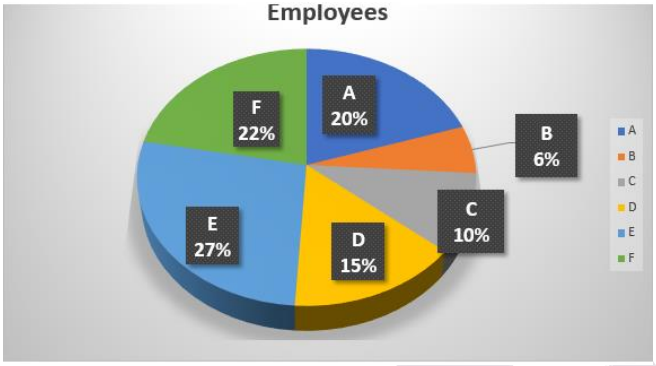
13.The set of numbers (7, 8, 9, *m*, 8, 9, 10, n) has an arithmetic mean of 8 and mode (most frequently occurring number) of 9. Then $m \times n$ =
A. 36
B. 40
C. 30
D. 42

14.In the given Venn diagram, the 'rectangle' represents 'engineers', the 'circle' represents 'managers' , and the 'triangle' represents 'married'. The numbers given in the diagram represents the number of persons in that particular category.



How many people are married but NOT engineers?
A. 29
B. 70
C. 13
D. 16

Direction: Study the following graph carefully and answer the question given below
Percentage of different types of employees in a company.
Total number of employees = 42000



15. What is the total number of B type and C type employees together?
A. 7620
B. 6750
C. 6720
D. 2760
E. None of these

16.Find the correctly matched the following bacterial stress response with the mechanism of action
A. Heat shock response (i) Sigma factor σ E
B. Envelope stress response (ii) RNA chaperones and ribosomal factors
C. General stress response (iii) Sigma factor σ S
D. Cold shock response (iv) Sigma factor σ 32

17.An autoimmune disease of humans usually involving antinuclear antibodies
A. Sclerosis
B. Systemic Lupus Erythematosus (SLE)
C. Rheumatic fever
D. Myasthenia gravis

18.Which among the following product is the link between Anaplerosis in TCA cycle and Fatty acid oxidation?
A. Fumaryl CoA
B. Pyruvate
C. Succinyl CoA
D. Oxaloacetate

19.Which is not a variation of the species-time hypothesis?
A. Resident species in the Tropics have not yet evolved forms to exploit similar temperate habitats
B. Tropical species have not migrated back to temperate areas following glaciation
C. Evolution is faster in the Tropics than in temperate areas
D. Rates of disturbance are lower in temperate than in tropical areas.

20.A transgenic sheep was developed which was used for replacement therapy for individuals suffering from emphysema. Which protein is generally produced from this ship?
A. Plasminogen activator (tPA)
B. Casein
C. α-anti trypsin (AAT)
D. Amyloid precursor proteins

21.When a person is dehydrated, where will be the hypotonic fluid found?
A. Glomerular filtrate
B. Proximal tubule
C. Loop of Henle
D. Distal convoluted tubule

22.Four statements are given below, choose the correct one:
A. Adult human bone grows only at extreme end (Epiphysis).
B. Adult human bone grows throughout its length.
C. Adult human bone grows only in the centre.
D. Adult human bone grows at growth plate, in between epiphysis and diaphysis.

23.Which of the common bases (A, C, G, T) of DNA has no oxygen in its structure?
A. Thymine
B. Adenine
C. Cytosine
D. Guanine

24.In Ramachandran's plot, which quadrant does the ψ and ϕ values of a left-handed alpha helix composed of all D-amino acids occupy?
A. Upper left
B. Lower left
C. Upper right
D. Lower right

25.Which one of the examples is not the type of congenital/primary immunodeficiency?
A. X-linked agammaglobulinemia (XLA)
B. Viral hepatitis
C. Severe combined immunodeficiency (SCID)
D. Common variable immunodeficiency (CVID)

26.The frequency of two alleles in a gene pool is 0.28 (B) and 0.72 (b). Find the percentage of heterozygous individuals in the population.
A. 0.60
B. 0.40
C. 0.87
D. 0.13

27.In myasthenia gravis blocking antibodies bind to
A. Acetyl choline receptors
B. Dopamine receptors
C. Serotonin receptors
D. Axons

28.Which of the following secondary metabolites is the phenolic compound in plants?
A. Coumarin
B. Phytochelatin
C. Phytoalexins
D. Cyanogenic glucosides

29.Which one of the given statements is false about the characteristics of biosensors?
A. Biosensors must be highly specific.
B. There should not be any linearity.
C. They should be highly selective.
D. Must have a quick response time.

30.Which chromosome is affected in the Charcot-Marie-Tooth diseases?
A. chromosome 13
B. chromosome 15
C. chromosome 17
D. chromosome 5

31.Find out the incorrect statement regarding the mitochondrial membrane transport?
A. The outer and inner mitochondrial membranes contain distinct translocation complexes (TOM and TIM complexes, respectively) that work together during import.
B. Most mitochondrial matrix proteins contain a removable targeting sequence (called the presequence) located at the N-terminus of the molecule.
C. Most proteins destined for the internal mitochondrial membrane contain internal targeting sequence which is removed after inserting it into the lipid bilayer.
D. Tim 23 binds with proteins having an N- terminal presequence which includes all matrix proteins.

32.Evolution of similar phenotypes in distantly related species is
A. Divergent evolution
B. Bifurcated evolution
C. Distributed evolution
D. Convergent evolution

33.Which of the following is not an example of adaptive behaviour?
A. Mimicry of leaves by insects like katydid.
B. Echolocation in bats.
C. Fish species that live in completely dark caves have vestigial, non-functional eyes.
D. Plants produce toxins that prevent other plants from growing nearby, therefore reduces competition.

34.Which of the following factors do not influence the structure of the community?
A. The geography of the community's location
B. Interaction between the organisms
C. Homogeneity of the environment
D. Frequency of disruptive events

35.Which of the following are genetic markers
P) VNTR (or Variable number tandem repeat)
Q) Microsatellite polymorphism
R) SNP (or Single nucleotide polymorphism)
S) STR (or Short tandem repeat)
A. P,Q,R
B. Q,R,S
C. P,Q,R,S
D. P,R and S

36.Which one of the following pathways is the **incorrect** mechanism of sex determination between male and female in humans?
A. Presence of SRY ---> Medulla ---> Testes ---> Sertoli cells ---> Anti-mullerian hormone ---> Inhibits the formation of female reproductive organ.
B. Presence of SRY ---> Medulla ---> Testes ---> Leydig cells ---> Regression of Wolffian duct ---> Male reproductive organs.
C. Presence of SRY ---> Medulla ---> Testes ---> Leydig cells ---> Testosterone ---> Produces male secondary sexual characteristics.
D. Absence of SRY ---> Cortex ---> Ovary ---> Theca cells ---> Estrogen ---> Female reproductive organs

37.Which of the following toxins is involved in the modification of the G protein-coupled receptor?
A. Botulinum toxin
B. Diptheria toxin
C. Cholera toxin
D. Tetanus toxin

38.Match the following:

1. RNase D	a. CCA sequence
2. RNase P	b. 3' processing
3. tRNA nucleotidyltransferase	c. 5' processing

A. 1-a, 2-b, 3-c
B. 1-b, 2-a, 3-c
C. 1-b, 2-c, 3-a
D. 1-c, 2-b, 3-a

39.Which of the following molecular marker types employs a combo of restriction enzymes and PCR?
A. AFLP
B. SSR
C. RAPD
D. SNP

40.Based on the bond strength, arrange the stabilizing interactions given below:
A. Hydrogen bond > Ionic bond > Covalent bond > Van der waals
B. Van der waals > Hydrogen bond > Ionic bond > Covalent bond
C. Hydrogen > Covalent bond > Ionic bond > Van der waals
D. Covalent bond > Ionic bond > Hydrogen bond > Van der waals

41.Match the following
I) Bergey's Manual
II) Binomial Nomenclature
III) Kingdom Monera
IV) Genus of Mango
A). Carolus Linnaeus
B). Cyanobacteria

C). Mangifera
D). Classification of bacteria
Choose the correct one
A. I-A, II-D, III-B, IV-C
B. I-B, II-A, III-D, IV-C
C. I-D, II-A, III-B, IV-C
D. I-C, II-A, III-B, IV-A

42.Which one of the following about the steps involved in the development of zygote is true?
A. Fertilization ---> Zygote ---> 2 celled-8 celled stage by mitosis ---> Morula ---> Blastocyte.
B. Zygote ---> Fertilization ---> 2 celled-8 celled stage by mitosis ----> Blastocyte ---> Morula.
C. 2 celled-8 celled stage by mitosis ---> Fertilization ---> Blastocyte ---> Morula ---> Zygote.
D. Blastocyte ---> Morula ---> 2 celled-8 celled stage by mitosis ---> Zygote ---> Fertilization.

43.In animal breeding for developing a pure line which of the following method is used?
A. Inbreeding
B. Hybridization
C. Outcrossing
D. Crossbreeding

44.In Agrobacterium-mediated transfer, which of the following pairs of genes present in Ti plasmid for the synthesis of Auxin?
A. ocs and nos
B. tms1 and tms2
C. frs and mas
D. tmr and ags

45.In people suffering from hypoxia, concentration of 2,3-bisphosphoglycerate _____ in erythrocytes.
A. Increases
B. Remains unchanged
C. Decreases
D. Remains same as O_2

46.Which type of cell junction involves in synchronizing the beating of heart muscle cells?
A. Desmosomes
B. Gap junctions
C. Tight junctions
D. Adherens junctions

47.Following statements are made about B and T-cell epitopes. Mark the option depicting wrong statement in regards to B and T-cell epitopes.
A. A B-cell epitope is the antigen portion binding to the immunoglobulin. These antigens occur are mostly made up of proteins.
B. T-cell epitopes are peptides derived from antigens and recognized by the T-cell receptor (TCR) when bound to MHC molecules displayed on the cell surface of APC
C. The CD4 coreceptor, which binds to MHC II and recognizes peptides presented by MHC II molecules.
D. The CD8 coreceptor, which also binds to MHC II, and recognises peptides presented by MHC II molecules.

48.Leigh syndrome caused by genetic mutations in the mitochondrial genome, it is inherited by
A. From the mother
B. From the father
C. From both parents
D. None of these

49.The order of the electron transport chain is given below. Which of the following inhibitors act on the passage of electrons from Cyt b and Cyt c1?
NADH ---> Q ---> Cyt b ---> Cyt c1 ---> Cyt c ---> Cyt (a+a3) ---> O2
A. Rotenone
B. CO
C. DCMU
D. Antimycin-A

50.Which period did first birds appear, gymnosperms dominate, the evolution of angiosperms occur in the geological time scale?
A. Cambrian period
B. Devonian period
C. Triassic period
D. Jurassic period

51.Toll like receptors are a class of proteins that play a key role in the innate immune system. TLRs are a type of pattern recognition receptor (PRR) and recognize molecules that are broadly shared by pathogens as pathogen-associated molecular patterns(PAMP). The table given below lists of Toll like receptors (Column a) and Ligand Column b)

TLRs	Ligand
a. TLR-1	i. Flagellin
b. TLR-3	ii. Bropirimine
c. TLR-5	iii. Tri acyl lipopeptides
d. TLR-7	iv. double stranded RNA

A. a-i, b-ii, c-iii, d-iv
B. a-ii, b-iii, c-iv, d-i
C. a-iii, b-iv, c-i, d-ii
D. a-iv, b-i, c-ii, d-iii

52.Enzyme linked Immunosorbent assay is commonly known as ELISA . where Ag-Ab interaction is monitored by enzyme measurement. Which is not application of ELISA ?
A. Detection of hepatitis B markers in serum.
B. Percentage of Hb in blood.
C. Detection of HIV antibodies in blood sample.
D. Detection of mycobacterium antibodies in tuberculosis.

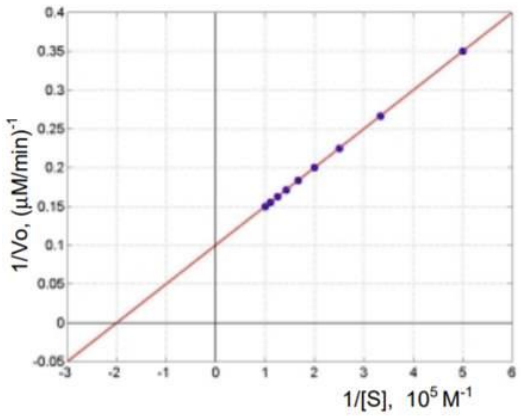
53.When a habitat is fragmented, it usually breaks down into smaller regions. Another drawback is that there are more species in vast areas than when the same space is divided into multiple small habitats. This is due to the fact that broad habitats provide uniform settings, whereas _____and _____ are more likely in small areas.
A. Inbreeding and migration
B. Migration and Genetic drift
C. Inbreeding and genetic drift
D. Genetic drift and Mutation

54.The ventrolateral preoptic nucleus (VLPO) causes the inhibitory neurotransmitters _____ and _____ to inhibit the arousal regions of the brain.
Fill in the blanks with appropriate options.
A. GABA, glutamate.
B. GABA, galanin.
C. galanin, glutamate.
D. All of the above.

55.In cucumbers, smooth fruit (t) is recessive to warty fruit (T) and glossy fruit (d) is recessive to dull fruit (D). It had been determined that these two genes exhibit a recombination frequency of 16%. If a double heterozygous is test crossed with homozygous recessive parent. What will be the frequency warty dull fruits?
A. 0.8
B. 0.16
C. 0.42
D. 0.84

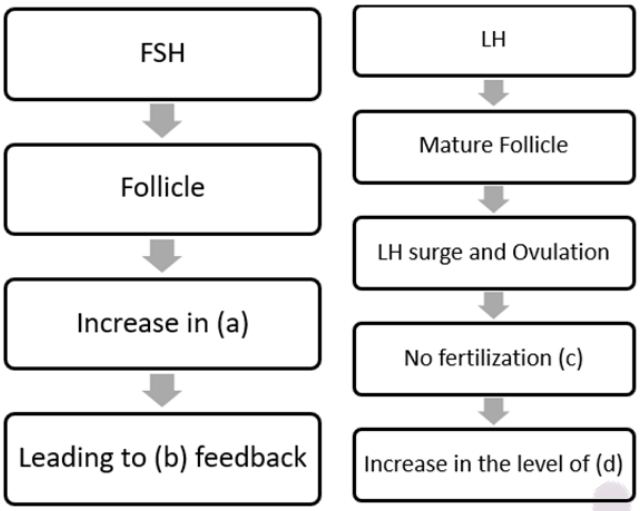
56.In a Lineweaver burk plot, enzyme initial rate and substrate concentration is given, graph is shown in figure, concentration of enzyme is maintained at constant level that is 1μM (10-6).

(S)μM	(Vo)μM/Min
3	2.9



Calculate the Km Value and Vmax of the reaction.
A. Km=10μM, Vmax=5μM/min
B. Km=5μM, Vmax=5μM/min
C. Km=5μM, Vmax=4μM/min
D. Km=4μM, Vmax=5μM/min

57.Uterine and ovarian cycles are controlled by GnRH from hypothalamus, which stimulates the release of LH and FSH from anterior pituitary. Fill the blanks of the flowchart given below.



A. a- estrogen b-positive c-corpus luteum d-progesterone
B. a- estradiol b-negative c-corpus luteum d-progesterone
C. a- estradiol b-positive c-corpus albicans d-progesterone
D. a- estrogen b-positive c-corpus albicans d-progesterone

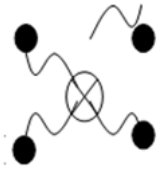
58.Given below are a set of statistical methods/parameters (Column A) and their potential applications/utility in biological research (column B), in a random manner.

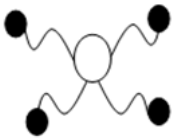
Column A	Column B
A. Regression analysis	i. measures strength of association between two variables
B. Chi-square analysis	ii. calculation of deviation between observed and expected values
C. Variance	iii. prediction of value of dependent variable based on known value of associated variable
D. Correlation coefficient	iv. calculate the spread of a distribution

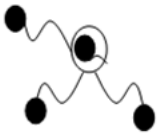
Which of the following options is a correct match of entries in Column A and B?

A. A-(ii), B-(iv),C-(i), D-(iii)
B. A- (iii), B-(ii), C-(iv), D-(i)
C. A-(iv), B-(i), C-(ii), D-(iii)
D. A-(i), B-(iii), C-(ii), D-(iv)

59.Which of the following picture represents the inactivated state of voltage-gated K^+ ion channels?

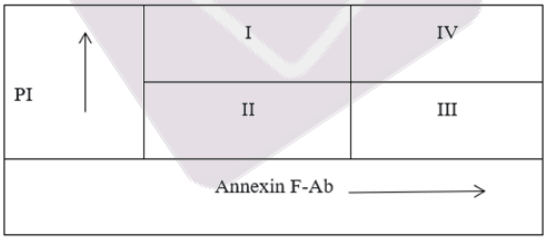
A. 

B. 

C. 

D. None of the above.

60.Cells at different stages can be distinguished by their DNA content. Cellular DNA can be quantified by using DNA binding dyes like DAPI. When a cell is passed from flow cytometry it is captured by sidelight and forward light to determine its characteristics. During early apoptosis phosphatidyl serine moves to the outer monolayer of the plasma membrane. Annexin A5 is a cellular protein in flow cytometry that is commonly used to detect apoptotic cells by its ability to bind to phosphatidylserine that was used for FITC tagging. Propidium iodide is used to identify necrotic cells. After FACs analysis what should be in Quadrant-I, II, III, and IV?



A. I-Necrotic Cell, II-Live cell, III-Early Apoptotic cell, IV-late Apoptotic cell.
B. I- Late Apoptotic cell, II- Necrotic Cell, III-Live cell, IV- Early Apoptotic cell
C. I-Early Apoptotic cell, II- Late Apoptotic cell, III- Necrotic Cell, IV-Live cell
D. I-. Live cell, II- Early Apoptotic cell, III- late Apoptotic cell, IV- Necrotic Cell

61.Match the following:

1. Trichomoniasis	*i. Anopheles*
2. American sleeping sickness	ii. Sexual contact
3. Leishmaniasis	iii. Sand fly
4. Malaria	*iv. Triatoma*

A. 1-i, 2-ii, 3-iii, 4-iv
B. 1-ii, 2-I, 3-iv, 4-iii
C. 1-iii, 2-iv, 3-ii, 4-i
D. 1-ii, 2-iv, 3-iii, 4-i

62.Phylogeny is defined as the study of evolutionary lineages of a species, or taxa. It is studied by drawing phylogenetic trees. Following are the statements about them-
P) A phylogenetic tree is also known as cladogram that represents evolutionary relationships among organisms or taxa.
Q) The pattern of branching in a phylogenetic tree reflects how species or other groups evolved from a series of common ancestors.
R) In trees, two species are less related if they have a more recent common ancestor and more related if they have a less recent common ancestor.
S) Phylogenetic trees are hypotheses, not definitive facts.
Which of the following are correct?
A. P, Q, R
B. P, Q, S
C. only P
D. only R

63.Which of the following statement (s) is/are correct about food web?
P) the largest energy level at first trophic level
Q) Presence of complex food webs decreases the stability of the ecosystem.
R) largest biomass can be found on the producer level.
S) consists of number of interconnected food chains through which energy travels in an ecosystem.
T) members of higher trophic level feed upon many organisms of lower trophic level.
A. P, R, S, T
B. P, Q, S, T
C. only Q and R
D. Q, R, S, T

64.Match the following and choose the correct option.
I) Pusa Savani A) An allergic plant, created by traditional breeding
II) IR-8, Jaya, Padma B) High yield variety of lady's finger
III) M S Swaminathan C) High yield variety of wheat
IV) Kiwi D) Green revolution
Options
A. I-A, II-C, III-D, IV-B
B. I-B, II-C, III-D, IV-A
C. I-C, II-B, III-D, IV-A
D. I-B, II-D, III-C, IV-A

65.The table given below lists of translational inhibitors (Column a) and their inhibitions (Column b)

Gene silencing agents	Functions
a. Fusidic Acid	i. Catalyzes ADP-ribosylation of and inactivation of eEF-2
b. Diptheria Toxin	ii. Inhibits prokaryotic peptidyl tranferase
c. Cycloheximide	iii. Preventing EF-G from dissociating from the large subunit
d. Chloromphenicol	iv. Inhibits eukaryotic peptidyltransferase

A. a-i, b-ii, c-iii, d-iv
B. a-ii, b-iii, c-iv, d-i
C. a-iii, b-i, c-iv, d-ii
D. a-iv, b-i, c-ii, d-iii

66.Consider the following statements:
A) Each strand in a β sheet is a helix with 3.6 amino acids per turn.
B) Loops of polypeptide that protrude from the surface of a protein often form the binding sites for other molecules.
C) An enzyme reaches a maximum rate at high substrate concentration because it has a fixed number of active sites where substrate binds.
D) Higher concentrations of enzyme give rise to a higher turnover number
Which of the following statements are correct?
A. A and D
B. A and C
C. B and C
D. B and D

67.The table given below lists of gene silencing agents (Column a) and their functions (Column b)

Gene silencing agents	Functions
a. RNase H-independent ODNs	i. Degradation of mRNA
b. RNase H-dependent ODNs	ii. Protein inhibition
c. Ribozymes and DNA enzymes	iii. Inhibition of translation of the target protein
d. SiRNA	iv. Degradation of the mRNA by RNase H

A. a-i, b-ii, c-iii, d-iv
B. a-ii, b-iii, c-iv, d-i
C. a-iii, b-iv, c-i, d-I
D. a-iv, b-i, c-ii, d-iii

68.Ecological succession is the process of gradual change in the structure of species of an ecological community with time. Given below are stages of autotrophic ecological succession (COLUMN A) with their characteristic features (COLUMN B). Find their correct match-

COLUMN A	COLUMN B
a. Nudation	**1. the environment gets modified and progressively becomes unsuitable for the existing community which is replaced by new invaders or another community sooner or later.**
b. Invasion	**2. the development of a bare area due to several reasons, such as eruption, flooding, landslide, erosion, fire deposition, disease.**
c. Competition and reaction	**3. community becomes more or less stabilized for extended period of time and it can keep itself in the equilibrium or steady state with the climate of that area**
d. Climax	**4. the influx of the reproductive bodies or propagules of various organisms and their settlement in the new or bare area**

A. a-1, b-4, c-2, d-3
B. a-3, b-4, c-1, d-2
C. a-2, b-4, c-1, d-3
D. a-2, b-1, c-4, d-3

69.Electrons are transferred from NADH/$FADH_2$ to O_2 through a series of electron carriers present on the inner mitochondrial membrane. Electron carriers involved are grouped into four large respiratory enzyme complexes. Out of the following, which option is incorrect about the respiratory enzymes complex-II of electron transport chain.

a. Complex –II is present in the inner mitochondrial membrane and is an integral part of succinate –CoQ reductase complex.
b. Two electrons are released in the conversion of Succinate to fumarate are transferred first to NAD then to an iron-sulphur center and finally to CoQ.
c. Two protons are translocated across the membrane by the succionate –CoQ reductase complex
d. Malonate is an competitive inhibitor of Complex-II of electron transport chain
e. Complex-II donates two electrons to complex-III and regenerates oxidize CoQ.
A. a,b,c,d,e
B. b,c
C. b,c,d
D. c,d,e

70.Match the following:

1. Trichomoniasis	*i.* *Anopheles*
2. American sleeping sickness	ii. Sexual contact
3. Leishmaniasis	iii. Sand fly
4. Malaria	*iv.* *Triatoma*

A. 1-i, 2-ii, 3-iii, 4-iv
B. 1-ii, 2-I, 3-iv, 4-iii
C. 1-iii, 2-iv, 3-ii, 4-i
D. 1-ii, 2-iv, 3-iii, 4-i

71.Cell fate is defined as future identity, or the identity of its daughter cells, before it is actually phenotypically detectable through differentiation or division. A fate of cell is specified by different ways given below. Find out the incorrect one.
A. autonomous specification
B. conditional specification
C. Competence
D. syncytial specification

72.Why is the law of independent assortment considered essential?
A. It determines the dominant or recessive trait.
B. To conserve the genetic uniformity
C. To produce the genetic diversity
D. To test the F1 generation genotype

73.A biosensor is a measuring device used to detect chemical compounds by converting a biological response into an electrical signal. Given below is the schematic diagram of biosensor. Identify the blank component.

A. Microprocessor
B. Filter
C. Transducer
D. A/D converter

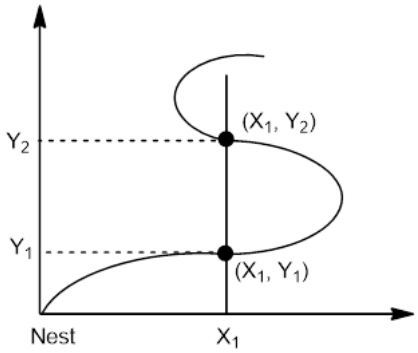
74.A new born was observed with spina bifida, a neural-tube defect that occurs when the spine does not completely enclose the spinal cord. This occur in the baby as the mother was vitamin deficient which was passed into the progeny. Which vitamin is associated with spina bifida?
A. Cobalamin
B. Biotin
C. Folate
D. Niacin

75.The ABC model of flower development in angiosperm demonstrates the presence of three classes of genes that regulate the development of floral organs. The genes are referred to as class A genes, class B genes and class C gene. These genes and the interaction between them induce the development of floral organs in 4 whorls: sepals, petals, stamens and carpels. Mutation was observed in AP2 gene which lead to deformation of the floral whorls. Deformation will be in which order.
A. sepals, petals, petals, carpels
B. Stamen, Carpel, Stamen, Carpel
C. Carpel, Stamen, Stamen, Carpel
D. Petals, Sepals, Sepals, Petals

ANSWERS

1. Ans. C.
As,
-7.5 + 22.5 = 15;
15 – (22.5 × 2 = 45) = -30;
-30 + (45 × 2 = 90) = 60;
60 - (90 × 2 = 180) = -120;
-120 + (180 × 2 = 360) = 240.
Thus the missing number is -120.
Hence, option C is the correct answer.
2. Ans. D.
If $\tan^2 \theta + \cot^2 \theta = 2$
then value of tanθ and cotθ is 1
so $1^2 + 1^2 = 1 + 1 = 2$
θ = 45°
$2^{\sec\theta \operatorname{cosec}\theta} = 2^{sec45°cosec45°}$
$= 2^{\sqrt{2}\times\sqrt{2}} = 2^2 = 4$
Hence option D is the correct answer
3. Ans. D.
Suppose we take four different colours of gloves i.e. Green, Blue, Red and Yellow
First we take out green color gloves
Then Blue color gloves
Then Red color gloves
At last yellow color gloves
If all four colors of gloves are taken out then fifth one will be again any of the given four color gloves, and then so on…
It means if we have four colors of different gloves then in fifth time the color of gloves started matching.
So, here we can conclude that the maximum number of gloves that you have to take out before a matching pair is found is **X** number of gloves.
Hence option D is correct.

4. Ans. C.



The option C Graph is not possible because if we draw a vertical line, it cuts the graph at two distinct points, which is giving two different values of distance for the same time, and it is not possible.

5. Ans. D.

Let the mangoes eaten by him is x on the 1st day.

∴ According to the question,

$x + (x + 3) + (x + 6) + (x + 9) + (x + 12) = 50$

$\Rightarrow 5x + 30 = 50$

$\Rightarrow 5x = 20$

$\Rightarrow x = 4$

So he eats (4 + 6) = 10 mangoes on the 3rd day.

Hence, option D is the correct answer.

6. Ans. B.

According to question,

$\binom{m}{n}$ means the number of way n objects can be chosen from m objects can be from 40 players is $\binom{40}{11} = {}^{40}C_{11}$

Now, 1 caption chosen from 11 selected players then m = 11 and n = 1.

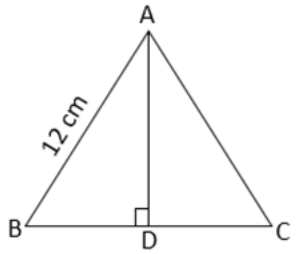
Therefore, number of ways 1 captain chosen from 11 player

$\binom{11}{1} = {}^{11}C_1 = 11;$ where, ${}^{n}C_1 = n$

Hence, total number of ways = ${}^{11}C_1 \times {}^{40}C_{11} = 11v\binom{40}{11}$

∴ correct option is B.

7. Ans. C.
Given:
ABC is an equilateral triangle,
AD is perpendicular to BC
And AB = 12 cm



Since ΔABC is an equilateral triangle and AD is perpendicular to BC, AD will be a median of ΔABC.

Therefore, AD = $\frac{\sqrt{3}}{2}$ AB = $\frac{\sqrt{3}}{2} \times 12 = 6\sqrt{3}$ cm

8. Ans. C.
Given:
Average weight of family after adding the weight of the child = 27 kg.
Therefore, total weight of family after adding the weight of the child = (25 + 1) × 27 = 26 × 27 = 702 kg.
Now, average weight of family before adding the weight of the child = 27 + 1 = 28 kg.
Therefore, total weight of family before adding the weight of the child = 25 × 28 = 700 kg.
Now, weight of child = Total weight of family after adding the weight of the child – Total weight of family before adding the weight of the child = 702 – 700 = 2 kg
9. Ans. C.
Speed of A = 9 km/hr = 2.5 m/s

Time taken by A to complete the race = $\frac{300}{2.5}$ = 120 seconds

B took 15 more seconds to complete the race and A also gave him a start of 30 m.
Therefore, distance travelled by B in 135 (120 + 15) seconds = 270 m (300m – 30m)

Speed of B = $\frac{270}{135}$ = 2m/s = 7.2 km/hr

10. Ans. C.

Total distance walked by the person = $6 \times 5\frac{3}{4}$ = 34.5 km

Required time by bicycle = 34.5/15 = 2.3 hrs = 2 hrs 18 min.

11. Ans. D.

9 @ 3 → (9 – 3) × 2 = 12

15 @ 4 → (15 – 4) × 2 = 22

16 @ 14 → (16 – 14) × 2 = 4

6 @ 2 → (6 – 2) × 2 = **8**

Hence, the correct option is **D.**

12. Ans. B.

Area grazed by all cows = $\frac{180^o}{360^o}\pi r^2$

$= \frac{\pi r^2}{2} = \frac{1}{2} \times \frac{22}{7} \times 7 \times 7 = 77$ sq m

Semi-perimeter of triangular field (s)

= (26+28+30)/2 = 42 cm

$\therefore$ Area of the field = $\sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{42(42-46)(42-28)(42-30)}$

$= \sqrt{42 \times 16 \times 14 \times 12} = 336$ sq m

$\therefore$ Area ungrazed by the cows = 336 - 77

= 259 sq m

13. Ans. A.

Given:

Arithmetic mean of numbers = 8

Total numbers in set = 8

Sum of all numbers = 8 × 8

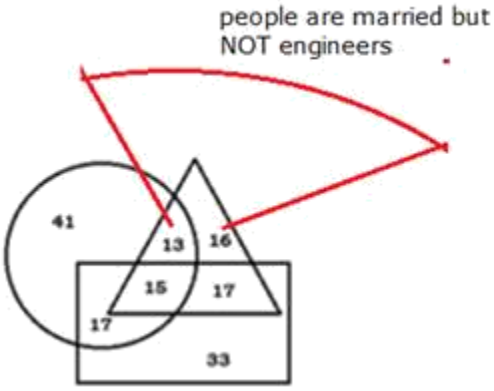
Ã 7 + 8 + 9 + m + 8 + 9 + 10 + n = 64

Ã m + n + 51 = 64

Ã m + n = 64 – 51 = 13

Again, given:

Most frequently occurring number (Mode) is 9.
However, in the given data, except m and n, 9 and 8 both are two times.
Therefore, from m and n, one must be 9.
Then, the other = 13 – 9 = 4
Now, m × n = 9 × 4 = 36
14. Ans. A.
Here 13 and 16 represent people are married but NOT engineers.

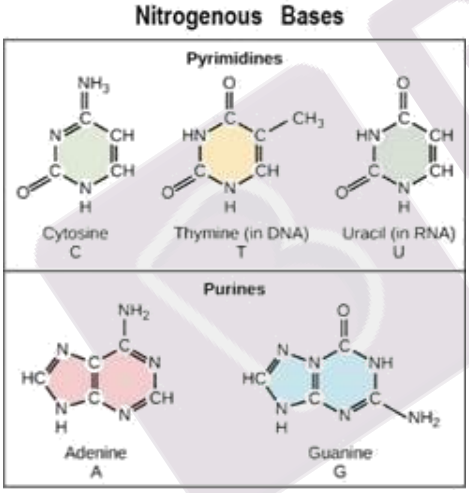


So the required number of people=13+16=29
Hence, option A is the correct answer.
15. Ans. C.
Total percentage of B type and C type employees together = 6% + 10%

Total number of B type and C type employees together = 42000 $\times \frac{(6+10)}{100} = 6720$

16. Ans. C.
● Heat shock response is regulated by Sigma factor σ 32
● Envelope stress response, controlled by the sigma factor sigma E and the Cpx two-component system.
● Cold shock response facilitates the expression of RNA chaperones and ribosomal factors.
17. Ans. B.
Antinuclear antibodies (ANAs) produce immune complexes that promote pathogenesis by tissue deposition or cytokine production in systemic lupus erythematosus (SLE), a prototypic autoimmune illness.
18. Ans. C.
Succinyl CoA is the end product of beta-oxidation of lipids with an odd-numbered chain; it can join TCA or be converted to acetyl CoA to enter the TCA cycle.

19. Ans. D.
The species-time hypothesis suggests that temperate areas are less species-rich because they have had less time to recover after the ice ages than have tropical areas, which were relatively unaffected.
20. Ans. C.
A transgenic sheep was developed in which AAT (alpha- antitrypsin) protein is produced. This protein is generally used for replacement therapy for individuals suffering from emphysema. Hence, C is the correct option.
21. Ans. C.
Hypotonic fluid will be present in the loop of Henle when a person is dehydrated. A loop of Henle is a part of the kidney tubule, forming a long loop in the medulla of the kidney from which the blood reabsorbs water and salts.
22. Ans. D.
In bone development until adolescence condition, at growth plate, hyaline cartilage persists; which is the region between diaphysis and epiphysis and that region is responsible for the growth in length of long bones.
23. Ans. B.
Adenine doesn't have oxygen in its structure.



24. Ans. B.
The inversion of stereochemistry at Ci α makes the Ramachandran plot of D-amino acid residues differ by a 180° rotation from that of L-amino acid residues.
• Beta strand composed of all D-amino acids occupies the lower right quadrant and all L-amino acids of beta occupy the upper left quadrant.

• Right-handed alpha-helix of D-amino acids will occupy the upper right quadrant but the right alpha-helix of L-amino acids will occupy the lower left quadrant.
• Left-handed alpha-helix of D-amino acids will occupy the lower left quadrant but the right alpha-helix of L-amino acids will occupy the upper right quadrant.
25. Ans. B.
• Secondary or acquired immunodeficiency disorders occurs when an outside source like a toxic chemical or infection attacks the body.
• Primary immunodeficiency disorder that results from defects in immune system development or function.
• Disorders involving the T-cell arm of the adaptive system, such as severe combined immunodeficiency (SCID) require immune reconstitution.
26. Ans. B.
According to Hardy Weinberg equilibrium equation,
$P^2 + 2pq + q^2 = 1$ & $p + q = 1$
p = frequency of the dominant allele q = frequency of the recessive allele
p^2 = percentage of homozygous dominant individuals q^2 = percentage of homozygous recessive individuals
2pq = percentage of heterozygous individuals.
Here, we need to find the percentage of heterozygous individuals i.e 2pq
2*B*b = 2*0.28*0.72 = 0.40. The percentage of the heterozygous individual in the population is 0.40.
27. Ans. A.
Antibodies against the acetylcholine receptor (AChR), which can be split into binding, blocking, and modifying antibodies, are found in 85-90 percent of patients with myasthenia gravis (MG). Antibodies that bind to AChR can activate complement and cause AChR to be lost.
28. Ans. A.
• Coumarins are phenolic compound secondary metabolites of higher plants, few microorganisms (bacteria and fungi). The main function is for defence mechanisms against herbivores and attacks by microorganisms. Coumarin is biosynthesized from phenylalanine via shikimic acid.
• Phytochelatins are short peptides alkaloids, usually contains 5–20 amino acids, that are synthesized from glutathione. It acts as a cellular antioxidant.
• Phytoalexins and Cyanogenic glucosides are sulfur and nitrogen-containing alkaloids respectively.

29. Ans. B.

● Linearity is the attribute that shows the accuracy of the measured response.

● Linearity of the biosensor can be linked with the resolution of the biosensor and range
of analyte concentrations.

● Linearity is mathematically represented as y=mc, where c is the concentration of the analyte, y is the output signal, and m is the sensitivity of the biosensor.

30. Ans. C.

Type I Charcot-Marie-Tooth illness causes muscle weakness by duplicating a portion of chromosome 17.

31. Ans. C.

Mitochondrial proteins contain signal sequences that target them to their home base. Most mitochondrial matrix proteins contain a removable presequence located at the N-terminus of the molecule that includes a number of positively charged residues. In contrast, most proteins destined for the internal mitochondrial membrane contain internal targeting sequences that remain as part of the molecule. This means that the incorrect statement is C. Further, the outer mitochondrial membrane contains a protein-import complex, the TOM complex. Proteins that are destined for the internal mitochondrial membrane or matrix must pass through the intermembrane space and engage a second protein-import complex located in the internal mitochondrial membrane, called a TIM complex. The internal mitochondrial membrane contains two major TIM complexes: TIM22 and TIM23. TIM22 binds integral proteins of the internal mitochondrial membrane that contain an internal targeting sequence and inserts them into the lipid bilayer. TIM23 binds proteins with an N-terminal presequence, which includes all of the proteins of the matrix (as well as a number of proteins of the internal mitochondrial membrane).

32. Ans. D.

Evolution of similar phenotypes in distantly related species is convergent evolution.

33. Ans. C.

● A vestigial structure is a feature that was an adaptation for the organism's ancestor, but that evolved to be non-functional because the organism's environment changed.

● When their sighted ancestors ended up living in caves, there was no longer any natural selection that maintained the function of the fishes' eyes.

• These fish still have eyes today but they are not functional and are not an adaptation.

34. Ans. C.

• In a community's environment, heterogeneity allow greater species richness because there are more distinct habitats to be occupied.

• The geography of the community's location plays a crucial role. Island communities that are far away from the mainland tend to have smaller numbers of species than those that are closer to the mainland.

• Communities with an intermediate level of disturbance may have greater species diversity than communities with very frequent or very rare disturbances.

35. Ans. C.

Genetic marker may be a short DNA sequence, such as a sequence surrounding a single base-pair change (single nucleotide polymorphism, SNP), or a long one, like minisatellites.

Some commonly used types of genetic markers are

• RFLP (or Restriction fragment length polymorphism)
• AFLP (or Amplified fragment length polymorphism)
• RAPD (or Random amplification of polymorphic DNA)
• VNTR (or Variable number tandem repeat)
• Microsatellite polymorphism
• SNP (or Single nucleotide polymorphism)
• STR (or Short tandem repeat)
• SFP (or Single feature polymorphism).

36. Ans. B.

At first, it was assumed only the SRY gene in Y chromosomes plays an important in the determination of sex. But later, gonadal determination has proven to rely on a complex network of genes, whose balanced expression levels either activate the testis pathway and simultaneously repress the ovarian pathway.

In normal females, Müllerian ducts are maintained, Wolffian ducts regress. In males, anti-mullerian hormone inhibits the production of female reproductive organs.

37. Ans. C.

• Cholera toxin activates G protein $G_s\alpha$ through an ADP-ribosylation reaction that holds G protein in its GTP-bound form, thereby overstimulate adenylate cyclase to produce cAMP.

● Botulinum toxin binds presynaptically to cholinergic nerve terminals and decreases acetylcholine production to cause a neuromuscular block.
● Tetanus toxin also binds to presynaptic terminals of the neuromuscular junction but this blocks neurotransmitter release by cleaving vesicle-associated membrane protein (VAMP) and induces spastic paralysis.
● Diphtheria toxin selectively ADP-ribosylates ribosomal elongation factor, EF-2, inhibits the protein synthesis.

38. Ans. C.

The endonuclease RNase P catalyzes the cleavage action at 5’ end of pre-tRNA. RNase D catalyzes the processing of 3’ end. The triplet sequence CCA at the 3’ end is not coded by the genome but added as a part of tRNA processing by tRNA nucleotidyltransferase. This means that the correct answer is C with the sequence 1-b, 2-c, 3-a.

39. Ans. A.

Amplified fragment length polymorphism (AFLP) is a PCR-based approach that generates and compares unique fingerprints for genomes of interest by selectively amplification of a selection of digested DNA fragments.

40. Ans. D.

● Strength of Van der waals interaction is 0.4-4.0 kJ/mol .
● The bond strength of the hydrogen bond is 12-30 kJ/mol.
● The bond strength of the ionic bond is >30 kJ/mol.
● The bond strength of the covalent bond is > 40 kJ/mol.

41. Ans. C.

Bergeys manual is a manual of bacteria classification; Binomial nomenclature system is given by Carolus Linnaeus; Cyanobacteria belongs to kingdom Monera and Mangifera is the genus of mango.

42. Ans. A.

After fertilization, a zygote is the first stage in the development of organisms. The genes of the new zygote are not activated to produce proteins until several cell divisions into cleavage. During cleavage, the relatively huge zygote subdivides into many smaller cells through mitosis. These smaller cells called blastomeres and a solid cell mass called the morula.

43. Ans. A.

Inbreeding method known to increase homozygosity, so if we wish to evolve pure lines of animal, this method is necessary. It also exposes recessive gene which is harmful that are then eliminated by selection. Inbreeding method helps in the accumulation of superior gene and for elimination of undesirable gene.

44. Ans. B.
Oncogenes help in the synthesis of auxins and cytokinins. The over-production of phytohormones leads to the proliferation of tumour formation.
â ocs (Octopine synthase) and nos (Nopaline synthase) genes are involved in opine synthesis for driving transgene expression.
â tms1 (Tryptophan-2-mono-oxygenase) and tms2 (Indoleacetamide hydrolase) are key factors in auxin metabolism.
â Frs (Fructopine synthase), mas (Mannopine synthase) and ags (Agropine synthase) help in opine synthesis.
â tmr (Isopentyltransferase) gene involved in cytokinin synthesis.
45. Ans. A.
In people suffering from hypoxia, concentration of 2,3-bisphosphoglycerate increases in erythrocytes because of lowered oxygenation in peripheral tissues which results from inadequate functioning of the lungs or circulatory system.
46. Ans. B.
● Gap junction: The signal to contract is passed efficiently through gap junctions, allowing the heart muscle cells to contract in unison.
● Tight junctions in the digestive tract or kidneys, where the intestines and nephrons possess segment-specific permeability that allows for the absorption of nutrients.
● Adherens junction plays an important role in embryonic morphogenesis.
● Desmosome is found in tissue that experience intense mechanical stress, such as bladder tissue, gastrointestinal mucosa, and epithelia
47. Ans. D.
● T-cell epitopes are presented by MHC I and MHC II. MHC molecules are recognized by two distinct subsets of T-cells, CD8 and CD4 T-cells, respectively.
● CD8 T-cells become cytotoxic T lymphocytes (CTL). Meanwhile, CD4 T-cells become helper (Th) or regulatory (Treg) T-cells.
● CD8 T-cells express the CD8 coreceptor, which binds to MHC I, and recognize peptides presented by MHC I molecules.
● CD4 T-cells express the CD4 coreceptor, which binds to MHC II and recognizes peptides presented by MHC II molecules.
48. Ans. A.
● The mitochondrial mode of inheritance is strictly maternal, whereas nuclear genomes are inherited equally from both parents.
● Mitochondrial inheritance does not obey the classic rules of genetics.

● Mitochondria-associated disease mutations are always inherited maternally because the mitochondria in mammalian sperm are usually destroyed by the egg cell after fertilization

49. Ans. D.

● Antimycin is a potent electron transport chain (ETC) inhibitor. It inhibits the flow

of electrons through complex III of the ETC by blocking the passage of electrons from

cytochrome b to cytochrome c. All species that depend on mitochondrial respiration are

very sensitive to antimycin and undergo toxic effects when they are exposed.

● Rotenone, a pesticide, is an inhibitor of Complex I of the electron transport chain. Rotenone inhibits electrons from NADH cannot enter the electron transport chain, results in the inability to produce ATP from the oxidation of NADH.

● CO has a capacity of inhibiting cytochrome c oxidase (complex IV), leading to electron accumulation at the complex III level, which facilitates anion superoxide generation.

● DCMU inhibits electron transfer in the link between photosystems II and I. O2 can evolve in the presence of DCMU if an artificial electron acceptor such as ferricyanide can accept electrons from Q.

50. Ans. D.

● Cambrian period: marine animals and algae diversified.

● Devonian period: diversification of boney fishes, mass extinction at the end of this period.

● Triassic period: continents begin to separate, first dinosaurs, first mammals

● Jurassic period: first birds, gymnosperms dominate, the evolution of angiosperms.

51. Ans. C.

TLR-1 has multiple triacyl lipopeptides as ligand present on the cell surface of bacteria. TLR-3 has double stranded RNA and poly I:C as ligand present in the cell compartment of viruses. TLR-5 has flagellin as ligand presnt on the cell surface of bacteria. TLR-7 has multiple ligands sucha s imidazoquinoline, ioxoribine, bropiurimine that are present in the cell compartments of mococytes, b-lymphocytes and dendritic cells.

52. Ans. B.
The principal of ELISA is mainly based on the formation of Ag-Ab complex which is detected by chromogenic detection using. The conjugated enzyme act on a specific substrate called chromogenic substrate and generate a color reaction product. Hence, during detection of hepatitis B markers in serum, HIV antibodies in blood sample or mycobacterium antibodies in tuberculosis, enzyme conjugated secondary antibodies are used but in determining percentage of Hb in blood sample there is no role of Ag-Ab interaction. Therefore, B is wrong.
53. Ans. C.
When a habitat is fragmented, it typically divides into smaller sections. Another drawback is that big regions support more species than smaller ecosystems. This is due to the fact that large habitats have uniform conditions, whereas inbreeding and genetic drift are more prevalent in small areas.
54. Ans. B.
GABA and galanin works as the inhibitory neurotransmitters while glutamate is involved in the arousal function.
55. Ans. C.
Four types of gametes will be produced by the heterozygous parent: two types of non-recombinant gametes (TD and td) and two types of recombinant gametes (Td and tD). According to the recombination frequency we can say that 16% of the gametes produced by the heterozygous parent will be recombinants. Because there are two types of recombinant gametes, each should arise with a frequency of 16%/2= 8%. All the other gametes will be non-recombinants; so they should arise with a frequency of 100% -16%= 84%. Because there are two types of non-recombinant gametes, each should arise with a frequency of 84%/2 =42%. The other parent in the testcross is homozygous and therefore produces only a single type of gamete (td) with a probability of 1.
The expected proportion of each type can be determined by using the multiplication rule, multiplying together the probability of each uniting gamete. Testcross progeny with warty and dull fruit (TtDd) will be 0.42 (TD from heterozygous parent×td from homozygous parent = 0.42×1)
56. Ans. B.
Calculation of Km = Km is calculated by X intercept, that is -1/Km (in Lineweaver burk plot)
In given plot X intercept is -2
Thus -1/-2=1/2=0.5

According to plot $0.5*10^{-5}=5*10^{-6}M$
Km=5μM
Km=1/2Vmax
Vmax=2Km
Vmax=5*2=10
Vmax=10μM/Min
57. Ans. B.
Uterine and ovarian cycles are controlled by GnRH from hypothalamus, which stimulates the release of LH and FSH from anterior pituitary. FSH and LH stimulate development of follicles and secretion of estrogens by the follicles. LH also stimulates ovulation, formation of corpus luteum and the secretion of progesterone and estrogen by the corpus luteum.
58. Ans. B.

A. Regression analysis	iii. prediction of value of dependent variable based on known value of associated variable
B. Chi-square analysis	ii. calculation of deviation between observed and expected values.
C. Variance	iv. calculate the spread of a distribution
D. Correlation coefficient	i. measures strength of association between two variables.

59. Ans. C.
The voltage- gated K^+ ion channel can exist in three different states: close, open and inactivated. Inactivation is accomplished by movement of a small inactivation peptide that dangles from the cytoplasmic portion of the protein. The inactivation peptide is thought to gain access to the cytoplasmic mouth of the pore by snaking its way through one of four "side windows" as illustrated in C. This means that the correct answer is C.
Further, A represents the closed ion channel and B represents the opened ion channel.
60. Ans. A.
In necrotic cells, phosphatidylserine will not move to the outer leaflet, but the cell will be able to take PI. Hence the level of PI will be high, but Annexin F-Ab binding will be below, so quadrant-I is a necrotic cell. In quadrant-II, the level of PI and Annexin is low, which means the live cells will be there. In quadrant-III level of Annexin binding is high, which means the cell is in the apoptotic stage, but when the level of PI is low, that means the cell is in the

early apoptotic stage. In quadrant IV, the level of annexin binding and the level of PI are high, which is a characteristic of the late apoptotic cells.

61. Ans. D.

The given table contains protozoan diseases in humans and their mode of transmission.

Trichomoniasis is a Sexually Transmitted disease (STD) caused by Trichomonas vaginalis, so 1-ii.

American sleeping sickness is caused by Trypanosoma cruzi and transmitted through triatomid bugs. This means that the correct combination of 2 is iv.

Leishmaniasis also known as black fever is caused by Leishmania donovani. The disease is transmitted by sand fly, thus 3-iii.

Malaria is caused by Plasmodium spp., which is transmitted to human body by Anopheles mosquitoes. Thus the combination of 4 is i.

The answer will be 1-ii, 2-iv, 3-iii, and 4-I which is D.

62. Ans. B.

A phylogenetic tree also known as cladogram that represents evolutionary relationships among organisms or taxa. They are just hypotheses, not definitive facts. The pattern of branching in a phylogenetic tree reflects how species or other groups evolved from a series of common ancestors. In trees, two species are more related if they have a more recent common ancestor and less related if they have a less recent common ancestor. Hence, all are correct except R.

63. Ans. A.

Food web consists of number of interconnected food chains through which energy travels in an ecosystem. The largest energy level and largest biomass can be found on the producer level because of highest amount of solar energy captured by them. Presence of complex food webs increases the stability of the ecosystem due to more interactions between various food chains. Hence, except statement Q, all are correct.

64. Ans. B.

Pusa Savani is the high yielding, resistant variety of ochra (bhindi). IR-18, Jaya, Padma are high yield variety of wheat, kiwi is an allergic plant wherein allergy is reduced by breeding technology; M.S, Swaminathan is the scientist the credited with bringing green revolution in India.

65. Ans. C.

many of the antibiotics utilized for the treatment of bacterial infections as well as certain toxins function through the inhibition of translation. Inhibition can be effected at all stages of translation from the initiation to elongation to

termination. Fusidic Acid, prevents EF-G from dissociating from the large subunit. Diptheria Toxin, catalyzes ADP-ribosylation of and inactivation of eEF-2. Cycloheximide, inhibits eukaryotic peptidyltransferase and Chloromphenicol inhibits prokaryotic peptidyltransferase.

66. Ans. C.

Each strand in a alpha helix has 3.6 amino acids per turn. Turnover depends on individual enzyme (Kcat) not on total enzyme

67. Ans. C.

RNase H-independent ODNs hybridize to target mRNA and leads to inhibition of translation of the target protein. RNase H-dependent ODNs hybridize to target mRNA to degrade mRNA by RNase H. Ribozymes and DNA enzymes catalyzes cleavage of target mRNA and ultimately degrade the mRNA. SiRNA hybridize to target mRNA by its antisense strand and guide it into endoribonuclease enzyme complex (RISC) leads to degradation of the mRNA.

68. Ans. C.

Nudation is the formation of a bare area due to several reasons, like eruption, landslide, erosion, flooding, fire, deposition, disease etc. Invasion is the influx of the reproductive bodies or propagules of various organisms and their settlement in the new or bare area. Due to increased competitions which can be intra-and interspecific, the environment is changed and progressively becomes unsuitable for the existing community which is replaced by new invaders or another community (seral community) sooner or later. Ultimately, a stage is reached when the final community becomes stabilized for a longer period of time and it can keep itself in the steady state or equilibrium with the climate of that area. Hence, C is correct option.

69. Ans. B.

Succinate dehydrogenase is an inner mitochondrial membrane bound enzyme, is an integral component of succinate –CoQ reductase complex. It converts succinate to fumraate releasing 2 electrons which are transferred to FAD, then to iron-sulphur complex and finally to CoQ. CoQ draws electrons into respiratory chain, not only from NADH but also from succinate. No protons are translocated across the membrane by the succinate –CoQreductase complex.

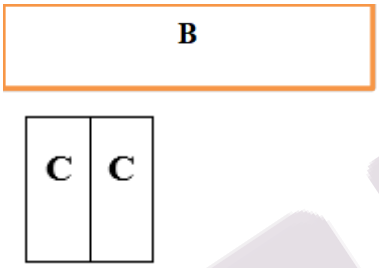
70. Ans. D.

The given table contains protozoan diseases in humans and their mode of transmission.

Trichomoniasis is a Sexually Transmitted disease (STD) caused by Trichomonas vaginalis, so 1-ii.

American sleeping sickness is caused by Trypanosoma cruzi and transmitted through triatomid bugs. This means that the correct combination of 2 is iv.
Leishmaniasis also known as black fever is caused by Leishmania donovani. The disease is transmitted by sand fly, thus 3-iii.
Malaria is caused by Plasmodium spp., which is transmitted to human body by Anopheles mosquitoes. Thus the combination of 4 is i.
The answer will be 1-ii, 2-iv, 3-iii, and 4-I which is D.
71. Ans. C.
There are three general ways a cell can become specified for a particular fate; they are autonomous specification, conditional specification and syncytial specification. (A) In autonomous specification, if a particular blastomere is removed from an embryo early in its development, that isolated blastomere will produce the same cells that it would have made if it were still part of the embryo. (B) In conditional specification, fate of a cell depends upon its position in the embryo and is determined by interactions with neighbouring cells. (C) competence is ability of cells to respond to inductive signal. (D) In syncytial specification, morphogens diffuse through the syncytium to set up concentration gradients that give cells information about their position. Hence, C is incorrect.
72. Ans. C.
● Along with crossing over, the independent assortment is responsible for the generation of new gene combinations in the organism. As a result, it adds to eukaryote genetic diversity.
● Separate gamete cells obtain two different independently arranged genes during meiosis, according to the law of segregation.
● Recombination happens during meiosis and is a process in which fragments of DNA are broken and recombined to create new gene combinations. Recombination scrambles maternal and paternal gene segments, ensuring that genes assort separately.
73. Ans. C.
Biosensors are devices used to detect the presence or concentration of chemical compounds which can be biological analyte like biomolecule or a microorganism. They consist of three parts: biological detection system- a component that recognizes the analyte and produces a signal, a signal transducer which transforms the signal into a measurable signal, and a reader device Transducers are used converting these biological signals into electrical signals. Hence, C is the right option.

74. Ans. C.
Folate is particularly important for the growth and specialization of central nervous system cells. Neural-tube birth abnormalities are more common in children whose mothers were deficient in folate during pregnancy. Spina bifida is a neural tube defect that arises when the spine does not completely enclose the spinal cord. Folate deficiency is causally connected to the development of spina bifida. Spina bifida can cause a variety of physical and mental problems. Observational studies in the United States demonstrate that the prevalence of neural-tube abnormalities decreased after the fortification of enhanced cereal grain products with folate in 1996, compared to before the fortification of grain products with folate.
75. Ans. C.
Whorl 1- A lone= Sepals; Whorl 2- A+B= Petals; Whorl 3- B+C= Stamens and Whorl-4-C alone= Carpels. If mutations occur in AP2 gene of A gene so there will not be formation of Whorl-1 sepals as well as Whorl-2 Petals.



Carpel Stamen Stamen Carpel
So, this pattern will be followed for floral development in case o f mutation in AP2 gene

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