

ENTRANCE EXAMINATION - 2020

**Ph.D. Microbiology
Department of Plant Sciences**

Time: 2 hours

Maximum Marks: 70

HALL TICKET NO.

--

INSTRUCTIONS

Please read carefully before answering the questions:

1. Write your Hall Ticket Number in the OMR Answer Sheet given to you. Also write the Hall Ticket Number in the space provided above.
2. Answers are to be marked only on the OMR answer sheet following the instructions provided there upon.
3. Hand over the OMR answer sheet at the end of the examination to the Invigilator.
4. No additional sheets will be provided. Rough work can be done in the question paper itself/space provided at the end of the booklet.
5. The question paper contains 70 questions. **Part-A:** Question Nos. 1-35 and **Part-B:** Questions Nos. 36-70 of multiple-choice printed in 15 pages, including this page. One OMR answer sheet is provided separately. **Please check.**
6. The marks obtained in **Part-A** will be used for resolving the tie cases.
7. Each question carries one mark.
8. Calculators and mobile phones are NOT allowed.

Part-A

1. Cornoy's solution comprises of the following chemical reagents:

- A. One part of Glacial acetic acid + 6 parts of Ethyl alcohol + 3 parts of Chloroform
- B. Three parts of Glacial acetic acid + 6 parts of Ethyl alcohol + 1 part of Chloroform
- C. Six parts of Glacial acetic acid + 3 parts of Ethyl alcohol + 1 part of Chloroform
- D. Three parts of Acetic acid + 1 part of Ethyl alcohol

2. Cobalt-60 radiation is generally used in pharmaceutical and animal husbandry sectors. For what purpose this radiation is used?

- A. Treatment of retinal disorder in human and animals
- B. Strengthening immune system
- C. Cold sterilization of antibiotics, hormones, medical equipment and pasteurize meat products
- D. Treatment of embryonic disorder in human and animals

3. Several research groups have performed the complete genome sequencing of Coronavirus strains collected from different geographical regions of the world and submitted in NCBI database. One researcher was interested to predict the number and types of genes present on COVID-19 genome using these sequences. Which software he can use for this?

- A. WUHAN
- B. PROSITE
- C. DOCK
- D. Vgas

4. Calvin Bridges established the theory of chromosomal non-disjunction in 1913 while studying *Drosophila* offspring in the cross of white-eyed females ($X^w X^w$) and red-eyed ($X^{w+} Y$) males. The exceptional progeny that he recovered from the above cross are

- A. Red-eyed fertile females ($X^{w+} X^w$) and white-eyed sterile males ($X^w O$)
- B. Red-eyed fertile females ($X^{w+} X^w Y$) and white-eyed fertile males ($X^w O$)
- C. White-eyed sterile females ($X^w X^w$) and red-eyed fertile males ($X^{w+} Y$)
- D. White-eyed fertile females ($X^w X^w Y$) and red-eyed sterile males ($X^{w+} O$)

5. What is CORINA?

- A. a name of COVID-19 vaccine which is under preparation
- B. a name of one of the corona virus strain
- C. a name of software which is useful for generating 3D structure of small molecule
- D. a name of special database being used for sequence submission for corona virus and SARS genome

6. A geneticist sets out an experiment by crossing two strains of *Neurospora crassa* to determine the distance of a gene from its centromere. He finds 100 asci with first-division segregation pattern and 25 asci with a second-division segregation pattern. The map distance from gene to centromere is
- 10 map units
 - 11 map units
 - 12.5 map units
 - 25 map units
7. The following are some of the commonly used stains to determine microorganisms. Identify the **wrong** match from the following:
- Malachite green – Safranin – Used for staining endospores of *Bacillus*.
 - Ziehl-Neelsen technique – Kinyoun technique – Carbol-fuchsin is used as primary stain – Used for staining *Mycobacterium* which have waxy mycolic acids in their cell walls.
 - India ink – Nigrosin – Negative stains (staining around the cells) – Used for staining *Azotobacter* capsule.
 - Tannic acid – Potassium hydroxide – Pararosaniline – Used for staining flagella staining.
8. One newly married couple of the same age group visited a forest in African country where they got some parasitic infection with exactly same symptoms. Both visited the doctor and based upon investigation both declared to be infected with same parasite. The doctor gave them different medicines to both of them. The husband asked to the doctor why you did not give the same medicine to my wife? The doctor replied that medicine which I prescribed you have severe side effect as teratogenic effect. What is this teratogenic effect?
- an agent which disturbs the menstruation cycle and leads to severe vaginal bleeding
 - an agent which does not allow sperm and ova cells to fuse during fertilization
 - an agent that disturbs the development of an embryo of fetus
 - an agent that blocks the production of ova cells
9. Which of the following condition is **true** for reverse phase chromatography?
- The mobile phase is polar and stationary phase is non-polar
 - The mobile phase is non-polar and stationary phase is polar
 - Both the mobile phase and stationary phase are organic
 - Both the mobile phase and stationary phase are inorganic
10. Commonly used negative stains to visualize virus particles in electron microscopy are
- Ammonium sulphate and Polyethylene glycol
 - Uranyl acetate and Phosphotungstic acid
 - Lithium chloride and Calcium chloride
 - Acrylamide and Bis acrylamide

11. A research scholar in a laboratory has isolated mesophyll protoplasts from cowpea plants by using cellulose and pectinase enzyme digestions in the mannitol medium. What is the best stain or dye that can be used for staining living cells?

- A. Methylene blue
 B. Fluoresce diacetate
 C. Bromophenol blue
 D. Tinopal CBS-X

12. Radiation is often categorized as either ionizing or non-ionizing depending on the energy of the radiated particles. A common source of ionizing radiation is radioactive materials that emit α , β , or γ radiation, respectively. Based on the relative abilities of penetration, which type of radiation can be shielded by using an aluminum sheet.

- A. α B. β C. μ D. γ

13. Gas production of a microbial culture can be monitored by suspending a Durham tube in the carbohydrate-containing broth to trap the gas bubbles. If gas is produced, it is typically CO₂ or _____.

- A. O₂ B. H₂ C. NH₃ D. CH₄

14. If 0.1 mL of a culture from a 10^{-6} dilution yielded 38 colonies, how many bacteria were there per mL in the original sample?

- A. 3.8×10^6 B. 3.8×10^7 C. 3.8×10^8 D. 3.8×10^9

15. In the research laboratory, we tried to clone two genes 'A' and 'B' independently into a plasmid for overexpression in *E. coli* and protein purification. All our attempts to clone 'A' were unsuccessful, whereas gene 'B' was cloned easily. When we inserted 'A' into the same plasmid containing 'B', the cloning was successful, and overexpression was achieved. The below statements were proposed to explain this result:

- (i) Protein encoded by 'A' gene is not lethal to *E. coli*
 (ii) 'A' has introns that prevent its expression in *E. coli*
 (iii) Expression of 'A' gene is lethal to *E. coli*
 (iv) The protein encoded by 'B' inhibits the activity of 'A' protein

Which statements are correct to explain the observations?

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

16. Which of the following antibiotics is inhibited by Neomycin Phosphotransferase II?

- A. Ampicillin B. Chloramphenicol
 C. Kanamycin D. Spectinomycin

17. When an infectious agent is analyzed chemically, it was found to contain nitrogen and sulfur but not phosphorous. It is likely to be a

- | | |
|---------------|----------|
| A. Bacterium | B. Virus |
| C. Mycoplasma | D. Prion |

18. Consider the following statements on genetic drift:

- (i) It is significant in small populations
- (ii) It can cause allele frequencies to change in a pre-directed way
- (iii) It can lead to a loss of genetic variation within populations
- (iv) It can cause harmful alleles to become fixed

Which of the above statements are correct?

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

19. If 8 mL of distilled water is added to 2 mL of 95% ethanol, what is the final concentration of ethanol in the solution?

- | | | | |
|-----------|----------|---------|--------|
| A. 0.019% | B. 0.19% | C. 1.9% | D. 19% |
|-----------|----------|---------|--------|

20. In fluorescence microscopy, the molecules that fluoresce:

- A. Absorb at longer wavelength and emit at shorter wavelength
- B. Absorb at shorter wavelength and emit at longer wavelength
- C. Absorb and emit at the same wavelength
- D. The phenomenon of absorption and emission are independent of wavelength

21. Which of the following conditions are required for determination of thermal death time?

- A. Temperature is varied
- B. Time is fixed
- C. Temperature is fixed and time is varied
- D. Temperature is fixed and time is not selected

22. For amplification of GC rich sequences by polymerase chain reaction, identify the reagent that binds and stabilizes AT sequences and destabilizes GC regions.

- A. Tetramethyl ammonium chloride
- B. Betaine
- C. 7-Deaza-2'-deoxyguanosine-5'-triphosphate
- D. Sodium dodecyl sulphate

23. When triacylglycerol is hydrolyzed with a strong base the process is called—

- | | |
|-------------------|-----------------------|
| A. Hydrolysis | B. Hydrogenation |
| C. Saponification | D. β -oxidation |

24. Which statement below is **not true** about fluorescent *in situ* hybridization (FISH)?

- A. FISH is a molecular cytogenetic technique that uses fluorescent probes that bind to only those parts of a nucleic acid sequence with a high degree of sequence complementarity
- B. FISH provides a powerful tool for identifying the location of a cloned DNA sequence on metaphase chromosomes
- C. Using FISH, an investigator cannot identify or track an organism of interest or a domain of interest in a natural sample
- D. FISH can be used to measure gene expression in organisms in a natural sample

25. Match the following:

- | | |
|--------------------------------|--------------------------|
| 1. Differential Centrifugation | i. Amphoteric Molecules |
| 2. Affinity chromatography | ii. Fluorescence |
| 3. Alexander Jablonski | iii. GS-MS |
| 4. Non-volatile compounds | iv. Ligand |
| 5. Isoelectric focusing | v. Sub-cellular particle |
| | vi. LC-MS |

- | | |
|--------------------------------|--------------------------------|
| A. 1-v, 2-iv, 3-ii, 4-iii, 5-i | B. 1-v, 2-iv, 3-ii, 4-vi, 5-i |
| C. 1-i, 2-iv, 3-ii, 4-iii, 5-v | D. 1-iv, 2-i, 3-vi, 4-iii, 5-v |

26. Usually the protein-ligand/drug binding studies are called molecular docking. After successful docking the following result(s) can be noticed.

- | | |
|------------------------|-----------------------|
| I) Free energies | II) Molecular weight |
| III) Binding Constants | IV) Bond interactions |
| A. I, II, III & IV | B. I, II & IV |
| C. II, III & IV | D. I, III & IV |

27. Proteins can be separated from one another on the basis of solubility, size, charge, and binding ability. After a protein has been purified, which of the following method(s) can be used to determine the protein?

- | | |
|--------------------|------------------------|
| I) Western blot | II) Circular Dichroism |
| III) HPLC | IV) Mass spectrometry |
| A. I, II, III & IV | B. I & IV |
| C. II, III & IV | D. I, III & IV |

28. In which phase of growth does the recipient cell takes up the donor DNA?
- | | |
|---------------------------|----------------------------|
| A. Lag phase | B. Early logarithmic phase |
| C. Late logarithmic phase | D. Stationary phase |
29. EMB Agar (Eosin Methylene Blue Agar) is recommended for the isolation and differentiation of Gram negative enteric bacteria from clinical and nonclinical specimens. The green metallic sheen of the colonies is due to
- | |
|---|
| A. Eosin and methylene blue combine to produce a dye complex that precipitates under neutral conditions |
| B. Eosin and methylene blue combine to produce a dye complex that precipitates under acidic conditions |
| C. Only methylene blue gets precipitated under acidic conditions |
| D. Only eosin gets precipitated under neutral conditions |
30. The basis of tuberculin test used to detect *Mycobacterium tuberculosis* infection is
- | |
|--|
| A. Anaphylactic hypersensitivity (Type-1) |
| B. Antibody dependent cytotoxic hyper-sensitivity (Type-2) |
| C. Immune complex mediated hypersensitivity (Type-3) |
| D. Cell mediated delayed hypersensitivity (Type-4) |
31. Mapping of the distances between genes or distances of genes from centromeres or from specific molecular markers measured in terms of base pairs of nucleotides is known as:
- | | |
|------------------------|---------------------|
| A. Genetic Mapping | B. Linkage mapping |
| C. Cytological mapping | D. Physical mapping |
32. The restoring of a mutant phenotype to wild-type by expressing the coding sequence of the gene by its native promoter in the mutant background is termed as:
- | | |
|-----------------------|-------------------------|
| A. Gene recombination | B. Gene silencing |
| C. Gene synthesis | D. Gene complementation |
33. Phase typing is routinely used in clinical microbiology for identification of which of the following pathogen
- | | |
|---------------------------------|-------------------------------|
| A. Enteroviruses | B. <i>Staphylococci</i> |
| C. <i>Plasmodium falciparum</i> | D. <i>Leishmania donovani</i> |
34. Which of the following is a DNA database?
- | | |
|---------|------------|
| A. KEGG | B. ExPASy |
| C. DDBJ | D. PROSITE |

35. In Hershey & Chase experiment with T₂ Bacteriophage, "DNA is the genetic material" in Bacteriophage and not proteins based on only incorporation of ...

- A. Radioactive Sulphur
- B. Radioactive Phosphorus
- C. Radioactive Nitrogen
- D. Radioactive Carbon

Part-B

36. A 'regulon' is defined as

- A. A group of operons or individual genes controlled by a common regulator
- B. A master gene regulating the function of a set of genes
- C. All the regulatory genes of the genome
- D. The genes present in the control region of an operon

37. Read the following statements with regard to chemolithoautotrophic bacteria and identify the **correct** statement

- A. These are a class of bacteria which obtain energy by oxidizing organic compounds, derive electrons from reduced inorganic compounds and grow using CO₂ as the sole source of carbon.
- B. These are a class of bacteria which obtain energy, electrons and carbon from organic sources.
- C. These are a class of organisms that conserve their energy, electrons, and carbon from inorganic chemical sources.
- D. These are a class of bacteria that conserve their energy and electrons from organic sources and carbon from inorganic sources

38. Which of the following disease is also known as Ohio Valley disease?

- | | |
|-------------------|------------------|
| A. Histoplasmosis | B. Aspergillosis |
| C. Plague | D. Schizophrenia |

39. The process of breakdown of glycogen (n) to glucose-1-phosphate and glycogen (n-1) by which glycogen is converted into glucose to provide immediate energy and to maintain blood glucose levels is known as:

- | | | | |
|-----------------|-----------------|----------------|-------------------|
| A. Glycogenesis | B. Glucogenesis | C. Lipogenesis | D. Glycogenolysis |
|-----------------|-----------------|----------------|-------------------|

40. What is amphotericin B?

- A. It is an antibiotic used for leprosy disease caused by *Mycobacterium leprae*
- B. It is an amphoteric compound which can react less as an acid and more as a base
- C. It is an antifungal medicine used to treat fungal infection
- D. It is the name of one of the larval stage of animals that belongs to amphibian class

41. Peptidoglycan of Bacterial cell wall made of N-actyl glucose amine and N-acetyl muramic acid joined by ----- glycosidic bond.

- A. α - 1,4 glycosidic bond
- B. β - 1,4 glycosidic bond
- C. α - 1,6 glycosidic bond
- D. β - 1,6 glycosidic bond

42. In this question, a statement is given, followed by two conclusions. Give answer

Statement: Under optimal conditions, C4 crop species can assimilate CO₂ at rates two to three times greater than that of C3 species.

Assumption 1: Rubisco is present in the leaf bundle sheath cells of C4 plants where concentration of CO₂ may reach to several fold higher than that in C3 plants.

Assumption 2: Unlike C4 plants, photosynthesis of C3 plants is not inhibited by O₂ and they have a very low CO₂ compensation point.

- A. Only assumption 1 is practical
- B. Only assumption 2 is practical
- C. Both assumptions are practical
- D. Neither assumption 1 nor assumption 2 is practical

43. Proton-motive force is created inside the thylakoid membrane, which is a resultant process of protons carried by ...,

- A. Plastoquinone
- B. Pheophytin
- C. Reaction center
- D. Antenna complex

44. Either transfer of pollen grains over long distance partially or fully by bats in mangoes / banana's is commonly termed as...

- A. Malacophily
- B. Cheiropteriphily
- C. Entomophily
- D. Epihydrophily

45. Which of the following cis-acting regulatory element is the preferred binding site of several AP2/EREBP transcription factor members?

- A. AuxRE
- B. HSE
- C. DRE
- D. P1BS

46. Allelomorphic recessive traits of *Pisum sativum* studied for Plant height, Flower color and Seed shape by Mendel are...

- A. Tall, Purple and Round
- B. Dwarf, White and Wrinkled
- C. Tall, White and Wrinkled
- D. Dwarf, Purple and Round

47. Which of the answer is **true** for the given statements on rhizobia-legume symbiosis?

Statement 1: The microsymbionts of 3 genera, including *Rhizobium*, *Bradyrhizobium*, or *Azorhizobium*, collectively called as rhizobia, are associated with root nodules of leguminous plants.

Statement 2: *Parasponia* is a leguminous genus which is known to form root nodules with *Rhizobium* sps.

- A. Statement 1 is false whereas statement 2 is true.
- B. Statement 1 is true whereas statement 2 is false.
- C. Both statements are true.
- D. Both statements are false

48. A few bacteria like *Pseudomonas* can grow on long chain fatty acids as sole carbon and energy source. Assuming that palmitic acid is the sole source of energy, theoretically how many net molecules of ATP can be produced from this $C_{16}H_{32}O_2$ fatty acid.

- A. 108
- B. 106
- C. 104
- D. 102

49. Match the scientists listed in "A" with their respective major research areas listed in "B"

	A		B
a.	David Balcoumbe	i.	CRISPR
b.	Pal Maliga	ii	<i>Agrobacterium</i>
c.	M. Van Montagu	iii	Small RNAs
d.	Jenifer Doudna	iv	Chloroplast transformation

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

50. Identify the mismatches

- i. A neutral stain – Giemsa
- ii. Thermal death time – Time that kills all cells in a given time
- iii. Elek's gel diffusion – Diphtheria toxin
- iv. Ionizing radiation – Infrared radiation

A. i, ii

B. iii, iv

C. ii, iii

D. i, iv

51. The following are some of the major classes of enzymes, their functions and examples. Identify the correct statements from the following:

- I. Oxidoreductases are enzymes which are involved in oxidation and reduction reactions. Oxidases, oxygenases, peroxidases, dehydrogenases and kinases are good examples.
- II. Lyases are enzymes which add the elements of water, ammonia or carbon dioxide to (or from) double bonds. Decarboxylases, aldolases and synthases are good examples.
- III. Ligases are enzymes which join two molecules. Carboxylases and synthetases are good examples.
- IV. Transferases are enzymes which transfer functional groups like ammonia or phosphate. Phosphorylases, methyltransferases, proteases and phosphatases are good examples.

A. I, II

B. III, IV

C. II, III

D. I, IV

52. The following are some of the polar lipids along with their examples. Match the correct example(s) for the polar lipids

Polar lipids		Example
I.	Phospholipids	a. Lecithin
II.	Sphingolipids	b. Cephalin
		c. Cardiolipin
		d. Cereborosides
A. a and d are phospholipids while b and c are sphingolipids		
B. a, b and d are phospholipids while c is sphingolipid		
C. a, b and c are phospholipids while d is sphingolipid		
D. d is phospholipid while a is sphingolipid		

53. Which is the precursor for the synthesis of Glycine and Cysteine?

A. α -ketoglutarate

B. Pyruvate

C. 3-Phosphoglycerate

D. Ribose 5-phosphate

54. Plants and microorganisms have the unique ability to produce terpenoid lipids. Identify the **correct** statement from the following about their biogenesis

- A. Plants have only mevalonate pathway while microorganisms have both mevalonate and methylerythritol phosphate pathways.
- B. Plants have both mevalonate and methylerythritol phosphate pathways while microorganisms have only methylerythritol phosphate pathway.
- C. Both plants and microorganisms have both mevalonate and methylerythritol phosphate pathways.
- D. Plants have both mevalonate and methylerythritol phosphate pathways while microorganisms have only mevalonate pathway.

55. The following are some of the disaccharides which on hydrolysis yield two molecules of monosaccharides. Identify the **wrong** matches from the following:

- I. Trehalose - Glucose + Glucose - α -1, 6 glycosidic bond
- II. Maltose - Glucose + Glucose - α -1, 4 glycosidic bond
- III. Lactose - Glucose + Galactose - β -1, 4 glycosidic bond
- IV. Isomaltose - Glucose + Glucose - β -1, 6 glycosidic bond

- A. I, II B. III, IV C. II, III D. I, IV

56. Read the following statements and reason carefully with regard to facultative anaerobic bacteria and identify the **correct** answer

Statement: These are bacteria which ordinarily grow under aerobic environments but can also grow in the absence of oxygen. A good example of this is *Escherichia coli* which has chosen its life style to grow under both oxic and anoxic environments.

Reason: Bacteria like *E. coli* has versatile metabolism deriving energy (ATP) using aerobic respiration where oxygen is used as terminal electron acceptor, while energy is derived through fermentation under anaerobic conditions which explains its facultative adaptation.

- A. Both statement and reason are correct and the reason explains the statement.
- B. Only the statement is correct and the reason is not explaining the statement.
- C. Both statement and reason are incorrect
- D. Statement is incorrect and reason is correct explanation.

57. Transgenic expression of the ribonuclease *barnase* gene under the control of anther or pollen-specific gene promoter has been proved to be a good approach for production of engineered male sterile plants in crop species. The source of barnase gene has been

- A. *Bacillus thuringiensis* B. *Bacillus amyloliquefaciens*
C. *Bacillus subtilis* D. *Streptomyces hygroscopicus*

58. A cross is made between two strains of yeast viz., $ura3\ lys4^- \times ura3^+ lys4^+$. What will the spore genotypes be in unordered tetrads that are non-parental ditypes?

- A. $ura3\ lys4^-; ura3^+ lys4^+; ura3^+ lys4^-; ura3\ lys4^+$
B. $ura3\ lys4^-; ura3\ lys4^-; ura3^+ lys4^+; ura3^+ lys4^+$
C. $ura3\ lys4^+; ura3\ lys4^+; ura3^+ lys4^-; ura3^+ lys4^-$
D. $ura3\ lys4^-; ura3\ lys4^-; ura3^+ lys4^-; ura3^+ lys4^+$

59. Consider the following statements of COVID-19 caused by a novel corona virus (SARS-CoV-2) and choose the **correct** options.

- I. It emerged in Wuhan in China
II. Bat has been suspected as a natural host of virus origin
III. SARS-CoV-2 virus is an enveloped negative-sense RNA virus
IV. Genome of SARS-COV-2 contains variable number (6-11) of open reading frames

- A. Statements I, II and III are correct
B. Statements I, III and IV are correct
C. Statements I, II and IV are correct
D. Statements II, III and IV are correct

60. Which crop plant is **not** a product of genetic engineering?

- A. Golden Rice B. IR-8
C. Bt cotton D. Roundup Ready

61. Formyl methionine tRNA is present in

- A. Yeast B. Bacteria
C. Insects D. Mammals

62. Match the following using the codes given below:

- | | |
|-------------------|---------------------------------|
| 1. Whooping cough | (a) <i>Treponema pallidum</i> |
| 2. Syphilis | (b) <i>Borrelia burgdorferi</i> |
| 3. Gastric ulcers | (c) <i>Bordetella pertussis</i> |
| 4. Lyme disease | (d) <i>Helicobacter pylori</i> |

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

63. The dye eosinate of methylene blue belongs to which group?

- | | |
|----------------|----------------|
| A. Acidic dye | B. Basic dye |
| C. Neutral dye | D. Oxazine dye |

64. Match the following using the codes given below:

- | | |
|-----------------|---------------------------------|
| 1. Vancomycin | (a) Folic acid metabolism |
| 2. Trimethoprim | (b) Protein synthesis |
| 3. Rifampin | (c) Cell wall biosynthesis |
| 4. Amikacin | (d) DNA-directed RNA polymerase |

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

65. The outer membrane of the Gram-negative cell wall is anchored to the underlying peptidoglycan by means of which of the following?

- | | |
|------------------------|-----------------------|
| A. Braun's Lipoprotein | B. Phospholipids |
| C. Proteins | D. Lipopolysaccharide |

66. Which statement among the following is true to Archaea?

- A. They have N-acetylglucosamine and N-acetylmuramic acid as repeating alternate units in the backbone
- B. They have D and L amino acids as part of the short peptide chain
- C. They have adhesion sites joining the outer membrane and the plasma membrane
- D. They have membrane lipids whose side chains are composed of repeating units of the isoprene

67. The unique feature of Mycoplasmas which distinguishes them from other prokaryotes is:

- A. Presence of chitin in cell walls
- B. Presence of murein in cell walls
- C. Presence of peptidoglycan cell wall
- D. Absence of cell wall

68. Proteins are synthesized by the translation of mRNAs into polypeptides on ribosomes. In most cases, the initial polypeptide-translation product undergoes some type of modification before it assumes its functional role in a living system. These changes are broadly termed as—

- | | |
|----------------------------|------------------------------------|
| A. Mutation | B. Enzymatic modification |
| C. Oxidation and reduction | D. Posttranslational modifications |

69. An enzyme inhibitor is a molecule that disrupts the normal reaction pathway between an enzyme and a substrate. Which of the statement(s) is/are true in connection with the enzyme inhibition

- I) Reversible can be competitive or non-competitive
- II) It is always reversible
- III) It may be reversible or irreversible
- IV) It is always non-covalent interactions

A. I & III

B. I, II & IV

C. I, II, III & IV

D. I, III & IV

70. Sequence-specific RNA degradation process that targets foreign RNA is termed as RNA silencing. The foreign RNA includes: viral RNA, transposon RNA, dsRNA, etc, However, this phenomenon in fungi is called as

- A. Post transcriptional gene silencing
- C. Tilling

- B. Quelling
- D. RNA interference

-----//END//-----

University of Hyderabad
Entrance Examinations - 2020

School/Department/Centre
Course/Subject

: Department of Plant Sciences, School of Life Sciences
: Ph.D. Microbiology

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
1	A	26	D	51	C	76	
2	C	27	B	52	C	77	
3	D	28	C	53	C	78	
4	D	29	B	54	C	79	
5	C	30	D	55	D	80	
6	A	31	D	56	A	81	
7	D	32	D	57	B	82	
8	C	33	B	58	C	83	
9	A	34	C	59	C	84	
10	B	35	B	60	B	85	
11	B	36	A	61	B	86	
12	B	37	C	62	B	87	
13	B	38	A	63	C	88	
14	C	39	D	64	B	89	
15	D	40	C	65	A	90	
16	C	41	B	66	D	91	
17	D	42	A	67	D	92	
18	D	43	A	68	D	93	
19	D	44	B	69	A	94	
20	B	45	C	70	B	95	
21	C	46	B	71		96	
22	B	47	B	72		97	
23	C	48	B	73		98	
24	C	49	C	74		99	
25	A	50	D	75		100	

Note/Remarks : --

Signature  25/09/2020
School/Department/Centre

अध्यक्ष / HEAD

वनस्पति विज्ञान विभाग / Dept. of Plant Sciences
जैविक विज्ञान संकाय / School of Life Sciences
हैदराबाद विश्वविद्यालय / University of Hyderabad
हैदराबाद / Hyderabad-500 046, भारत / INDIA