DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

24-0010-D TEST BOOKLET

Time Allowed: 3:00 hrs | **MAIN PAPER- BIOLOGY** | **Maximum Marks: 300**

INSTRUCTIONS TO CANDIDATES

Read the instructions carefully before answering the questions: -

1. This Test Booklet consists of 13 (thirteen) printed pages and has 75 (seventy five) **items (questions)**.
2. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET ***DOES NOT*** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
3. **Please note that it is the candidate's responsibility to fill in the Roll Number and other required details carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet and the Separate Answer Booklet. Any omission/discrepancy will render the OMR Answer Sheet and the Separate Answer Booklet liable for rejection.**
4. Do not write anything else on the OMR Answer Sheet except the required information. Before you proceed to mark in the OMR Answer Sheet, please ensure that you have filled in the required particulars as per given instructions.
5. Use **only Black Ball Point Pen** to fill the OMR Answer Sheet.
6. This Test Booklet is divided into 4 (four) parts – **Part – I, Part - II , Part – III** and **Part IV.**
7. All FOUR parts are **Compulsory**.
8. **Part-I consists of Multiple Choice-based Questions.** The answers to these questions have to be marked in the **OMR Answer Sheet** provided to you.
9. **Part - II , Part – III** and **Part IV consist of Conventional Questions.** The answers to these questions have to be written in the **Separate Answer Booklet** provided to you.
10. In Part-I, each item (question) comprises of 04 (four) responses (answers). You are required to select the response which you want to mark on the OMR Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose *ONLY ONE* response for each item.
11. After you have completed filling in all your responses on the OMR Answer Sheet and the Answer Booklet(s) and the examination has concluded, you should hand over to the Invigilator ***only the OMR Answer Sheet and the Answer Booklet(s)***. You are permitted to take the Test Booklet with you.
12. **Penalty for wrong answers in Multiple Choice-based Questions:**
    THERE WIL BE **PENALTY** FOR WRONG ANSWERS MARKED BY A CANDIDATE.
    (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to the question will be deducted as penalty.
    (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to the question.
    (iii) If a question is left blank. i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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PART – I
MULTIPLE CHOICE BASED QUESTIONS

Instructions for Questions 1 to 50:

- Choose the correct answer for the following questions
- Each question carries 3 marks (50 x 3 = 150 marks)

(1) Pollination brought about by bats is called:

(a) Zoophily

(b) Entomophily

(c) Ornithophily

(d) Cheropterophily

(2) One nucleus of the pollen tube and secondary nucleus of the ovum grow into:

(a) Stigma

(b) Endosperm

(c) Anther

(d) Stamen

(3) ..... incompatibility prevents cross pollination.

(a) intraspecific

(b) interspecific

(c) self

(d) outbreeding

(4) Which of the following prepares the endometrium of the uterine wall for implantation of the fertilised ovum?

(a) oxytocin

(b) prolactin

(c) progesterone

(d) gonadotropin

(5) Cryptorchidism is a condition in which testis are:

(a) surgically removed

(b) not developed in the foetus

(c) unable to produce sperms

(d) unable to descend in scrotal sacs

(6) The main source of progesterone in the early stages of pregnancy in mammals is the:

(a) placenta

(b) interstitial cells

(c) graffian follicles

(d) corpus luteum

(7) Amniocentesis is a method by which we can :

(a) grow cells on culture media

(b) identify a brain disease

(c) determine mutations

(d) determine a disease of the embryo

(8) A technique used in the making in test tube babies is :

(a) IUI

(b) ICSI

(c) GIFT

(d) ZIFT

(9) The most widely accepted method of contraception in India is:

(a) IUDs

(b) Diaphragms

(c) Tubectomy

(d) Cervical caps

(10) Lactational amenorrhea is 98% effective upto a maximum period of:

(a) 3 months

(b) 6 months

(c) 9 months

(d) 12 months

(11) Where are the genes for cytoplasmic male sterility in plants located?

(a) Chloroplast

(b) Mitochondria

(c) Cytosomes

(d) None of the above

(12) In sickle cell anaemia glutamic acid is replaced by another amino acid whose triplet code is:

(a) GGG

(b) AAG

(c) GAA

(d) GUG

(13) What determines the differences between the progeny and parents?

(a) Variation

(b) Heritage

(c) dominance

(d) Inheritance

(14) The primary site for the control of gene expression in prokaryotes is:

(a) mRNA transport stage

(b) Processing stage

(c) transcriptional initiation stage

(d) transcription stage

(15) The process of RNA splicing shows the dominance of:

(a) DNA world

(b) RNA world

(c) Protein world

(d) Microbial world

(16) Satellite DNA shows:

(a) high degree of polymorphism

(b) low degree of polymorphism

(c) no polymorphism

(d) none of the above

(17) Analogous organs arise due to:

(a) divergent evolution

(b) artificial selection

(c) genetic drift

(d) convergent evolution

(18) Abiogenesis theory of origin supports:

(a) spontaneous generation

(b) origin of life from blue-green algae

(c) origin of life is due to pre-existing organisms

(d) organic evolution is due to chemical reactions

(19) The theory of spontaneous generation stated that:

(a) life can arise from the living forms only

(b) life can arise from both the living and non-living forms

(c) life can arise from the non-living forms only

(d) life can arise spontaneously, neither from living nor from the non-living forms.

(20) Gene drift occurs when gene migration occurs:

(a) Spontaneously

(b) By chance

(c) because of a disaster

(d) Slowly

(21) Interferons are released by:

(a) liver cells

(b) spleen cells

(c) infected cells

(d) white blood cells

(22) The antibodies involved in triggering an allergic response are:

(a) Ig G

(b) Ig E

(c) Ig A

(d) Ig D

(23) Plague is caused by the bacterium:

(a) Yersinia pseudotuberculosis

(b) Yersinia pestis

(c) Yersinia enterocolitica

(d) Yersinia proxima

(24) A biopesticide used for protecting plants from butterfly caterpillars is:

(a) Trichoderma

(b) Baculovirus

(c) Glomus

(d) Bacillus thuringiensis

(25) Which alga can be used as food for the human being?

(a) Chlorella

(b) Polysiphonia

(c) Spirogyra

(d) Ulothrix

(26) Which of the following organisms is used in alcoholic fermentation?

(a) Penicillium

(b) Saccharomyces

(c) Aspergillus

(d) Pseudomonas

(27) Which of the following statement is not correct regarding primary waste-water treatment?

(a) Initially floating debris is removed by distillation

(b) Grit and pebbles are removed by sedimentation

(c) Solids that settle form the primary sludge

(d) Supernatant forms the effluent

(28) *Acinetobacter baumannii* is a:

(a) Decomposing bacteria

(b) Nitrogen-fixing bacteria

(c) Pathogenic bacteria

(d) None of the above

(29) The purpose of wine distillation is:

(a) toxicity reduction

(b) enable fermentation

(c) spoilage prevention

(d) increased alcohol concentration

(30) Which microbe cannot be used for ethanol production?

(a) Saccharomyces cerevisiae

(b) Escherichia coli

(c) Pseudomonas syringae

(d) Aspergillus niger

(31) The microbial source of restriction enzyme Hind III is:

(a) Escherichia coli

(b) Haemophilus aegyptius

(c) Haemophilus influenzae

(d) Streptomyces albus

(32) Which organism is used to transfer T-DNA into plant cells?

(a) Streptomyces hygroscopicus

(b) Salmonella typhi

(c) Agrobacterium tumefaciens

(d) Escherichia coli

(33) A plasmid vector in recombinant DNA technology is::

(a) A virus that transfers gene to bacteria

(b) extra-chromosomal autonomously replicating circular DNA

(c) DNA with sticky end

(d) any fragment of DNA carrying desirable gene.

(34) A gene gun, also known as a biolistic gun is used for:

(a) disarming pathogen vectors

(b) transformation of plant cells

(c) constructing recombinant DNA by joining with vectors

(d) for DNA fingerprinting

(35) The technique of Sothern blotting involves:

(a) attachment of probes to DNA fragments

(b) transfer of DNA fragments from electrophoretic gel to a nitrocellulose sheet

(c) comparison of DNA fragments to two sources

(d) transfer of DNA fragments to electrophoretic gel from cellulose membrane

(36) The process of RNA interference has been used in the development of plants resistant to:

(a) Nematodes

(b) Insects

(c) Fungi

(d) Viruses

(37) What can be an alternative substitute of DMSO in cryopreservation of stem cells?

(a) Knockout Serum

(b) Glycerol

(c) Beta Mercaptoethanol

(d) Methanol

(38) Transgenic animals serve as ..... for human for better understanding of genes and their functions:

(a) probe

(b) clone

(c) organism

(d) model

(39) Bt cotton is a genetically modified crop that:

(a) increases the need for broad-spectrum insecticides

(b) produces a natural insecticide to kill pests

(c) is effective against all pests

(d) is the first transgenic plant

(40) GEAC stands for:

(a) Genetic Ethical Approval Committee

(b) Genetic Engineering Active Commission

(c) Genetic Ethical Active Commission

(d) Genetic Engineering Approval Committee

(41) Mutualism is what form of interaction?

(a) Positive Intraspecific

(b) Negative Interspecific

(c) Positive Interspecific

(d) Negative intraspecific

(42) "Two closely related species competing for the same resources cannot coexist indefinitely and the competitively inferior will eventually be eliminated." This statement was made by:

(a) The Gause competitive exclusion principle

(b) The theory of mutation

(c) The theory of special creation

(d) The Organic Evolutionary Theory

(43) On what basis is the tiger census in our national parks calculated?

(a) Number of stripes

(b) Fecal pellets

(c) Number of pug marks and fecal pellets

(d) Number of limbs

(44) Which of the following determines percolation and water holding capacity of the soil?

(a) Climate

(b) soil composition

(c) weathering process

(d) soil development

(45) What percent of the incident solar radiation is photosynthetically active radiation (PAR)?

(a) 100%

(b) 85%

(c) 50%

(d) 20%

(46) According to Lindeman's trophic efficiency rule, only.....of energy is transferred from one trophic level to the next, while the remaining is lost as heat.

(a) 10%

(b) 20%

(c) 30%

(d) 50%

(47) What happens to species diversity as we move away from the equator towards the poles?

(a) increases

(b) decreases

(c) remains unchanged

(d) increases and then decreases

(48) .....have the highest number of endangered species among vertebrates.

(a) Fishes

(b) Reptiles

(c) Mammals

(d) Birds

(49) The Red Data book documents:

(a) organisms already extinct

(b) organisms on the verge of extinction

(c) endemic plants

(d) endemic animals

(50) The Similipal Biosphere Reserve is located in:

(a) West Bengal

(b) Punjab

(c) Assam

(d) Odisha

PART – II

SHORT ANSWER TYPE QUESTIONS

(Answer any 10 out of 13 questions) 10 x 5 marks each = 50 marks

51. Discuss the different functions of the placenta.
52. What do you understand by ornithophily and chiropterophily?
53. State some measures that will help in the prevention of sexually transmitted diseases.
54. What is Down's syndrome?
55. Differentiate between repetitive DNA and Satellite DNA.
56. Define Hardy- Weinberg's principle.
57. What is the principle of vaccination? Discuss how vaccines can be used to prevent microbial infections. Also write down the name of the entity from which the hepatitis B vaccine is prepared.
58. Describe broad spectrum antibiotics giving suitable examples.
59. What is a biopiracy? Discuss giving a suitable example.
60. Explain the principle involved in ELISA.
61. What methods are used to conserve biodiversity? Why is important?
62. Give an account of energy flow in an ecosystem.
63. What is the role of 'sacred groves' and 'Ramsar sites' in conservation of biodiversity?

PART- III

LONG ANSWER TYPE QUESTIONS

(Answer any 5 out of 8 questions) 5 x 10 marks each = 50 marks

64. Differentiate between oogenesis and spermatogenesis.
65. Discuss the special modes of reproduction that take place with the act of fertilization.
66. What is DNA fingerprinting? Mention its application
67. Briefly discuss the Human and rice genome projects.
68. Tabulate the various major deficiency diseases caused due to lack of vitamins and essential minerals.
69. Discuss the role of microbes as biocontrol agents for the environment.
70. What are genetically modified organisms? How are they different from hybrids?
71. What are the main modes of interactions between populations?

PART – IV

ESSAY TYPE QUESTIONS

(Answer any 2 out of 4 questions) 2 x 25 marks each = 50 marks

72. Discuss the various developmental stages of a zygote until implantation with the help of suitable diagrams.
73. Briefly discuss plant diseases, pathogen dissemination, symptoms and control measures that can be taken.
74. Describe the process of succession and elaborate on their different types.
75. What are the various tools of recombinant DNA technology?

.....x.....

SPACE FOR ROUGH WORK