Sr. No. 005

ENTRANCE TEST-2022

SCHOOL OF BIOLOGICAL SCIENCES

BIORESOURCES

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series A

Roll No. : | | | | | | |

Instructions for Candidates :

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1. For producing 100 pollen grains, how many Microspore Mother Cells (MMCs) are required ?
   (A) 75
   (B) 100
   (C) 25
   (D) 50

2. The process of double fertilization refers to the formation of zygote and endosperm by the fusion of :
   (A) Two eggs
   (B) Two eggs and polar nuclei with pollen nuclei
   (C) One male gamete with egg and other with synergid
   (D) One male gamete with egg and other with two polar nuclei

3. Which of the term applies to the development of young within the female where it receives nourishment from blood through placenta ?
   (A) Oviparity
   (B) Ovoviparity
   (C) Viviparity
   (D) Ovovoparity

4. The fertilization of the egg in human female normally occurs in Fallopian tubes and during this process the Sperm Lysin helps in the penetration of sperm into an egg, this enzymatic substance is also known as :
   (A) Hyaluronidase
   (B) Androgamone
   (C) Cytogamone
   (D) Hyaluronic Acid

5. Labeling a specimen is an important practice in research and which amongst the below mentioned information's is not carried on the label of a herbarium sheet :
   (A) Collection date
   (B) Plant height
   (C) Local name
   (D) Collectors name

6. Biogeographic regions provide valuable information to the scientists for understanding the distribution of organisms and ecosystem and India has been divided into how many biogeographic zones :
   (A) 5
   (B) 12
   (C) 10
   (D) 8

7. The organization which publishes a "Red List" by compiling this information from a network of conservation organizations to rate the most endangered species :
   (A) IUCN
   (B) WWF
   (C) UNEP
   (D) WCMC

8. Conservation methods are adopted to limit the extinction of biodiversity and which one of these methods is an example of ex-situ conservation ?
   (A) Wildlife Sanctuary
   (B) Sacred Groove
   (C) National Park
   (D) Seed Bank

9. Single Cell Protein (SCP) is a dried form of protein extracted from [illegible]
   (A) Algae
   (B) Yeast
   (C) Bacteria
   (D) All of these

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10. Yeast produce enzymes which turn sugar in bread dough into ethanol and carbon dioxide and the rise in bread is due to :
(A) Oxygen
(B) Ethanol
(C) Carbon dioxide
(D) None of these

11. Penicillin the first true antibiotic used to treat bacterial infections which was discovered accidently by :
(A) Alexander Fleming
(B) Robert Hooke
(C) Louis Pasteur
(D) Edward Jenner

12. "COVID-19" is an infectious disease caused by the SARS-CoV-2 virus and the 19 in it refers to as :
(A) 19 Variants of Coronavirus
(B) 19 Symptoms of the Coronavirus disease
(C) 19th Coronavirus Pandemic
(D) The Coronavirus and the disease it causes were identified in 2019

13. The classification of the maize grain type "Pop Corn" is :
(A) *Zea mays* indurate
(B) *Zea mays* everta
(C) *Zea mays* indentata
(D) *Zea mays* ceretina

14. Agriculture originated in a few small hubs around the world, but probably first in :
(A) China
(B) Ethiopia
(C) Fertile Crescent
(D) Far east Asia

15. Jute is a long, soft, shiny fiber, that can be spu into coarse, strong threads is obtained from th cultivated *Corchorus* sp. is a :
(A) Primary xylem
(B) Primary Phloem
(C) Secondary xylem
(D) Secondary Phloem

16. The Botanical name of the perennial medicinal plant locally called as "kahzaban" is :
(A) *Aconitum hetophylum*
(B) *Arnebia benthamii*
(C) *Taraxacum officinale*
(D) *Podophylum hexandrum*

17. Which amongst these techniques was used for creating "Dolly" the first cloned sheep ?
(A) Germinal Cell Transfer
(B) Gene Transfer
(C) Somatic Cell Transfer
(D) Nuclear Transfer

18. The Lactose found in milk is a disaccharide composed of :
(A) Maltose and Glucose
(B) Glucose and Galactose
(C) Glucose and Fructose
(D) Glucose and Sucrose

19. The act mating in sheep is called as :
(A) Tupping
(B) Kidding
(C) Coupling
(D) Serving

20. Milk is a nutrient-rich liquid which is primary source of nutrition to our young ones because it is an excellent source of :
(A) Vitamin A
(B) Phosphorus
(C) Calcium
(D) All of these

21. Water has an excellent ability to absorb heat without changing its own temperature. It has higher specific high and latent heat of vaporization. It helps organisms to buffer temperature fluctuations and cool themselves. These unusual thermal properties of water are because of :
(A) Extensive hydrogen bonding in water
(B) Bent structure of water molecule
(C) High dielectric constant of water
(D) None of these

22. In liquid water each water molecules hydrogen bonds with an average of 3.4 other molecules, where bonds are broken and formed very quickly. In these flickering clusters of water averge life of each hydrogen bond is :
(A) 1-20 seconds
(B) 1-20 minutes
(C) 1-20 picoseconds
(D) 1-5 minutes.

23. Which amongst these biomolecules is the major source of energy to living organisms ?
(A) Amino acids
(B) Lipids
(C) Carbohydrates
(D) Proteins

24. The solution having a pH of 6.0, will have the :
(A) Number of hydrogen ions equal to the number of hydroxyl ions
(B) Number of hydrogen ions less than the number of hydroxyl iohs
(C) Number of hydrogen ions greater than the number of hydroxyl ions
(D) None of these

25. The characteristic of plasma membrane is tha
(A) It is Selectively Permeable
(B) It is Inflexible
(C) It is a Lipid bilayer with Phospholipids a Cholesterol only
(D) It is a Lipid bilayer with Phospholipids a proteins only

26. Which amongst the following has a nucleus ?
(A) Blue green Algae
(B) Bacteria
(C) Mycoplasma
(D) Amoeba

27. An organelle is a subcellular structure that one or more specific jobs to perform in the and which among these organelle is also kno as "Palade Particle" :
(A) Endoplasmic Reticulum
(B) Golgi Apparatus
(C) Ribosome
(D) Lysosome

28. The location of the constricted reg "centromere" in the metacentric chromosome
(A) At the end of the chromosome
(B) Off-Centre leading to shorter p arm tha arm
(C) In the Middle of the chromosome
(D) Off-set from the centre leading to m shorter p arm

29. Which of the following is true for gibberelli
(A) Gibberellins Influence Floral Determination
(B) Gibberellin can substitute for requirement for flowering in many plar
(C) Gibberellin causes stimulation of fruit
(D) All of these

30. Growth regulators controlling plant growth and development are called as phytohormones and which amongst the following is not a phytohormone ?
(A) Brassinosteroid
(B) Salicylic Acid
(C) Corticosteroid
(D) Polyamines

31. Which hormone is responsible for automatic physiological reaction "fight or flight" that is perceived as stressful or frightening ?
(A) Melatonin
(B) Insulin
(C) Epinephrine
(D) Progesterone

32. Which amongst these is not an endocrine gland ?
(A) Lacrimal
(B) Adrenal
(C) Thyroid
(D) Pituitary

33. Transpiration ratio defined as the amount of water transpired by the plant, divided by the amount of carbon dioxide assimilated by photosynthesis is highest for :
(A) C_3 plants
(B) C_4 plants
(C) CAM plants
(D) All plants have same

34. Oxygen evolving complex is associated with :
(A) Photosystem I
(B) Photosystem II
(C) ATP synthase
(D) None

35. During calvin cycle CO_2 is accepted by ribulose-1,5-bisphosphate. As a result the first stable intermediate formed is :
(A) 3-phosphoglycerate
(B) Oxaloacetic acid
(C) Malate
(D) Pyruvic acid

36. In photorespiration the glycine decarboxylase multienzyme complex catalyses the conversion of two molecules of glycine and one of NAD^+ to one molecule each of serine, NADH, $NH4^+$ and CO_2 in :
(A) Chloroplast
(B) Mitochondria
(C) Peroxisomes
(D) Golgi

37. Which amongst the following groups represent the simplest form of carbohydrates ?
(A) Aldehyde and Ketone groups
(B) Carboxyl groups
(C) Alcohol and Carboxyl groups
(D) Hydroxyl groups and Hydrogen groups

38. Starch is polymeric carbohydrate which is composed of linear and branched chains of :
(A) Amylopectin and glycogen
(B) Amylose and glycogen
(C) Amylose and Amylopectin
(D) Amylose and Amylopectin and glycogen

39. Rancidity of lipids of lipid-rich foodstuff is because of :
(A) Hydrogenation of unsaturated fatty acids
(B) Oxidation of fatty acids
(C) Reduction of fatty acids
(D) Dehydrogenation of saturated fatty acids

40. The degree of unsaturation of lipids can be measured as :
(A) Polenske number
(B) Saponification number
(C) Reichert Meissel number
(D) Iodine number

41. The first protein which was sequenced by an English biochemist "Frederick Sanger" was :
(A) Haemoglobin
(B) Myoglobin
(C) Insulin
(D) Actin

42. Which amongst the following diseases is the severe form of malnutrition due to protein deficiency ?
(A) Hypothyroidism
(B) Rickets
(C) Kwashoirkor
(D) Anaemia

43. Apoenzyme is important for enzymatic activity and is responsible for specificity of enzymes to their substrates, it is actually a :
(A) Non-protein group of an enzyme
(B) Protein portion of an enzyme
(C) Biologically active conjugated enzyme
(D) None of the above

44. The pancreas organ plays essential role in converting the food into fuel for body cells by secreting natural juices containing :
(A) Lipase
(B) Protease
(C) Amylase
(D) All of the above

45. Enzymes are biological catalysts that enhance the rate of reaction by :
(A) Lowering free energy of reactants
(B) Increasing free energy of products
(C) Lowering activation energy
(D) All of these

46. Colour blindness in humans is an inability to perceive differences between some or all colours and the hereditary disorder is due to a recessive trait linked to :
(A) X chromosome
(B) Y chromosome
(C) Z chromosome
(D) None of these

47. Cytoplasmic Male Sterility (CMS) is a condition under which plants are unable to produce functional pollen and it is a valuable tool for producing hybrid seed in :
(A) Cross pollinating species
(B) Self pollinating species
(C) Both (A) and (B)
(D) None of these

48. The enzyme which breaks the hydrogen bonds in the DNA :
(A) Polymerase
(B) Ligase
(C) Helicase
(D) Topoisomerase

49. The bases are held together in a DNA double helix by hydrogen bonds. These bonds are :
(A) Non-covalent bonds
(B) Covalent bonds
(C) Ionic bonds
(D) van der Waals forces

The percentage of the human genome encoding proteins is approximately :

(A) 20
(B) 5
(C) 2
(D) 99

The nature of structural genes of lac operon that transcribes mRMA is :

(A) Monocistronic
(B) Replicative
(C) Monokaryotic
(D) Polycistronic

Genes which are active all the time synthesizing substances needed by the cell are called :

(A) Metabolic genes
(B) Housekeeping genes
(C) Control genes
(D) Dominant genes

3. The two core techniques that enabled the birth of modern biotechnology are :

(A) Red and green biotechnology
(B) Genetics and Mathematics
(C) Genetic Engineering and Maintenance of a sterile environment
(D) Classical and Traditional biotechnology

54. The Plasmid DNA used for transferring novel piece/s of DNA attached to it into the host organism is called as :

(A) Carrier
(B) Protein
(C) Antibody
(D) Vector

55. The making of multiple copies of the desired DNA template is called as :

(A) Cloning
(B) Transferring
(C) r-DNA Technology
(D) Genetic Engineering

56. In the technique of Southern blotting there is :

(A) Attachment of probes to DNA fragments on electrophoretic gel
(B) Transfer of DNA fragments from electrophoretic gel to a nitrocellulose membrane
(C) Transfer of DNA fragments to electrophoretic gel from cellulose membrane
(D) Comparison of DNA fragments to two sources

57. The Polymerase Chain Reaction (PCR) is a technique used to amplify DNA sequences and it was invented by :

(A) Fredric Sanger
(B) Boyer
(C) Kary Mullis
(D) Cohn

58. Transgene is a gene transferred by genetic engineering techniques from one organism to another and its expression in the target tissue is identified by a :

(A) Transgene
(B) Promoter
(C) Enhancer
(D) Reporter

59. Respiration and photosynthesis are central to this process :

(A) Nitrogen Cycle
(B) Carbon Cycle
(C) Phosphorus Cycle
(D) Sulphur Cycle

60. Which amongst the following processes provide both energy and manure ?

(A) Burning of wood
(B) Pyrolysis of wood
(C) Gasification of wood
(D) Biogas formation

Sr. No. .....

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Question Booklet Series **A**

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1. Which among the following is a biodiversity hotspot in India?

(A) Andes Mountains

(B) Western Ghats

(C) Thar Desert

(D) All the above

2. The Red Data book published by IUCN contains,

(A) List of new species

(B) List of plants with red pigment

(C) Threatened plant and animal species

(D) Economically important species

3. The pyramid of number in a grassland ecosystem will be,

(A) Inverted

(B) Upright

(C) Linear

(D) None of the above

4. The components of a functional ecosystem include,

(A) Producers, consumers and decomposers

(B) Producers and consumers only

(C) Consumers and decomposers only

(D) Human beings, plants and animals

5. The Centre of Origin of Wheat is,

(A) South-East Asia

(B) South-West Asia

(C) North America

(D) North Africa

6. *Arnebia benthami* belongs to the family,

(A) Fabaceae

(B) Ranunculaceae

(C) Boraginaceae

(D) Solanaceae

7. The term "deadly nightshade" is common name of,

(A) *Atropaacuminate*

(B) *Arnebiabenthami*

(C) *Saussuriacostus*

(D) *Daturastramonium*

8. Which plant part is medicinally most important in Saussuria costus

(A) Leaf

(B) Flower

(C) Seed

(D) Root

9. The spinning of silk by silkworm larva occurs in the following manner,

(A) Inside to outside

(B) Outside to inside

(C) Randomly in all directions

(D) None of the above

10. For livestock improvement, outbreeding is an important strategy, because it helps in,

(A) Overcoming inbreeding depression

(B) Producing purelines of animals

(C) Selection of inferior breeds

(D) Improving lifespan of animals

11. The genetic basis of heterosis can be explained by,

(A) Dominance

(B) Over-dominance

(C) Epistasis

(D) All the above

12. The technique of multiple ovulation Embryo transfer technology (MOET) has been successfully demonstrated in,

(A) Cattle

(B) Sheep

(C) Both (A) and (B)

(D) Neither (A) nor (B)

13. Which among the following is characteristic of Tobacco Mosaic Virus (TMV)?

(A) Rod shaped and RNA

(B) Oval shaped and DNA

(C) Spherical and RNA

(D) Rod shaped and DNA

14. The conjugation in bacteria was discovered by,

(A) Watson and Crick

(B) Robert Koch

(C) Lederberg and Zinder

(D) Lederberg and Tatum

15. Which of the following antibiotics functions as protein synthesis inhibitor?

(A) Penicillin

(B) Cefotaxime

(C) Tetracycline

(D) All the above

16. The antibiotic erythromycin is produced by,

(A) *Streptomycesgriseus*

(B) *Streptomyceserythreus*

(C) *Streptomycesaureofaciens*

(D) *Streptomycesvenezuelae*

17. The third law of thermodynamics was proposed by,

(A) Isaac Newton

(B) William Thomson

(C) Rudolf Clausius

(D) Walther Nernest

18. What is the value of ΔG when the system is in equilibrium?

(A) $\Delta G > 1$

(B) $\Delta G < 1$

(C) $\Delta G = 0$

(D) $\Delta G = 1$

19. In a fully turgid cell, the following is zero,

(A) Osmotic Pressure

(B) Diffusion Pressure Deficit

(C) Turgor Pressure

(D) All the above

20. The Nobel Prize for demonstration of ATP as the universal carrier of chemical energy in the cell was given to,

(A) Wilhelm Rontgen

(B) Karl Lohmann

(C) Fritz Lipman

(D) Michael Houghton

21. Which of the following statement is not true about the cell wall?

(A) Made up of cellulose

(B) Provides mechanical support

(C) Maintains cell shape

(D) Contains a phospholipid bilayer

22. The cristae in mitochondria act as the sites for,

(A) Protein synthesis

(B) Lipid synthesis

(C) Oxidation-reduction reaction

(D) None of the above

23. The small subunits of 70s and 80s ribosomes respectively are,

(A) 30s & 50s

(B) 30s & 40s

(C) 40s & 60s

(D) 40s & 30s

24. A histone octamer comprises of following components,

(A) 2H2A & 2H2B

(B) 2H3 & 2H4

(C) 1H2A, 1H2B, 1H3 & 1H1

(D) None of the above

25. Which among the following is true about a cleistogamous flower?

(A) Male and female gametes of same flower take part in fertilization

(B) Male and female gametes of different flowers take part in fertilization

(C) Male and female flowers are produced separately on same plant

(D) Male and female flowers are produced on different plants

26. How many microspore mother cells will produce 800 microspores presuming normal microsporogenesis?

(A) 100

(B) 200

(C) 400

(D) 800

27. In humans, the egg is liberated from ovary in the following stage,

(A) Primary oocyte stage

(B) Secondary oocyte stage

(C) Early follicular stage

(D) None of the above

28. A test-tube baby is produced by,

(A) Both fertilization of egg and development of embryo in the uterus

(B) Both fertilization of egg and development of embryo in the test-tube

(C) Fertilization of egg in-vitro and transfer of embryo in the uterus

(D) Fertilization of egg in uterus and transfer of embryo in the test-tube

29. The following is not a function of auxin hormone,

(A) Rooting

(B) Callus formation

(C) Apical dominance

(D) Induction of dormancy

30. The major hormone responsible for seed germination is,

(A) Auxin

(B) Gibberellin

(C) Cytokinin

(D) Ethylene

31. Which among the following is not an endocrine gland?

(A) Pituitary gland

(B) Thyroid gland

(C) Salivary gland

(D) Parathyroid gland

32. The parathyroid gland produces following hormone,

(A) Thyroxine

(B) Melatonin

(C) Adrenalin

(D) Parathyroid hormone

33. Non-cyclic photophosphorylation results in the production of,

(A) NADPH

(B) ATP

(C) Malic acid

(D) Both (A) and (B)

34. Among C4 plants, the first acceptor of CO_2 is,

(A) Phosphoenol-pyruvate

(B) Oxalo-acetate

(C) Malic-acid

(D) None of the above

35. Which among the following is end product of glycolysis?

(A) Ascorbic acid

(B) Pyruvic acid

(C) Glucose-1-phosphate

(D) Citric acid

36. The enzymes of β-oxidation are present in,

(A) Chloroplast

(B) Endoplasmic reticulum

(C) Mitochondria

(D) Golgi apparatus

37. What is the general formula for carbohydrates?

(A) $(CH_2O)n$

(B) $(C_6H_{12}O_6)n$

(C) $(CH_2\text{-}COOH)n$

(D) None of the above

38. The carbon chain of saturated fatty acids possess,

(A) Single bonds

(B) Double bonds

(C) Triple bonds

(D) All the above

39. Which among the following is a structural polysaccharide?

(A) Glycogen

(B) Cellulose

(C) Chitin

(D) Both (B) & (C)

40. Which statement is true about fatty acids if the number of carbon atoms increases in a fatty acid chain?

(A) Boiling point will increase

(B) Boiling point will decrease

(C) Melting point will increase

(D) Melting point will decrease

41. The enzymes that catalyze the reaction involving transfer of hydrogen atoms from organic compounds to electron acceptors for generating energy are,

(A) Reductase

(B) Dehydrogenase

(C) Oxidase

(D) Peroxidase

42. The bond between amino acids of a polypeptide chain is called,

(A) Phosphodiester bond

(B) Peptide bond

(C) Hydrogen bond

(D) Ionic bond

43. Which statement is true about a co-enzyme?

(A) It is an organic non protein molecule bound to apoenzyme

(B) It can not catalyze a reaction itself

(C) It enhances action of an enzyme

(D) All the above

44. Which of the following is a digestive enzyme?

(A) Amylase

(B) Pepsin

(C) Trypsin

(D) All the above

45. Two genes showing lack of independent assortment is due to,

(A) Epistasis

(B) Pleiotropy

(C) Linkage

(D) All the above

46. When a plant with genotype AaBb is subjected to selfing, the probability of getting AABB genotypes will be,

(A) 1/16

(B) 1/8

(C) 1/4

(D) 1/2

47. A human karyotype with 44A+XXY condition is an example of,

(A) Turner syndrome

(B) Kleinfelter syndrome

(C) Patao syndrome

(D) None of the above

48. A dicentric chromosome bridge is formed during the meiosis of,

(A) Translocation heterozygote

(B) Pericentric Inversion heterozygote

(C) Paracentric Inversion heterozygote

(D) Deletion heterozygote

49. In any normal DNA molecule, which of the following ratio is constant

(A) A+T = G+C

(B) A+T > G+C

(C) A+G = T+C

(D) A+G > T+C

50. The enzyme which catalyzes the formation of RNA from DNA template is called,

(A) Klenow Polymerase

(B) RNA polymerase

(C) Peptidyltransferase

(D) Reverse transcriptase

51. Identify initiation and termination codons respectively among the following,

(A) AUG & UAA

(B) AUG & GUG

(C) UAA & UAG

(D) UGA & AUG

52. Which among the following is not an inducible operon,

(A) Lactose operon

(B) Tryptophan operon

(C) Both (A) & (B)

(D) Neither (A) nor (B)

53. Energy flow in an ecosystem is always,

(A) Unidirectional

(B) Bidirectional

(C) Multidirectional

(D) Non directional

54. The great variability of plants, animals and microbes in an ecosystem is collectively referred to as,

(A) Genetic Diversity

(B) Geodiversity

(C) Biodiversity

(D) None of the above

55. Which among the following is not a renewable source of energy,

(A) Fossil fuel

(B) Solar energy

(C) Hydropower

(D) All the above

56. Global warming is referred to a phenomenon of,

(A) Penetration of harmful UV rays due to depletion of Ozone layer

(B) Increase in temperature due to increase in CO_2 concentration of atmosphere

(C) Melting of Ice at Polar regions

(D) Increase in pollution level due to burning of fossil fuel

57. Which type of restriction endonuclease is used mostly in Recombinant DNA Technology?

(A) Type-I

(B) Type-II

(C) Type-III

(D) All the above

58. A plasmid having following characteristics can be used as a cloning vector,

(A) Origin of replication

(B) Selectable marker gene

(C) Restriction sites

(D) All the above

59. The following technique is used for separation of amplified DNA,

(A) Gel electrophoresis

(B) Ultracentrifugation

(C) HPLC

(D) Southern Blotting

60. Who invented the PCR technique?

(A) Herbert Boyer

(B) James Watson

(C) Karry Mullis

(D) Hamilton Smith

ROUGH WORK

Sr. No. 265

ENTRANCE TEST-2020

SCHOOL OF BIOLOGICAL SCIENCES

BIO–RESOURCES

Question Booklet Series **A**

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. :

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. Which of the following is considered as a missing link between reptiles and birds ?

(A) Archaeopteryx

(B) Pteranodon

(C) Casuarias

(D) Caudipteryx

2. Which of the following exemplifies the homologous organ ?

(A) The arm of a human, wing of a bird

(B) Wing of an insect, wing of a bird

(C) Leg of a dog, leg of a spider

(D) None of the above

3. In photosynthesis, the first step is :

(A) Photolysis of water

(B) Production of $NADPH_2$

(C) Photoexcitation of chlorophyll

(D) Synthesis of ATP

4. The precursor for abscisic acid (ABA) is :

(A) Zeatin

(B) Lutein

(C) Violaxanthin

(D) Mevalonic acid

5. What is the most precise function of the filiform apparatus ?

(A) Guide the entry of pollen tube

(B) Recognize the suitable pollen at the stigma

(C) Produce nectar

(D) Stimulate division of generative cell

6. Functional megaspore in an angiosperm develops into :

(A) Endosperm

(B) Embryo

(C) Embryo-sac

(D) Ovule

7. When the activity of one gene is suppressed by the activity of a non-allelic gene, it is known as :

(A) Pseudo-dominance

(B) Hypostasis

(C) Epistasis

(D) Incomplete dominance

8. Which term represents a pair of contrasting characters ?

(A) Heterozygous

(B) Homozygous

(C) Codominant genes

(D) Allelomorphs

9. Number of bonding pairs of electrons in water H_2O is :

(A) 1

(B) 2

(C) 3

(D) 4

10. The experiment that simulated conditions thought to be present on the early earth for understanding the evolution of life is :

(A) Hershey–Chase experiment

(B) Geiger–Marsden experiment

(C) Miller–Urey experiment

(D) Schiehallion experiment

11. Histones, the very important constituent of chromatin, represent a family of :
    (A) Negatively charged proteins
    (B) Positively charged proteins
    (C) Both positively and negatively charged proteins
    (D) Carbohydrates not proteins

12. Hydrogen bonds are :
    (A) As strong as covalent bonds
    (B) Stronger than covalent bonds
    (C) Weaker than covalent bonds
    (D) The strongest bonds

13. The function of a catalyst is to :
    (A) Decrease the rate of a reaction by way of affecting the reaction equilibria
    (B) Increase the rate of a reaction by way of affecting the reaction equilibria
    (C) Decrease the rate of a reaction but not affecting the reaction equilibria
    (D) Increase the rate of a reaction but not affecting the reaction equilibria

14. The interactions among lipids, and between lipids and proteins, in a fluid mosaic membrane are :
    (A) Covalent
    (B) Non-covalent
    (C) Either covalent or non-covalent
    (D) Neither covalent nor non-covalent

15. Introns are segments of DNA that :
    (A) Are expressed as genes
    (B) Regulate mRNA production
    (C) Code for long sequences of amino acids
    (D) Are inserted between expressed genes

16. Antibodies are :
    (A) Foreign substances that stimulate an immune response
    (B) A type of cells that protects the body
    (C) A type of virus that causes diseases
    (D) Serum proteins that protect the body

17. Which of the following blood group antigens is not determined by carbohydrate epitope ?
    (A) A
    (B) O
    (C) AB
    (D) Rhesus

18. The most important reason why a vaccine against AIDS is exceedingly difficult to produce is that the virus :
    (A) Is drug resistant
    (B) Has a reverse transcriptase
    (C) Shows antigen variation
    (D) Causes immunosuppression

19. The phase of the cell cycle immediately preceding mitosis is called :
    (A) S phase
    (B) G1 phase
    (C) G2 phase
    (D) M phase

20. Protein molecules that differ in a few amino acid residues are called :
    (A) Isoforms
    (B) Isotypes
    (C) Glycoforms
    (D) Polymers

21. The primary structure of a protein refers to its :
(A) Polymerization between sub-units
(B) Molecular weight
(C) Three dimensional configuration
(D) Amino acid sequence

22. Which of the following statements is correct ?
(A) Oxygen is more negative than hydrogen, hence oxygen atoms attract the electrons more strongly
(B) Hydrogen is more negative than oxygen, hence hydrogen atoms attract the electrons more strongly
(C) Oxygen and hydrogen are equally negative, hence oxygen atoms attract the electrons equally as hydrogen
(D) Oxygen is less negative than hydrogen, hence oxygen atoms attract the electrons more strongly

23. A chemical reaction will proceed in the forward direction only when the free energy change of the reaction is :
(A) Zero
(B) Positive
(C) Negative
(D) One

24. The monoclonal antibodies with catalytic activity are called :
(A) Abzymes
(B) Allozymes
(C) Ribozymes
(D) Isoenzymes

25. A low K_M value indicates :
(A) High substrate concentration
(B) High product concentration
(C) Weak enzyme-substrate binding
(D) Strong enzyme-substrate binding

26. Which of the following pigments does not have oxygen in its molecule ?
(A) Chlorophyll a
(B) Chlorophyll b
(C) Carotene
(D) Xanthophyll

27. In photorespiration the molecule that is oxidized in mithochondria to release CO_2 is :
(A) Glycine
(B) Glycolate
(C) Glyoxylate
(D) Glyceric acid

28. The enzymes of glycolysis are present in :
(A) Outer mitochondrial membrane
(B) Inner mitochondrial membrane
(C) Mitochondrial matrix
(D) Cytosol

29. Which of the following is not a termination codon in the universal genetic code :
(A) AUG
(B) UGA
(C) UAG
(D) UAA

30. Radio-isotope containing molecules are employed in :
(A) Chromatography
(B) Autoradiography
(C) Spectroscopy
(D) Electrophoresis

31. Arrangement of atoms and molecular groups in nucleic acids can be best studied through :

(A) Spectrophotometry

(B) Histochemistry

(C) Electron microscopy

(D) X-ray diffraction

32. In which of the following processes molybdenum has an important role ?

(A) Nitrogen fixation

(B) Flower induction

(C) Chromosome contraction

(D) Carbon assimilation

33. The cell at zero turgor pressure shows :

(A) Evident plasmolysis

(B) Incipient plasmolysis

(C) Limiting Plasmolysis

(D) Deplasmolysis

34. Function of ACTH is to :

(A) Stimulate pituitary

(B) Stimulate thyroid

(C) Stimulate the adrenal cortex to produce hormones

(D) Suppress the activity of adrenal cortex

35. Which of the two hormones are secreted by posterior lobe of pituitary gland ?

(A) Testosterone and androsterone

(B) Progesterone and estradiol

(C) Vasopressin and oxytocin

(D) Cortisone and cartisterone

36. Division in which the egg divides completely is known as :

(A) Holoblastic

(B) Meroblastic

(C) Macroblastic

(D) Blastogenic

37. The type of cleavage in an egg is determined by :

(A) Amount and distribution of yolk

(B) Number of egg membranes

(C) Size and location of nucleus

(D) Shape and size of sperm

38. Pleiotropic gene has :

(A) Single genotype

(B) Single phenotype

(C) Multiple genotypes

(D) Multiple phenotypes

39. A cross between homozygous recessive and heterozygous plant is :

(A) Monohybrid cross

(B) Dihybrid cross

(C) Test cross

(D) Back cross

40. When both alleles express their effect on being present together, the phenomenon is called :

(A) Dominance

(B) Codominance

(C) Pseudodominance

(D) Aphidominance

41. A chromosome with sub-terminal centromere is :

(A) Acentric

(B) Acrocentric

(C) Metacentric

(D) Telocentric

42. Which of the following is the principal cereal of tropics and was introduced from Old World into New World ?

(A) Maize

(B) Potato

(C) Rice

(D) Tobacco

43. Opium is obtained from :

(A) *Rauvolfia serpentine*

(B) *Arnebia benthamii*

(C) *Saussurea costus*

(D) *Papaver somniferum*

44. The National Botanical Research Institute is located in :

(A) New Delhi

(B) Lucknow

(C) Kolkata

(D) Bengaluru

45. Worker bees are :

(A) Fertile males

(B) Fertile females

(C) Sterile males

(D) Sterile females

46. Silkworm larva spins silk :

(A) From inside to outside

(B) From outside to inside

(C) Random way

(D) Either of the above

47. Which of the following is a well-known greenhouse gas ?

(A) N_2O

(B) NO

(C) NO_2

(D) None of the above

48. The interaction in which one species is harmed and the other is unaffected is called :

(A) Amensalism

(B) Commensalism

(C) Parasitism

(D) Predation

49. Which of the following is the best example of a perfect nutrient cycle ?

(A) Nitrogen cycle

(B) Phosphorus cycle

(C) Carbon cycle

(D) Sulphur cycle

50. Which of the following statement is true ?

(A) Grazing food chains are dominant in terrestrial ecosystems while the detritus based ones are so in aquatice econsystems

(B) Detritus based food chains are dominant in terrestrial ecosystems while the grazing ones are so in aquatic ecosystems

(C) Detritus based and grazing food chains are equally dominant in terrestrial ecosystems as well as aquatic ecosystems

(D) None of the above

51. The primary criteria for designation of biodiversity hotspots is :

(A) Species endemism and degree of habitat stability

(B) Species invasion and degree of habitat degradation

(C) Species extinction and habitat stability

(D) Species endemism and degree of habitat degradation

52. Which of the following is not a strategy for *ex-situ* conservation ?

(A) Botanical garden

(B) Biosphere reserve

(C) Seed bank

(D) Cryopreservation

53. The gene incorporated in the genetically modified Golden Rice is primarily meant for the biosynthesis of :

(A) Vitamin C

(B) Vitamin B

(C) Vitamin A

(D) Omega-3

54. The single specimen designated as the type of a species by the original author at the time the species name and description was published is :

(A) Lactotype

(B) Neotype

(C) Topotype

(D) Holotype

55. The technique used to make huge number of copies of a specific DNA segment is :

(A) Ligase chain reaction

(B) Polymerase chain reaction

(C) Transcription

(D) Translation

56. Chipko movement was launched for the protection of :

(A) Wetlands

(B) Forests

(C) Grasslands

(D) Estuaries

57. Which of the following contributes to a species to be invasive ?

(A) Release from native enemies

(B) Use of allelochemicals as novel weapons

(C) Increased competitive ability in new ranges

(D) All of the above

58. Biomagnification of DDT results in decline in bird population by :

(A) Thinning of egg shells

(B) Ca metabolism disturbance

(C) Premature breaking of egg shells

(D) All the above

59. According to Vavilov, the origin of cultivated wheat is :

(A) Africa

(B) South America

(C) Australia

(D) Ancient Mediterranean including Southwest Asia

60. Trisomy 18 results in :

(A) Edward's syndrome

(B) Turner's syndrome

(C) Patau's syndrome

(D) Klinefelter's syndrome

1. For an exergonic reaction $\Delta_R G$ is :
   (A) $= 0$
   (B) ≥ 0
   (C) > 0
   (D) < 0
2. In an endergonicreaction, the reactants absorbs heat from the surroundings, ΔH will be :
   (A) Positive
   (B) Negative
   (C) Remain unchanged
   (D) None of the above
3. Hydrolysis of one molecule of ATP to ADP yields :
   (A) 7.5 KJ of energy
   (B) 30.5 KJ of energy
   (C) 27.5 KC of energy
   (D) 30.5 KC of energy
4. Water potential of pure water is ?
   (A) ≥ 1
   (B) +1
   (C) 0
   (D) –1
5. 'Induced fit' hypothesis of enzyme action was suggested by :
   (A) Fischer
   (B) Koshland
   (C) Fischer and Whitaker
   (D) Fisher and Koshland
6. Over a temperature range of 0°C to 40°C, Q_{10} for an enzyme controlled reaction is :
   (A) ½
   (B) 1
   (C) 1½
   (D) 2
7. Prosthetic group is absent in
   (A) Simple proteins
   (B) Conjugated proteins
   (C) Nitrate Reductase
   (D) Haemoglobin
8. Which of the following is not an amino acid ?
   (A) Hydroxyproline
   (B) Hydroxylysine
   (C) GABA
   (D) None of the above
9. Lipids are formed by the condensation of :
   (A) Fatty acids and oligosaccharides
   (B) Fatty acids and amino acids
   (C) Fatty acids and alcohol
   (D) Amino acids and alcohol
10. Which of the following amino acid contain sulphur ?
   (A) Methionine
   (B) Serine
   (C) Glycine
   (D) Glutamine
11. Which of the following are essential amino acids ?
   (A) Leucine and Isoleucine
   (B) Methionine and Valine
   (C) Threonine and Tryptophan
   (D) All of the above
12. Cellulose is a polymer of :
   (A) α-glucose
   (B) β-glucose
   (C) Amino-acids
   (D) Deoxyribose
13. Fluid mosaic model of plasma membrane was proposed by :
   (A) Schleiden and Schwann
   (B) Schleiden and Nicholson
   (C) Singer and Nicholson
   (D) Singer and Schwann
14. Which of the following is true about a prokaryotic cell ?
   (A) Membrane bound organelles are present
   (B) Ribosomes are present
   (C) Lysosomes are present
   (D) Mesosomes are absent

15. Chiasma formation occurs in ?
(A) Leptotene
(B) Zygotene
(C) Pachytene
(D) Diplotene

16. DNA replication takes place during :
(A) G_1-phase
(B) G_2-phase
(C) S- phase
(D) M-phase

17. Base sequence on one strand of DNA is GCTTAACG. Replicated complementary strand will be :
(A) CGAAUUGC
(B) CGAAUUCG
(C) CGUUTTGC
(D) CGAATTGC

18. In a dihybrid cross, F_2 phenotypic ratio is 15:1. It is a case of :
(A) Complementary genes
(B) Duplicate genes
(C) Incomplete dominance
(D) Recessive epistasis

19. In a monohybrid cross, F_2 genotypic ratio is :
(A) 3:1
(B) 1:2:1
(C) 1:1
(D) 9:3:3:1

20. Back cross is made between :
(A) F_1 and recessive parent
(B) F_2 and recessive parent
(C) F_1 and any parent
(D) F_2 and any parent

21. Restriction endonucleases viz. *EcoRI* and *HindIII* produce :
(A) Blunt ends in DNA molecule
(B) Sticky ends in DNA molecule
(C) Sticky and Blunt ends respectively
(D) Blunt and sticky ends respectively

22. Sequence of structural genes of *lac* Operon is
(A) *z, y, a*
(B) *y, z, a*
(C) *a, z, y*
(D) *y, a, z*

23. DNA polymerase responsible for replication of mitochondrial DNA is :
(A) Alpha polymerase
(B) Beta polymerase
(C) Gama polymerase
(D) Delta polymerase

24. Genetic code UUU encodes :
(A) Leucine
(B) Isoleucine
(C) Serine
(D) Phenylalanine

25. Bacteriophages are :
(A) Bacteria that attack viruses
(B) Bacteria that attack spirochetes
(C) Viruses that attack bacteria
(D) Viruses that attack viroids

26. Prions are :
(A) Naked DNA
(B) Naked RNA
(C) Both (A) & (B)
(D) None of the above

27. Bacterial cell wall is strong and rigid due to the presence of :
(A) Murein
(B) Cellulose
(C) Phospholipid
(D) Proteins

28. Which of the following bacteria are rod shaped ?
(A) *Escherichia coli* and *Vibrio cholerae*
(B) *Escherichia coli* and *Salmonella typhi*
(C) *Treponemapalladium* and *Salmonella typhi*
(D) *Treponemapalladium and Vibrio cholera*

29. Photorespiration primarily occurs in :
(A) C_2 Plants
(B) C_3 Plants
(C) C_4 Plants
(D) All of the above

30. C_4 photosynthetic pathway operates in :
(A) Maize
(B) Sugarcane
(C) Amaranth
(D) All of the above

31. F_0F_1 particle is also called as :
(A) NADH dehydrogenase
(B) Cytochrome bci complex
(C) FADH dehydrogenase
(D) ATP Synthase

32. In thin layer chromatography mobile phase is always a :
(A) Liquid
(B) Gas
(C) Both (A) and (B)
(D) None of the above

33. Parthenocarpy can be induced by :
(A) Auxins
(B) Gibberellins
(C) Both (A) and (B)
(D) None of the above

34. Which of the following promotes bud dormancy ?
(A) Gibberellins
(B) Auxins
(C) Cytokinins
(D) Abscisic acid

35. Alpha cells of Islets of Langerhans secrete :
(A) Insulin
(B) Glucagon
(C) Secretin
(D) Pancreozymin

36. Over production of human growth hormone in adult causes :
(A) Gigantism
(B) Acromegaly
(C) Addison's disease
(D) Myxoedema

37. Xylem and phloem arise from :
(A) Plerome
(B) Periblem
(C) Dermatogen
(D) All of the above

38. Which of the following is a complex tissue ?
(A) Phloem
(B) Xylem
(C) Both (A) and (B)
(D) None of the above

39. Apocrine glands exemplifies :
(A) Nervous tissue
(B) Epithelial tissue
(C) Areolar tissue
(D) Muscular tissue

40. Which of the following is a connective tissue ?
(A) Bone
(B) Blood
(C) Ligament
(D) All of the above

41. Which of the following is an abiotic component of an ecosystem ?
(A) Bacteria
(B) Fungi
(C) Lichens
(D) Humus

42. During the transfer of organic matter from one trophic level to next (from herbivore to carnivore), amount of organic matter stored as flesh is :
(A) 10%
(B) 25%
(C) 50%
(D) 90%

43. Pyramid of energy in a grassland ecosystem is always :
(A) Upright
(B) Inverted
(C) Both (A) and (B)
(D) None of the above

44. Gross primary productivity is highest in :
(A) Savannah
(B) Temperate deciduous forest
(C) Temperate coniferous forest
(D) Tropical rain forest

45. Five kingdom classification was proposed by :
(A) Linnaeus
(B) Simpson
(C) Aristotle
(D) Whittaker

46. Fossilization occurs where :
(A) Organisms are buried by natural processes
(B) Organisms are destroyed and buried by natural processes
(C) Organisms are buried and preserved by natural processes
(D) Organisms are buried alive by natural processes

47. Which one of the following is not a natural taxonomic category ?
(A) Sub-species
(B) Species
(C) Genus
(D) Kingdom

48. Morphologically identical but reproductively isolated species are :
(A) Sub-species
(B) Geographic races
(C) Both (A) and (B)
(D) None of the above

49. Field mushrooms, *Agaricusspp.*, belong to phylum :
(A) Zygomycota
(B) Ascomycota
(C) Basidiomycota
(D) None of the above

50. Honey bee drones are :
(A) Haploid
(B) Diploid
(C) Triploid
(D) Tetraploid

51. Migration of honey bee colony due to unfavourable environmental conditions is termed as :
(A) Absconding
(B) Primary swarming
(C) After swarming
(D) Primary teeming

52. Which of the following is a prolific breeder fish ?
(A) Grass carp
(B) Silver carp
(C) Common carp
(D) Snow trout

53. Which of the following is the most diverse group among vertebrates ?
(A) Insects
(B) Birds
(C) Reptiles
(D) Fishes

54. Diversity of the habitats over the total landscape or geographical area is called as :
(A) Alpha diversity
(B) Beta diversity
(C) Gamma diversity
(D) Species diversity

55. Edible portion of apple is :
(A) Fleshy thalamus
(B) Fleshy mesocarp
(C) Fleshy mesocarp and endocarp
(D) Fleshy mesocarp and pericarp

56. Antimalarial activity is found in :
(A) *Atropa* (Atropine)
(B) *Artemisia* (Artemisinin)
(C) Both (A) and (B)
(D) None of the above

57. Ozone layer or shield is present in the :
(A) Thermosphere
(B) Ionosphere
(C) Troposphere
(D) Stratosphere

58. The most abundant greenhouse gas in the atmosphere is :
(A) CO_2
(B) Methane
(C) CFCs
(D) N_2O

59. Which of the following is a renewable and clean fuel ?
(A) Diesel
(B) Biodiesel
(C) Petroleum
(D) None of the above

60. Acid rain is caused by large scale emission of :
(A) Sulphur dioxide
(B) Nitrogen oxides
(C) Both (A) & (B)
(D) None of the above

1. How many true breeding varieties of pea were selected by Mendel for studying inheritance ?
   (A) 14
   (B) 7
   (C) 10
   (D) 5
2. Alleles are :
   (A) Slightly different forms of the same gene
   (B) Two different genes
   (C) Three different genes
   (D) Two or three different genes
3. The Z form of DNA differ from A and B DNA in the following feature/features :
   (A) Left handed direction of coiling
   (B) Zigzag S-P backbone
   (C) 12 base pairs per turn
   (D) All the three
4. Which of the statement is true about nucleosome ?
   (A) The positively charged DNA is wrapped around the negatively charged histone octomer
   (B) The negatively charged DNA is wrapped around the positively charged histone octomer
   (C) The negatively charged histone is wrapped around the positively charged DNA
   (D) The nucleosome is negatively charged
5. The average rate of polymerization of deoxynucleotides during DNA replication is :
   (A) 1000bp/sec
   (B) 2000bp/sec
   (C) 5000bp/sec
   (D) 10,000bp/sec
6. During translation the structural and catalytic role is played by :
   (A) m RNA
   (B) t RNA
   (C) r RNA
   (D) Both (A) and (B)
7. In the genetic code, the number of codons which code for amino acids are :
   (A) 64
   (B) 20
   (C) 63
   (D) 61
8. The enzyme DNA polymerase is isolated from the bacterium :
   (A) *Thermus aquatics*
   (B) *E.Coli*
   (C) *Agrobacterium tumefaciens*
   (D) None of the three
9. Plants that have adapted to bright sunlight are called :
   (A) Sciophytes
   (B) Halophytes
   (C) Heliophytes
   (D) Xerophytes
10. The density of a population in a given habitat during a given period fluctuates due to change in :
   (A) Natility and Mortality
   (B) Immigration and Emigration
   (C) Both (A) and (B)
   (D) None of the three
11. Barnacles growing on the back of a whale benefit from it while the whale is neither benefited nor harmed. This association is termed as :
   (A) Predation
   (B) Parasitism
   (C) Amensalism
   (D) Commensalism
12. The inverted pyramid of biomass is a characteristic feature of :
   (A) Grassland ecosystem
   (B) Forest ecosystem
   (C) Aquatic ecosystem
   (D) Both (A) and (B)

13. Out of the total global carbon, the quantity of carbon in atmosphere is :
(A) 71%
(B) 49%
(C) 1%
(D) 0.3%

14. A major cause of air pollution is :
(A) Carbon dioxide
(B) Nitrogen gas
(C) Unburnt hydrocarbons
(D) Both (A) and (C)

15. Which of the following atom is responsible for the depletion of ozone in the stratosphere ?
(A) Fluorine
(B) Chlorine
(C) Carbon
(D) Oxygen

16. In a sewage treatment plant, the BOD (biochemical oxygen demand) is reduced by treatment of sewage with :
(A) Anaerobic bacteria
(B) Aerobic microbes
(C) Sequential filtration
(D) Filtration and sedimentation

17. One of the causes of thinning of eggshells and their premature breaking leading in decline in bird population is :
(A) Calcium deficiency in food
(B) Bird flu
(C) Water pollution
(D) Air pollution

18. Out of every ten animals on planet earth, 7 are :
(A) Mammals
(B) Fishes
(C) Reptiles
(D) Insects

19. The greatest biodiversity region on earth is :
(A) Himalayas
(B) Amazonian rain forest
(C) Pacific ocean
(D) Atlantic ocean

20. Which of the following is/are extinct species ?
(A) Dodo
(B) Quagga
(C) Stiller's Sea Cow
(D) All the three

21. The medicinal plant known for the treatment of cerebral malaria is :
(A) *Atropa*
(B) *Podophyllum*
(C) *Artemisia*
(D) *Rheum*

22. By fitness of the individual, Darwin meant :
(A) Mental fitness
(B) Physical fitness
(C) Both (A) and (B)
(D) Reproductive fitness

23. Similarities in homologous structures of mammals, are evidences to the :
(A) Divergent evolution
(B) Convergent evolution
(C) Biological evolution
(D) Saltation

24. Which of the following is not true about Binomial Nomenclature ?
(A) Biological names are Latinized
(B) Both words in a biological name are printed in italics
(C) Both words in a biological name are underlined when hand written
(D) Both the words denoting the genus and the specific epithet start with a capital letter

25. Which of the hierarchical arrangement in ascending order of these taxonomic categories is correct ?
(A) Genus → Species→ Order→ Family
(B) Species→ Genus→ Family→ Order
(C) Species→ Genus→ Order→ Family
(D) Species→ Genus→ Order→ Class→ Family

26. The lining of stomach and intestine is composed of :
(A) Squamous epithelium
(B) Columnar epithelium
(C) Cuboidal epithelium
(D) Compound epithelium

27. Which of the following is a complex tissue ?
(A) Xylem
(B) Sclerenchyma
(C) Parenchyma
(D) Collenchyma

28. The photoreceptor that regulate circadian clock in plants and animals is :
(A) Phytochrome
(B) Cryptochrome
(C) Cytochrome
(D) Cytochrome complex

29. In a neuron the neurotransmitters are present in :
(A) Cell body
(B) Dendrites
(C) Synaptic knob
(D) Nissl's granules

30. Perinuclear space is the :
(A) Space between two nuclei in a binucleate cell
(B) Space between nuclear envelope and endoplasmic reticulum
(C) Space between two membranes of the nuclear envelope
(D) Space between nucleus and plasma membrane

31. Which of the function / functions is / are attributed to fluid nature of plasma membrane ?
(A) Cell growth
(B) Endocytosis
(C) Cell division
(D) All the three

32. Crossing overtakes place during :
(A) Zygotene
(B) Pachytene
(C) Metaphase I
(D) Anaphase I

33. Integration of a chromosome segment into a nonhomologous chromosome is known as :
(A) Inversion
(B) Duplication
(C) Translocation
(D) Deletion

34. The cyclic phosphorylation results in the synthesis of :
(A) ATP
(B) $NADP+H^+$
(C) NADP
(D) ADP

35. Tricarboxylic acid cycle is commonly called as :
(A) Calvin cycle
(B) Krebs cycle
(C) Electron Transport System
(D) None of the three

36. The number of carbons in the primary Co_2 fixation product, in C3 plants is :
(A) 4
(B) 3
(C) 5
(D) 6

37. Viroids are infectious particles made up of :
(A) RNA enclosed in a protein coat
(B) Both RNA and DNA enclosed in a protein coat
(C) RNA or DNA enclosed in a protein coat
(D) Free RNA lacking in protein coat

38. Archaebacteria are :
(A) Halophiles
(B) Thermoacidophiles
(C) Methanogens
(D) All the three

39. Inorganic substances such as nitrates, nitrites and ammonia are oxidized to release energy for ATP production by :
(A) Photosynthetic autotrophic bacteria
(B) Chemosynthetic autotrophic bacteria
(C) Heterotrophic bacteria
(D) Both (A) and (B)

40. Capsomers-the small subunits of the virus protein coat are arranged in :
(A) Helical form
(B) Polyhedral form
(C) Spiral form
(D) Both (A) and (B)

41. Predict in which of the following the entropy decreases ?
(A) A liquid crystallizes into a solid
(B) A crystal melts into a liquid
(C) A liquid changes into a gaseous state
(D) Temperature of a crystalline solid is raised

42. The equilibrium in the system H_2O (I)$\rightleftharpoons H_2O$ (g), is an example of :
(A) Homogeneous equilibrium
(B) Ionic equilibrium
(C) Heterogeneous equilibrium
(D) None of the three

43. The property/properties of H_2O (I) because of extensive hydrogen bonding between water molecules is/are :
(A) High freezing point
(B) High boiling point
(C) High heat of vaporization
(D) All the three

44. Water has the ability to act :
(A) Only as an acid
(B) Only a base
(C) Both acid and base
(D) Neither acid nor base (neutral)

45. The most abundant organic substance in plant kingdom is :
(A) Starch
(B) Cellulose
(C) Fructose
(D) Glycogen

46. Which of the following cannot be hydrolyzed ?
(A) Glucose
(B) Sucrose
(C) Lactose
(D) Maltose

47. Fats and oils are :
(A) Saturated fatty acids
(B) Unsaturated fatty acids
(C) Triglycerides
(D) Both (A) and (B)

48. Which of the following is a polysaccharide ?
(A) Glucose
(B) Fructose
(C) Glycogen
(D) Both (A) and (B)

49. The shape in which a long polypeptide chain can exist is referred to as the :
(A) Primary structure of protein
(B) Secondary structure of protein
(C) Tertiary structure of protein
(D) Quaternary structure of protein

50. Which of the following statements about amino acids is true ?
(A) Amino acids are water soluble
(B) Amino acids have low melting point
(C) Amino acids behave like simple amines or carboxylic acids
(D) None of the above

51. In an enzyme mediated chemical reaction, which of the following has highest energy ?
(A) Substrate
(B) Enzyme
(C) Enzyme-substrate complex
(D) Product

52. Protein part of enzyme is called as :
(A) Prosthetic group
(B) Co-enzyme
(C) Apoenzyme
(D) Co-factor

53. Gel electrophoresis is a technique by which biomolecules are separated because of differences in their :
(A) Net charge
(B) Molecular weight
(C) Both (A) and (B)
(D) Non-ionic nature

54. In nature, cytokinins are concerned with :
(A) Elongation of stem
(B) Cell division
(C) Elongation of internodes
(D) Tropism

55. Which of the following statements is true about *Agaricus* ?
(A) Mycelium is aseptate and coenocytic
(B) Plasmogamy is brought about by fusion of two vegetative cells of different strains
(C) Asexual reproduction takes place by conidia
(D) Aplanospores are produced in sporangia

56. American Foulbrood is a serious disease of :
(A) Silkworms
(B) Lac insects
(C) Honey bees
(D) Trout fish

57. Insects having wound healing properties are :
(A) Maggots
(B) Blister Beetle
(C) Spanish fly
(D) Cochineal insects

58. In agriculture, insects act as :
(A) Pollinators
(B) Natural enemies
(C) Scavengers
(D) All the three

59. The hormone responsible for maintaining normal rhythms of sleep-wake and body temperature is :
(A) Estrogen
(B) Secretin
(C) Melatonin
(D) Thyroxin

60. The hormones, that increase alertness, piloerection and maintain blood pressure, are secreted by :
(A) Adrenal gland
(B) Pineal gland
(C) Pituitary gland
(D) Thymus gland

1. In exothermic reactions
   (A) the heat content of reactants is less than that of the products
   (B) the internal energy of products is more than that of reactants
   (C) ΔH has a negative value
   (D) Heat is absorbed from the surroundings

2. Osmosis is defined as:
   (A) Flow of solvent molecules from the region of lower solute concentration to higher solute concentration through semi permeable membrane.
   (B) Flow of solvent molecules from the region of higher solute concentration to lower solute concentration through semi permeable membrane.
   (C) Flow of solute molecules from lower concentration to higher concentration through semi permeable membrane.
   (D) Flow of solute molecules from higher concentration to lower concentration through semi permeable membrane.

3. Strength of an acid depends upon
   (A) its density
   (B) its viscosity
   (C) its degree of ionization
   (D) none of the above

4. Rate of transpiration is dependent upon
   (A) Negative turgor pressure
   (B) Temperature
   (C) D.P.D.
   (D) Vapour pressure deficit

5. Enzymes with different molecular configuration, but with the same function are called
   (A) isoenzymes
   (B) apoenzymes
   (C) co-enzymes
   (D) inducible enzymes

6. Enzyme inhibition caused by a product of enzyme catalyzed reaction is
   (A) competitive inhibition
   (B) non competitive inhibition
   (C) feedback inhibition
   (D) metabolic antagonism

7. Primary structure of insulin protein was given by:
   (A) Stanley
   (B) Nicholson
   (C) Watson
   (D) Sanger

8. Which of the following is a sulphur containing amino acid?
   (A) Proline
   (B) Methionine
   (C) Aspartic acid
   (D) Tryptophan

9. The fatty acid not synthesized in man is
   (A) Oleic
   (B) Stearic
   (C) Palmitoleic
   (D) Linoleic

10. Which of the following is a phospholipid ?
   (A) Sphingomyelin
   (B) Oleic acid
   (C) Prostaglandin
   (D) Glycogen

11. The monosaccharides like glucose and fructose exist
   (A) only in ring form
   (B) only in open straight chain
   (C) both in ring and open straight chain form
   (D) none of the above

12. Among the following types of protein, which one is the simple water-soluble globular protein molecule?
   (A) Collagen
   (B) Albumin
   (C) Elastin
   (D) Keratin

13. Which of the following statements are correct?

1. Mitochondria contain DNA
2. Ribosomes are formed of phospholipids and oligosaccharides
3. 70s ribosomes occur in prokaryotes
4. Ribosomes are not found in Protists and Monera

(A) 1,2 and 3 are correct
(B) 1 and 2 are correct
(C) 2 and 4 are correct
(D) 1 and 3 are correct

14. A deletion in the short arm of chromosome 5 produces in humans, a genetic disorder called

(A) Cri du chat syndrome
(B) Down's syndrome
(C) Edward's syndrome
(D) Patau's syndrome

15. The function of the nucleolus in the cell is

(A) synthesis of RNA and ribosomes
(B) synthesis of DNA
(C) secretory
(D) biogenesis of ribosomes and synthesis of RNA protein

16. During cell division, DNA duplication occurs in

(A) prophase
(B) G1 of interphase
(C) S- phase of interphase
(D) early telophase

17. Which enzyme catalyzes the unwinding of DNA helix during replication?

(A) Primase
(B) Topoisomerase
(C) DNA Polymerase
(D) Helicase

18. Short DNA fragments referred to as Okazaki pieces are synthesized during DNA replication. The template strand for their synthesis is

(A) each of the strands of DNA duplex
(B) leading strand of DNA
(C) lagging strand of DNA
(D) single stranded DNA of virus like φ X 174

19. Extranuclear inheritance is a consequence of presence of genes in

(A) Mitochondria and plastids
(B) Endoplasmic reticulum and mitochondria
(C) Ribosomes and chloroplast
(D) Lysosomes and ribosomes

20. If a colour blind man marries a girl who is normal (homozygous) for this character, then genotypically:

(A) Sons and daughters will be normal
(B) Sons will be colour blind, daughters will be normal
(C) Sons will be normal, daughters will be carriers
(D) Both sons and daughters will be colour blind

21. Okazaki is known for his contribution to the understanding of :

(A) Transcription
(B) Translation
(C) DNA replication
(D) Mutation

22. The 3′- 5′ phosphodiester linkages inside a polynucleotide chain serve to join

(A) One DNA strand with other DNA strand
(B) One nucleoside with another nucleoside
(C) One nucleotide with another nucleotide
(D) One nitrogenous base with pentose sugar

23. Out of 64 codons only 61 codes the 20 different amino acids. This character of genetic code is called:

(A) Degeneracy
(B) Non ambiguous nature
(C) Redundancy
(D) Overlapping

24. Variable Number Tendem Repeats (VNTR's) in the DNA molecule are highly useful in:

(A) Monoclonal antibody production

(B) Stem cell culture

(C) Recombinant DNA technology

(D) DNA fingerprinting

25. In bacteria the respiratory enzymes are located on

(A) Plasmid

(B) Episome

(C) Mesosome

(D) Nucleoid

26. Short pieces of naked RNA, only 300 to 400 nucleotides long, with no protein coat capable of causing plant diseases are known as

(A) Viriod

(B) Virus

(C) Prion

(D) Karyon

27. Viruses causing rupturing of bacteria are:

(A) Lysogenic

(B) Lytic

(C) Lipolytic

(D) Lysozymes

28. *Thermococcus*, *Methanococcus* and *Methanobacterium* exemplify:

(A) Bacteria whose DNA is relaxed or positively supercoiled but have a cytoskeleton as well as mitochondria

(B) Bacteria that contain a cytoskeleton and ribosomes

(C) Archaebacteria that contain protein homologous to eukaryotic core histones

(D) Archaebacteria that lack any histones resembling those found in eukaryotes but whose DNA is negatively supercoiled

29. C4 plants are more efficient in photosynthesis than C3 plants because of

(A) Higher leaf area

(B) The presence of a large number of chloroplasts

(C) The presence of a thin cuticle on the leaf surface

(D) Lower photorespiration

30. In non-cyclic photophosphorylation, there are photolysis of 12 water molecules. How many H^+ are formed?

(A) 24 H^+

(B) 36 H^+

(C) 12 H^+

(D) 32 H^+

31. In the process of glycolysis, during oxidation electrons are removed by

(A) ATP

(B) Glyceraldehyde 3 phosphate

(C) NAD^+

(D) Molecular oxygen

32. The pyruvic acid formed during glycolysis is oxidized to CO_2 and H_2O in a cycle called:

(A) Calvin cycle

(B) Nitrogen cycle

(C) Hill reaction

(D) Kreb's cycle

33. Which phytohormone induces dormancy?

(A) Gibberelins

(B) Abscissic acid

(C) Auxin

(D) Ethylene

34. Which of the following hormone is responsible for the ejection of milk from mammary glands in mammals?

(A) Oxytocin

(B) Prolactin

(C) Serotonin

(D) Melatonin

35. The outgrowth of axillary bud is inhibited by
(A) Cytokinin
(B) Abscisic acid
(C) Auxin
(D) Ethylene

36. Which of the following is a mismatch?
(A) Oxytocin - uterus
(B) Parathyroid hormone - bones
(C) ADH - kidney
(D) Insulin - hypothalamus

37. Which of the following is not a character of meristematic tissue?
(A) Presence of prominent nucleus
(B) Presence of intercellular spaces
(C) Few and small vacuoles
(D) Proplastid present

38. Ligament is mainly made up of:
(A) Reticulum
(B) Elastin
(C) Myosin
(D) Collagen

39. Which one of the following prevents elongation in plants?
(A) Auxin
(B) Gibberellin
(C) ABA
(D) Cytokinin

40. Which of the following has "H" shaped grey matter?
(A) Cerebrum
(B) Spinal cord
(C) Cerebellum
(D) Medulla oblongata

41. The aggregate of processes that determines the size and composition of any population is known as
(A) Population dynamics
(B) Population dispersal
(C) Population explosion
(D) Population density

42. Detritus food chain in comparison to grazing food chain is
(A) Generally longer
(B) Generally equal
(C) Generally shorter
(D) None of these

43. Association in which one is benefitted without affecting the other is called
(A) Symbiosis
(B) Saprophytism
(C) Parasitism
(D) Commensalism

44. Sedimentary cycle having small gaseous component is found in
(A) Phosphorus
(B) Nitrogen
(C) Carbon
(D) Sulphur

45. Mayr's biological concept of species is mainly based on
(A) Morphological traits
(B) Reproductive isolation
(C) Modes of reproduction
(D) Morphology and reproduction

46. In an artificial system of classification
(A) A large number of characters are taken into consideration
(B) Correlated characters are more important
(C) Physiological characters are relied upon
(D) One or a few morphological characters are considered

47. Allopatric speciation occurs when population shows
(A) reproductive isolation
(B) ecological isolation
(C) seasonal isolation
(D) geographic isolation

48. The theory of evolution by natural selection states that

(A) Selection results in generating variations

(B) Selection and variation are independent

(C) Evolution is independent of variation

(D) Evolution is a rapid process

49. Which one of the following is a common Indian pearl oyster?

(A) *Pinctada indica*

(B) *Pinctada vulgaris*

(C) *Ostrea indica*

(D) *Ostrea vulgaris*

50. Which of the fish is a surface feeder?

(A) *Catla catla*

(B) *Cirrhinus mrigala*

(C) *Labeo rohita*

(D) *Heteropneustes fossilis*

51. Which of the following is an edible fungi?

(A) *Mucor*

(B) *Penicillium*

(C) *Agaricus*

(D) *Rhizopus*

52. Muga silk is produced by

(A) *Anthreaea mylitta*

(B) *Anthreaea pernyi*

(C) *Anthreaea roylei*

(D) *Anthreaea assamensis*

53. Which of the following is prioritised for conservation efforts by conservation biologist?

(A) Endemic species

(B) Panmictic species

(C) Keystone species

(D) Polygynous species

54. Which species has more chance of extinction?

(A) Monophagous and pandemic

(B) Monophagous and endemic

(C) Pandemic only

(D) Both (A) and (C)

55. Cryo-conserved materials such as oocytes, sperm embroyos and somatic cells are categorized into:

(A) In-vivo conservation

(B) In-situ conservation

(C) Ex-situ conservation

(D) In-vitro conservation

56. Geothermal energy is

(A) Renewable and conventional

(B) Renewable and non-conventional

(C) Non-renewable and conventional

(D) Non-renewable and non-conventional

57. Common indicator organism of water pollution is

(A) *Escherichia coli*

(B) *Cholera vibrio*

(C) *Salmonella typhi*

(D) *Entamoeba histolytica*

58. Continuous sewage flow into water body would lead

(A) Eutrophication

(B) Algal bloom

(C) Depletion of oxygen

(D) Increase in temperature

59. Multinational source of energy is

(A) Soil

(B) Water

(C) Sun

(D) All of the above

60. Montreal protocol is related with

(A) Water Pollution

(B) Soil Pollution

(C) Ozone layer depletion

(D) Noise Pollution

Sr. No. 159

ENTRANCE TEST-2016

FACULTY OF BIOLOGICAL SCIENCES

M.Sc. BIORESOURCE

Question Booklet Series **A**

Total Questions : 60

Time Allowed : 70 Minutes

Roll No. : | | | | | | |

Instructions for Candidates :

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. An endergonic reaction :
   (A) Proceeds spontaneously
   (B) Does not require activation energy
   (C) Overall releases energy
   (D) Overall requires energy

2. Oxygen :
   (A) Has a negative redox potential, thus easily reduces other molecules
   (B) Has a high positive redox potential, thus easily reduces other molecules
   (C) Has a high positive redox potential, thus easily oxidizes other molecules
   (D) Has a negative redox potential, thus easily oxidizes other molecules

3. Anaerobic glycolysis and oxidative phosphorylation are :
   (A) Conversion Reactions
   (B) Endergonic Reactions
   (C) Exergonic Reaction
   (D) All of these

4. Which one of the following statements is true ?
   (A) A strong electrolyte solution is a solution that always contains a high concentration of an acid or base
   (B) The strength of an acid can be influenced by the solvent into which it is placed
   (C) In aqueous solution a strong acid will dissociate to form a strong conjugate base and together these form a conjugate pair
   (D) pH 7 is considered to be neutral pH at all temperatures

5. Which of the following statements is false with respect to an enzyme's ability to catalyse a reaction ?
   (A) An enzyme provides a reaction surface and a suitable environment for the reaction to take place
   (B) An enzyme binds reactants such that they are positioned correctly and can attain their transition-state configurations
   (C) An enzyme allows the reaction to go through a less stable transition state than would normally be the case
   (D) An enzyme can weaken bonds in reactants through the binding process

6. Uncompetitive inhibition :
   (A) V_{max} remains constant, K_m increases
   (B) V_{max} increases, K_m decreases
   (C) V_{max} decreases, K_m decreases
   (D) V_{max} increases, K_m increases

7. Mg^{2+} is an inorganic activator for the enzyme :

(A) Phosphatase (B) Carbonic Anhydrase

(C) Enterokinase (D) Amylase

8. Which of the following amino acid is an alpha helix terminator ?

(A) Tryptophan (B) Phenyl alanine

(C) Tyrosine (D) Proline

9. The lipids of the cell membrane and the lipids found in butter and vegetable oil differ in which of the following ?

(A) The number of fatty acids attached to the glycerol molecule

(B) The type of glycerol molecule

(C) The carbon to carbon bonds

(D) Lipids of the cell membrane do not have hydrophobic sections of the molecule

10. Which pair are both structural carbohydrate molecules ?

(A) Starch and glycogen (B) Starch and cellulose

(C) Glycogen and cellulose (D) Cellulose and chitin

11. Which of the following is NOT a biologically active polymer ?

(A) Starch (B) Collagen

(C) Water (D) DNA

12. If the 2' carbon has an -OH group attached to it, the molecule would be :

(A) Sucrose (B) Ribose

(C) Deoxyribose (D) Fructose

13. A transducing phage :

(A) Contains only viral DNA

(B) May contain viral and bacterial DNA

(C) Contains one or more transposons

(D) Can never transfer extrachromosomal genes

14. Which of the following statements is false concerning a mating between F^+ and F^- cell ?

(A) The F^-cell is converted to an F^+ cell

(B) The F^+cell is converted to an F^-cell

(C) Chromosomal genes are rarely transferred

(D) Cell-to-cell contact is always necessary

15. Semi autonomous organelle in the cell is :
(A) Peroxisome (B) Chloroplast
(C) Golgi body (D) Endoplasmic reticulum

16. F0-F1 particles meant for ATP synthesis are present on :
(A) Outer mitochondrial membrane attached to the cytosolic or C face
(B) Outer mitochondrial membrane attached to the Matrix or M face
(C) Inner mitochondrial membrane attached to the Matrix or M face
(D) Inner mitochondrial membrane attached to the cytosolic or C face

17. All of the below mentioned obey Mendel's law except :
(A) Linkage (B) Independent assortment
(C) Purity of gametes (D) Dominance

18. The Dihybrid test cross ratio is :
(A) 9:3:2:1 (B) 9:3:3:1
(C) 1:1:1:1 (D) 9:3:2:2

19. Thymine dimers are often corrected by light induced repair mechanism. The enzyme involved in the process is :
(A) Photolyase (B) Photoligase
(C) DNA glycosylase (D) DNA ligase

20. Adjacent nucleotides are joined by :
(A) Covalent Bond (B) Phosphodiester Bond
(C) Hydrogen Bond (D) Peptide Bond

21. Sigma factor is a component of :
(A) DNA ligase (B) DNA polymerase
(C) RNA polymerase (D) Taq DNA polymerase

22. What is the main function of tRNA in relation to protein synthesis ?
(A) Inhibits protein synthesis
(B) Proof reading
(C) Identifies amino acid and transport them to ribosomes
(D) Synthesis of tyrosine

23. The actual synthesis of DNA in the E.coli is the function of :
(A) Polymerase I (B) Primase
(C) Polymerase III (D) DNA ligase

24. Consider the process that a cell uses to replicate its double-stranded DNA to make copies for daughter cells. Which statement describes the DNA in daughter cells ?

(A) The double helix in one daughter cell consists of two strands that were originally in the parent cell, while the double helix in the other daughter cell consists of two newly made strands

(B) The two strands of the double helices in both daughter cells consist of segments of new and parental DNA

(C) The double helices in each daughter cell consist of one parental strand and one newly made strand

(D) None of the above

25. Mad Cow disease has been highly publicized in Great Britain. This disease, which is similar to scrapie, is caused by :

(A) A prion
(B) A virus
(C) Rickettsiae
(D) An autoimmune reaction

26. Reverse transcriptase is an enzyme unique to the retroviruses. Which one of the following is a function of the enzyme reverse transcriptase ?

(A) DNase activity
(B) RNA-dependent RNA polymerase activity
(C) RNA isomerase activity
(D) RNA-dependent DNA polymerase activity

27. Which of the following can cause a phage in the lysogenic stage to revert to the lytic stage ?

(A) Ultraviolet light
(B) A competing phage
(C) Darkness
(D) Lack of nutrients

28. When exposed to harsh conditions, some bacteria form :

(A) Capsules
(B) Endospores
(C) Pilli
(D) Peplomers

29. Which of the following statements about the electron transport chain is NOT correct ?

(A) It is located in the inner mitochondrion membrane
(B) Cytochrome c accepts electrons from complex II
(C) Cytochrome oxidase (complex IV) accepts electrons from Cytochrome c
(D) Complex I is called NADH dehydrogenase

30. There are many transport systems in the mitochondrial membrane. One that exchanges ADP for ATP is called a :

(A) Antiporter
(B) Symporter
(C) Uniporter
(D) Active Transporter

31. Which of the following statements about paper and gas chromatography is correct ?

(A) The R_f and R_t values of a substance are determined solely by the interaction of the substance with the stationary phase
(B) A substance with a long retention time in gas chromatography is likely to have a high R_f value in paper chromatography
(C) A high R_f value is indicative of a substance that adsorbs strongly onto the stationary phase
(D) A long retention time in gas chromatography is indicative of a substance with a strong adsorption onto the stationary phase

32. Which of the following is not a use for mass spectrometry ?

(A) Calculating the isotopic abundance in elements
(B) Investigating the elemental composition of planets
(C) Confirming the presence of O-H and C=O in organic compounds
(D) Calculating the molecular mass of organic compounds

33. Which plant hormone is associated with the closure of the stomata in a plant under water stress ?

(A) Abscisic acid
(B) Auxin
(C) Cytokinin
(D) Ethylene

34. Application of which hormone prevents plant tissues from senescence or aging ?

(A) Ethylene
(B) Auxin
(C) Cytokinin
(D) Abscisic acid

35. Homeostasis :

(A) Refers to the unwavering control of a physiological set point
(B) Refers to maintaining a stable internal environment
(C) Refers to maintaining a stable external environment
(D) None of the above

36. Pituitary gland is under the control of :

(A) Pineal gland
(B) Adrenal gland
(C) Hypothalamus
(D) Thyroid gland

37. The term used to define the pre-treatment of plants to cold temperatures to induce flowering is :

(A) Florigen
(B) Endogenous
(C) Vernilization
(D) Photomorphogenesis

38. Plant length is increased by :

(A) Apical meristems
(B) Lateral meristems
(C) Periblem
(D) Parenchyma

39. Tissue present in trachea, kidney tubules and oviduct is :

(A) Columnar Epithelium
(B) Ciliated Epithelium
(C) Cuboidal Epithelium
(D) Squamous Epithelium

40. Which statement is NOT true about photoperiodism ?

(A) A short-day plant flowers when the day length is shorter than some critical length
(B) A day-neutral plant flowers according to some form of regulation other than photoperiodism
(C) A long-day plant will flower even when the day period is not long enough if there is a short period of light during the dark period
(D) The phytochrome form P_{fr} is converted to P_r in daylight, producing the active form that induces flowering in long-day plants

41. Which of the following is not a functional unit of an ecosystem ?

(A) Productivity
(B) Stratification
(C) Energy flow
(D) Decomposition

42. The pyramid of energy in any ecosystem is :

(A) Always upright
(B) May be upright or inverted
(C) Always inverted
(D) None of the above

43. Synecology deals with :

(A) Ecology of many species
(B) Ecology of many populations
(C) Ecology of community
(D) Ecology of cline

44. Which of the following is/are NOT characteristic of a K-selected species ?

(A) Early reproduction
(B) Low intrinsic rate of increase
(C) Rapid development
(D) Early reproduction and rapid development

45. A species inhabiting different geographical area is known as :

(A) Sympatrics (B) Allopatrics

(C) Siblings (D) Biospecies

46. In which condition gene ratio remains constant in a species ?

(A) Gene flow (B) Mutation

(C) Random mating (D) Sexual selection

47. Genetic drift is found in :

(A) Small population with or without mutated genes

(B) Large population with random mating

(C) Plant population

(D) Animal population

48. The study of the fossil plant is known as :

(A) Palaeontology (B) Palaeobotany

(C) Palenology (D) Palaeoanatomy

49. Spores are produced in :

(A) The stem of a mushroom (B) The gills of a mushroom

(C) Both (A) & (B) (D) None of the above

50. Mulberry silkworm is :

(A) *Bombyx mori* (B) *Anthreaea mylitta*

(C) *Anthreaea assamensis* (D) *Attacus atlas*

51. Honey is nectar :

(A) Obtained from flowers and stored in beehive

(B) And pollen obtained from flowers and stored in beehive

(C) Of flowers diluted by honey bee by mixing with saliva

(D) Of flowers processed by honey bee by mixing with saliva

52. Fig plants have evolved very close associations with which type of pollinator ?

(A) Flies (B) Butterflies

(C) Wasps (D) Birds

53. Biodiversity :

(A) Increases towards the equator (B) Decreases towards the equator

(C) Remain same throughout the planet (D) Has no effect on change in latitude

54. Endemic species are :

(A) Rare species

(B) Species localised in a specific location

(C) Cosmopolitan in distribution

(D) Critically endangered species

55. IUCN headquarter is at :

(A) Morges, Switzerland (B) Paris, France

(C) Vienna, Austria (D) New York, USA

56. Blue whale is placed under :

(A) Endangered (B) Critically endangered

(C) Rare (D) Extinct

57. The atmosphere around earth is warmed because :

(A) Warm air cannot escape, as in a greenhouse

(B) Molecules in the atmosphere are warmed by radiation from Earth and retain the heat

(C) Fossil fuels release heat

(D) Plants absorb CO_2

58. Which of the following is a renewable source of energy ?

(A) Coal (B) Hydropower

(C) Natural gas (D) Petroleum

59. Taj Mahal is said to be suffering from "Marble cancer". What is Marble cancer ?

(A) Acid rain which corrodes marble.

(B) Large numbers of fungus in Taj Mahal marble.

(C) Yellowing of the marble on account of Soot particles.

(D) Smoke filling the Taj Mahal from adjoining industries.

60. Which of the following countries has not ratified the Kyoto Protocol yet ?

(A) Australia (B) United States

(C) Japan (D) India

ROUGH WORK

M.Sc. Bio-Resources/

1. An environment which could not be inhabited by any kind of organism is one which lacks access to :

   (A) free nitrogen molecules (B) carbon in any form
   (C) free oxygen molecules (D) light

2. The total interacting animals and plants in any well defined area such as field or pond is known as :

   (A) Biosphere (B) Community
   (C) Biome (D) Ecosystem

3. Eutrophication refers to :

   (A) High production in an aquatic ecosystem
   (B) Low production in a terrestrial ecosystem
   (C) High production in a terrestrial ecosystem
   (D) Low production in an aquatic ecosystem

4. All the following are essential components of the nitrogen cycle on Earth except :

   (A) Calcium phosphate (B) Ammonia
   (C) Nitrate ions (D) Amino acids

5. Phylogenetic system of classification is based on :

   (A) Floral characters (B) Evoluationary relationships
   (C) Morphological features (D) Chemical constituents

6. In India endemic biota is very high in the :

   (A) Himalayan ranges (B) Western ghats
   (C) Thar desert (D) Gangetic plain

7. Changes in gene frequencies within a population are called :

   (A) Gene flow (B) Macroevolution
   (C) Microevolution (D) Binomial expansion

SEAL

8. Geographical isolation is associated with :

(A) Allopatric speciation (B) Sympatric speciation

(C) Clones (D) Polyploidy

9. The breeding season in the brown trout, *Salmo trutta fario* commences between :

(A) January — March (B) April — June

(C) July — September (D) October — December

10. The bio-pesticide which has been used to control aphids is :

(A) Lady bird beetle (B) Tiger beetle

(C) Silk moth (D) Mosquito

11. Cream-white Eri silk is secreted by the caterpillar of :

(A) *Antheraea assama* (B) *Attacus ricini*

(C) *Antheraea mylitta* (D) *Antheraea royally*

12. The mouth part of honey bee used to mould wax and adhere pollen is :

(A) Ligula (B) Labium

(C) Labellum (D) Labrum

13. Greenhouse gases absorb :

(A) UV rays of sun (B) Radio waves

(C) Infrared rays (D) Oil spill

14. Relative abundance in biodiversity is :

(A) Relative number of individuals of different species in a given community

(B) Relative diversity of species

(C) Relative number of species in an area

(D) None of the above

15. Aesthetic value in biodiversity is a form of :

(A) Intrinsic value (B) Extrinsic value

(C) Bequest value (D) Transformative value

16. Earthworm helps in :

(A) Keeping insect population under check

(B) Maintaining soil fertility

(C) Control weeds

(D) Manufacture of medicines

17. Marsh gas is commonly known as :

(A) Ammonia

(B) Carbon monoxide

(C) Nitrogen oxide

(D) Methane

18. Ozone hole is formed in the :

(A) Ionosphere

(B) Stratosphere

(C) Troposphere

(D) Biosphere

19. Black carbon aerosols are produced from :

(A) Burning of paddy stubbles

(B) CFC gas

(C) Incomplete combustion of fossil fuels

(D) Kerosene

20. Golden rice is a GMO (Genetically Modified Organisms) crop that synthesizes :

(A) Vitamin A

(B) Insulin

(C) Biotoxin

(D) Golden pigment

21. Which of the following carbohydrate combinations are collectively known as oligosaccharides ?

(A) Disaccharides to Polysaccharides

(B) Trisaccharides to Pentasaccharides

(C) Disaccharides to Hexasaccharides

(D) Disaccharides to Tetrasaccharides

22. The breaking down of simple sugar to alcohol, carbon dioxide and energy is called :

(A) Respiration

(B) Oxidation

(C) Fermentation

(D) Digestion

SEAL

23. When fatty acids are burned, they are first converted to :

(A) 6-carbon phosphate (B) Pyruvic acid

(C) Glycerin (D) 2-carbon compounds

24. Four double bonds Polyunsaturated fatty acids found in peanut oil is :

(A) Linolenic acid (B) Linoleic acid

(C) Arachidonic acid (D) Oleic acid

25. Which of the enzymes catalyses the activation, by phosphorylation of glycerol to glycerol 3-phosphate or phosphoglyceraldehyde (PGAL) ?

(A) Glycerokinase (B) Acetone decarboxylase

(C) Thiophorase (D) Thiolase

26. The acetyl-CoA formed in fatty acid oxidation enters the citric acid cycle, if fat and carbonates are well balanced. This entry of acetyl-CoA for the formation of citric acid depends on the availability of :

(A) Glacial acetic acid (B) Oxalo-acetic acid

(C) Trichloro-acetic acid (D) Aceto-acetic acid

27. The quaternary structure of a protein :

(A) consists of four subunits—hence the name quaternary

(B) may be either alpha or beta.

(C) depends on covalent bonding among the subunits

(D) depends on the primary structure of the subunits

28. A single amino acid is encoded by a group of :

(A) three enzymes (B) three nucleotides

(C) three anticodons (D) three molecules of ATP

29. Cell membrane is mainly constituted by lipids, proteins and carbohydrates with respect to their mutual proportion, which of the following statements is correct ?

(A) Proteins are in the least proportion

(B) Carbohydrates are in the least proportion

(C) Lipids are in the least proportion

(D) All the three are in equal proportion

30. In which of the following stages of cell division, the DNA content is doubled ?

(A) Interphase
(B) Anaphase
(C) Metaphase
(D) Prophase

31. Inner mitochondrial membrane contains enzymes called :

(A) Adenylate-kinase and nucleoside diphosphokinase
(B) ATP-synthetase, succinatedehydrogenase and respiratory chain enzymes
(C) Malate and isocitrate synthetase
(D) NADH-cytochrome reductase and monomeric oxidase

32. Electron microscopy has revealed that the Golgi complex is involved in the :

(A) Development of ribosomes
(B) Formation of primary lysosomes
(C) Accumulation of proteins only
(D) Accumulation of lipoprotein particles

33. All of the following processes lead to an increase in entropy except :

(A) Increasing the temperature of a gas
(B) Freezing a liquid
(C) Evaporating a liquid
(D) Forming mixtures from pure substances

SEAL

34. A statement of the 2nd Law of Thermodynamics is that :

(A) Spontaneous reactions are always exothermic
(B) Energy is conserved in a chemical reaction
(C) The entropy of the universe is continually increasing
(D) The enthalpy of reaction is the difference between product and reactant enthalpies

35. Osmosis involves :

(A) Diffusion of suspended particles from higher to lower concentration
(B) Diffusion of suspended particles from lower to higher concentration
(C) Diffusion of water from the more to the less concentrated side
(D) Diffusion of water from the less to the more concentrated side

36. Thermodynamics can be used to determine all of the following except :

(A) The direction in which a reaction is spontaneous

(B) The extent to which a reaction occurs

(C) The rate of reaction

(D) The enthalpy change of a reaction

37. Mendel's law of segregation implies that the two members of an allelic pair of genes :

(A) Are distributed to separate gametes

(B) May contaminate one another

(C) Are assorted independently of all other genes

(D) Are segregated pair-wise

38. If heterozygous males with type B blood group are crossed with heterozygous females with type A blood, what percent of their offspring can be expected to have type O blood ?

(A) 25% (B) 50%

(C) 75% (D) 100%

39. How many types of gametes will be required for F2 generation of a monohybrid cross of Mendel ?

(A) 2 (B) 4

(C) 8 (D) 16

40. Which of the following is not a difference between DNA and RNA ?

(A) RNA has uracil, DNA has thymine

(B) RNA has ribose, DNA has deoxyribose

(C) RNA has five bases, DNA has four

(D) RNA is a single polynucleotide strand, DNA is a double strand

41. In semi-conservative replication of DNA :

(A) the original double helix remains intact and a new double helix forms

(B) the strands of double helix separate and act as templates for new strands

(C) polymerization is catalyzed by RNA polymerase

(D) polymerization is catalyzed by a double helical enzyme

42. Which statement about both transformation and transcription is true ?

(A) DNA is transferred between viruses and bacteria

(B) Neither occurs in nature

(C) Small fragments of DNA move from one cell to another

(D) Recombination between the incoming DNA and host cell DNA does not occur

43. Control of gene expression in eukaryotes includes all of the following except :

(A) alternative splicing of RNA transcripts

(B) binding of proteins to DNA

(C) transcription factors

(D) feedback inhibition of enzyme activity by allosteric control

44. Transfer RNA molecules exist in the metabolizing cell in the :

(A) nucleus (B) mitochondrion

(C) cytoplasm (D) Golgi body

45. Translation and transcription are subdivisions of the general process of :

(A) DNA replication (B) glycolysis

(C) protein synthesis (D) the electron transport chain

SEAL

46. How many genes are present in a simplest virus ?

(A) One (B) Five

(C) Eight (D) Twelve

47. Which of the following is not correct for viruses ?

(A) They are made up of nucleic acids and proteins

(B) They can multiply in host cytoplasm

(C) They can grow in dilute sugary solution

(D) They cannot utilize oxygen

48. The three basic shapes found in most common bacteria are :

(A) triangles, squares, and rectangles

(B) hexagons, icosahedrons, and helices

(C) spheres, spirals, and rods

(D) cubes, filaments, and rhomboids

49. Members of the genus *Mycobacterium* share the characteristic of being :

(A) acid-fast
(B) easy to cultivate in the laboratory
(C) cocci in pairs
(D) spirochetes

50. Anaerobic respiration is also known as :

(A) Intra-molecular respiration
(B) Inter-molecular respiration
(C) Extra-molecular respiration
(D) Molecular respiration

51. The basis of the technique of chromatography for separating components of a mixture is :

(A) The absorption of infrared radiations by the components
(B) The interaction of components with both stationary and mobile phases
(C) The differing movements of particles of different mass in an electric field
(D) The deflection of charged particles in a magnetic field.

52. The rate of migration of DNA within an agarose gel in the gel electrophoresis technique is primarily based on the factor :

(A) The size of the DNA fragments
(B) The number of DNA fragments
(C) The size of the wells of gel
(D) The negative charge of the DNA

53. Photorespiration is characteristic of :

(A) C3 plants
(B) C4 plants
(C) CAM plants
(D) None of the above

54. Two major control centers for homeostasis are :

(A) Endocrine and exocrine glands
(B) Apocrine and heterocrine glands
(C) Receptors and effectors
(D) Brain and endocrine glands

55. What are the components of feedback mechanism ?

(A) Receptors, insulators, effectors
(B) Receptors, suppressors, effectors
(C) Receptors, regulators, effectors
(D) Receptors, depressors, effectors

56. The protein found in thyroid hormone is :

(A) Glucoprotein (B) Glyceraldehydes

(C) Thyroglobulin (D) Lecithin

57. The hormone which regulates calcium and phosphorus metabolism in the body is secreted by :

(A) Thyroid (B) Parathyroid

(C) Thymus (D) Pancreas

58. Which one of the following tissues, is having branching fibres :

(A) Cardiac muscle (B) Cartilage

(C) Smooth muscle (D) Skeletal muscle

59. Nerve fibers differ from muscle fibers in having :

(A) Myofibrils (B) Striations

(C) Sarcolemma (D) Dendrites

60. The growth caused by cell elongation with cell multiplication is called :

(A) Auxetic growth (B) Multiplicative growth

(C) Accretionary growth (D) None of these