

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA, VADODARA

Ph. D. ENTRANCE TEST (PET) – 7<sup>th</sup> August 2022

Signature of Invigilator

Roll.  
No.

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Paper - II  
Life Sciences (22/24)

Maximum Marks: 50

No. Of Printed Pages: 8

Instruction for the Candidate:

1. This paper consists of **FIFTY (50)** multiple choice type questions. Each Question carries **ONE (1)** mark.
2. There is no Negative Marking for Wrong Answer.
3. A separate OMR Answer Sheet has been provided to answer questions. Your answers will be evaluated based on your response in the OMR Sheet only. No credit will be given for any answering made in question booklet.
4. Defective question booklet or OMR if noticed may immediately replace by the concerned invigilator.
5. Write roll number, subject code, booklet type, category and other information correctly in the OMR Sheet else your OMR Sheet will not be evaluated by machine.
6. Select most appropriate answer to the question and darken appropriate oval on the OMR answer sheet, with black / blue ball pen only. **DO NOT USE PENCIL** for darkening. In case of over writing on any answer, the same will be treated as invalid. Each question has exactly one correct answer and has four alternative responses (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.  
**Example:** (A) (●) (C) (D) where (B) is correct response.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. Calculators, Log tables any other calculating devices, mobiles, slide rule, text manuals etc are **NOT** allowed in the examination hall. If any of above is seized from the candidates during examination time; he/ she will be immediately debarred from the examination and corresponding disciplinary action will be initiated by the Center Supervisor as deemed fit.
10. **DO NOT FOLD** or **TEAR** OMR Answer sheet as machine will not be able to recognize torn or folded OMR Answer sheet.
11. **You have to return the OMR Answer Sheet to the invigilator at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet on conclusion of examination.



**Paper - II**  
**Life Sciences (22/24)**

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- 01) The sequence of a protein can be known by using two methods, by sequencing protein or by sequencing DNA of the gene encoding the protein of interest. However, protein sequencing does not have which advantage over DNA sequencing?
- A) It reveals the presence of unusual amino acids
  - B) It is easy and fast
  - C) It reveals the position of disulphides
  - D) It reveals the position of exons and introns
- 02) Name the protein that has triple helix structure from the following?
- A) Alpha Keratin
  - B) Silk fibroin
  - C) Collagen
  - D) Elastin
- 03)

- 15) Which of the following version of BLAST queries protein sequence to nucleotide sequence database with the sequences translated in all six frames?  
 A) BLASTP  
 B) BLASTX  
 C) TBLASTN  
 D) TBLASTX
- 16) Dendrimers are formed from following material  
 A) Carbon  
 B) Organic  
 C) Cyclodextrin  
 D) Liposomes
- 17) Which of the following protein act as cellular thermometer?  
 A) DnaK  
 B) DnaJ  
 C) FtsH  
 D) GroES
- 18) Which of the following was used by Hershey and Chase to prove that DNA is the genetic material?  
 A) Bacteriophage  
 B) Viroid  
 C) Fungus  
 D) Bacterium
- 19) Which one of the following is the selective medium used for growth of sore throat causing pathogenic Streptococci?  
 A) Blood agar  
 B) Eosin Methylene Blue agar  
 C) Baird Parker agar  
 D) Lowenstein Jensen agar
- 20) Which of the following is an example of non selective anaerobic growth medium:  
 A) EMB Agar  
 B) MacConkey Agar  
 C) Robertson cooked meat medium  
 D) Wilson Blair medium
- 21) Which polymerase has made widespread use of PCR possible?  
 A) DNA polymerase I  
 B) DNA polymerase III  
 C) Taq polymerase  
 D) Pfu polymerase
- 22) When DNA from a target organism is purified, cut with a specific restriction endonuclease, then the fragments are joined into a plasmid vector to make a DNA library, the process is called :  
 A) PCR identification.  
 B) gene amplification.  
 C) shotgun cloning.  
 D) mass screening.
- 23) In a typical fermenter, the function of the sparger is to  
 A) provide steam in the fermentor during sterilization.  
 B) provide additional nutrients so that growth may ensue.  
 C) provide for proper cooling of the fermentor.  
 D) provide a source of small air bubbles to help oxygenate the medium.
- 24) What are organisms that obtain energy from the oxidation of inorganic compounds called?  
 A) Chemoautotrophs  
 B) Chemoorganotrophs  
 C) Chemolithotrophs  
 D) Chemoheterotrophs
- 25) An organism that oxidizes glucose for its energy in the presence of sunlight would be a/an \_\_\_\_\_.  
 A) Chemoorganotroph  
 B) Photoheterotroph  
 C) Chemolithotroph  
 D) Mixotroph
- 26) In a normal distribution all the three measures of central tendency fall at the same place. In a positively skewed distribution the first measure of central tendency coming is:  
 A) Median  
 B) Mode  
 C) Mean  
 D) Variance
- 27) Probability distribution applied to find out number of printing mistakes on a printed page is  
 A) Binomial  
 B) Normal  
 C) Polynomial  
 D) Poisson
- 28) Mechanical anisotropy of cell walls may get affected by  
 A) Hemicellulose content  
 B) Pectin de-methyl esterification  
 C) Cellulose content  
 D) Cellulose reorientation
- 29) In biochemical reactions, Thermodynamics does not say about:  
 A) Energy utilized  
 B) Energy released  
 C) Energy balance  
 D) Rate of reaction

- 30) One of these interactions (bonding) has the lowest strength
- Van der Waals
  - H-bond
  - Ionic bond
  - Covalent bond
- 31) AMP and MAP kinases are possible signalling intermediates in one of these Phytohormone induced cell division
- BA
  - JA
  - ABA
  - IAA
- 32) Calcium ion permeable channels in the plasma membrane of guard cells are activated by
- IAA
  - BA
  - ABA
  - GA
- 33) Strigolactones promote root associations with
- Bacteria
  - Virus
  - Nostoc
  - AM fungi
- 34) In the regulation of cell elongation, Auxin and ABP1 re-orient microtubules from
- Vertical to transverse
  - Transverse to longitudinal
  - Longitudinal to transverse
  - Transverse to transverse
- 35) Triple response during seed germination is because of
- Auxin
  - Cytokinin
  - Ethylene
  - Gibberellin
- 36) Obligately placed superior ovary is a characteristic feature of the family
- Fabaceae
  - Asteraceae
  - Brassicaceae
  - Solanaceae
- 37) Adherent junction consists of the transmembrane glycoprotein named as \_\_\_\_\_, which joins the adjacent cells.
- Keratin
  - Hyalin
  - Cadherin
  - Fibrin
- 38) In human skin, the correct pattern of arrangement for epithelial cells is defined as \_\_\_\_\_.
- Stratum basale>Stratum spinosum>Stratum granulosum>Stratum lucidum > Stratum corneum
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- 39) The spread of cancer from one part of the body to another is termed as:
- Peristalsis
  - Epistasis
  - Metastasis
  - Thrombosis
- 40) Muscles have energy reserves in the form of \_\_\_\_\_.
- ATP
  - ADP
  - Creatine Phosphate
  - GTP
- 41) Which level of taxonomy includes the study of evolutionary processes and patterns?
- Alpha
  - Beta
  - Gamma
  - Delta
- 42) In the five-kingdom classification, which kingdom displays conjugation, transformation, and transduction as modes of genetic recombination?
- Protista
  - Fungi
  - Monera
  - Plantae
- 43) Sharks do not face water balance issues despite their life in the deep sea because \_\_\_\_\_.
- They do not allow water entry or exit from the surrounding atmosphere.
  - They store Urea in the bloodstream to maintain the osmolarity and water balance.
  - They lack Urea or other waste forms hence osmolarity, and water balance is not required.
  - They have water-resistant skin.
- 44) When a typical lobopodium begins to form, an extension of ectoplasm called a \_\_\_\_\_ appears, and endoplasm begins to flow in it.
- Actin cap
  - Podium cap
  - Hyaline cap
  - Myosin cap

- 45) Which of the following is not an excretory organ?  
A) Malpighian tubules  
B) Antennal glands  
C) Kidneys  
D) Spicules
- 46) Which of the following is mismatched?  
A) Pinctada- Devilfish  
B) Laccifer- Lac insect  
C) Remora- Suckerfish  
D) Echinoidea- Seaurchin
- 47) Annelida has \_\_\_\_\_ larval form during development.  
A) Trichonymph  
B) Trochophore  
C) Caterpillar  
D) Bipinnaria
- 48) Of the various cell movements observed during gastrulation, splitting of cells to form two or more parallel sheets, and forming multiple layers of epithelium is observed in \_\_\_\_\_.  
A) Ingression  
B) Delamination  
C) Epiboly  
D) Invagination
- 49) The membrane enclosing the egg cytoplasm regulates the flow of specific ions during fertilization and must be capable of fusing with the sperm cell membrane. In invertebrates, this structure is usually called the \_\_\_\_\_.  
A) Chorion  
B) Axoneme  
C) Acrosomal vesicle  
D) Vitelline envelope
- 50) In Drosophila egg, karyokinesis occurs without cytokinesis. This creates a \_\_\_\_\_, which is a single cell with multiple nuclei.  
A) Cellular blastoderm  
B) Syncytium  
C) Pole cells  
D) Cephalic furrow

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**Rough Work:**