



‘समानो यन्त्रः समितिः समानी’

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 6th Semester Examination, 2024

CC13-MICROBIOLOGY

MEDICAL MICROBIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

1. Answer any **five** of the following: 1×5 = 5
 - (a) What is the difference between mortality and morbidity?
 - (b) What is an endemic disease? Give example.
 - (c) What is MDR?
 - (d) Name the causative agent of Athlete's foot.
 - (e) In which infection is Amantadine used?
 - (f) What is tetanospasmin?
 - (g) Name two opportunistic pathogens of human.
 - (h) Give examples of two normal microflora found in urogenital tract.

2. Answer any **three** of the following: 5×3 = 15
 - (a) Explain the mechanism of action of griseofulvin. 5
 - (b) What are cutaneous mycoses? Describe the symptoms in detail of an opportunistic mycosis. 1+4
 - (c) Mention four most common types of malaria along with the specific causative agents. What causes chills and shivering associated malarial fever recurrence? How do malaria get transmitted? 2+2+1
 - (d) Explain the mode of transmission and prophylaxis of Kala-azar. 2+3
 - (e) What is spectrum of activity for antibiotics? What are the types under spectrum of activity? Give example. Briefly describe the mode of action of Amphotericin B. 1+2+2

3. Answer any **two** of the following: 10×2 = 20
 - (a) Elaborate the mode of action of an antibacterial cell wall synthesis inhibitor and an antibacterial protein synthesis inhibitor. Add a note on serology-based diagnostic tests. 3+3+4
 - (b) Describe different types of disease transmission. Name one medically important exotoxin and its producing organism. Add a note on antibiotic resistance. 4+2+4
 - (c) Explain the mechanism of pathogenicity of *Bacillus anthracis*. Give an account of its prophylaxis and control. 6+4
 - (d) Write short notes on: 5+5
 - (i) Nosocomial infection
 - (ii) Pathophysiologic effects of LPS.

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CC14-MICROBIOLOGY
RECOMBINANT DNA TECHNOLOGY

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **five** of the following: 1×5 = 5
 - (a) Name a vector exhibiting chromosome walking property. 1
 - (b) Define microinjection. 1
 - (c) State one disadvantage in electroporation method. 1
 - (d) Who discovered restriction enzyme? 1
 - (e) What is chromosome walking? 1
 - (f) Mention the role of reverse transcriptase enzyme in DNA microarray. 1
 - (g) What are vir-genes and where are they located? 1
 - (h) What is the role of chloroform in DNA extraction protocol? 1

2. Answer any **three** of the following: 5×3 = 15
 - (a) Write down the construction and application of BAC. 5
 - (b) Discuss the properties of pUC18 vector. Differentiate between insertion and replacement phage vector. 3+2
 - (c) Write a short note on Southern blotting. 5
 - (d) Mention the steps involved in gene cloning. 5
 - (e) State the application of Type-II restriction enzymes in genetic engineering. 5

3. Answer any **two** of the following: 10×2 = 20
 - (a) Schematically represent the steps for colony PCR. Write a short note on Bt cotton. 7+3
 - (b) Discuss in detail how *Agrobacterium* sp. is used in gene delivery in molecular cloning. Explain briefly one technique for direct gene transfer in plants. 6+4
 - (c) Schematically explain the production of rec insulin. Write down the applications of RT PCR. 7+3
 - (d) State the role of SDS, APS and TEMED in SDS-PAGE. Discuss the different forms of plasmid observed in agarose gel. 3+7

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‘সমানো মন্ত্র: সমিতি: সমানী’

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DSE-P3-MICROBIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

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**The question paper contains two parts DSE-5 and DSE-6.
The candidates are required to answer any *one* from the *two* parts
Candidates should mention it clearly on the Answer Book.**

DSE-5 (BIOSAFETY AND INTELLECTUAL PROPERTY RIGHTS)

1. Answer any *five* of the following: 1×5 = 5
 - (a) Name any two microorganism which should be handled in class-III biosafety lab. 1
 - (b) Write down the full form of NBC. 1
 - (c) What is a class-II safety cabinet? 1
 - (d) What is WIPO? 1
 - (e) What is AERB in radiology? 1
 - (f) What is the Hague Agreement? 1
 - (g) What is the main benefit of the Budapest Treaty? 1
 - (h) Mention a feature of BSL-I laboratory. 1

2. Answer any *three* of the following: 5×3 = 15
 - (a) Discuss about the primary containment for biohazards. 5
 - (b) What is the principle of biosafety cabinet? What is the most commonly used biosafety cabinet and why? 2+3
 - (c) What about the different type of patents? Why are patents useful? 2+3
 - (d) What is TRIPS agreement? Does India follow TRIPS agreement, explain it. 2+3
 - (e) What is Madrid agreement? Discuss about traditional knowledge. 2+3

3. Answer any *two* of the following: 10×2 = 20
 - (a) Compare and contrast between patent, copyright and trademark. Discuss about the patent filling procedure. 6+4
 - (b) Write in detail RSD guidelines for using radioisotopes in laboratories and its precautions. 6+4
 - (c) Discuss the role of IBSC for GMO application in food and agriculture. Discuss about the Cartagena Protocol. 7+3
 - (d) Write a note on the features of Plant Breeders' Rights. Discuss the advantages and disadvantages of IP Protection. 5+5

DSE-6 (INHERITANCE BIOLOGY)

1. Answer any **five** of the following:

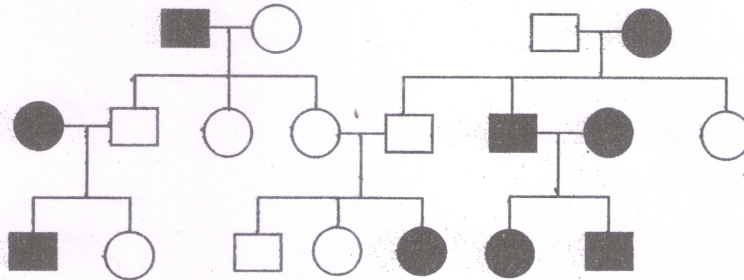
1×5 = 5

- What is the significance of pedigree analysis?
- What is chromosome banding?
- Define multiple alleles.
- What is chiasma?
- What is site-specific recombination?
- What is LOD score?
- What are pseudoalleles?
- Define independent assortment.

2. Answer any **three** of the following:

5×3 = 15

- Write a note on Down syndrome. 5
- With a suitable diagram describe the packaging of DNA molecule into chromosome. 5
- Write notes on polytene and lampbrush chromosomes. 5
- Analyse the given pedigree chart and write a detailed comment. 5



(e) Describe dominant epistasis with suitable example.

5

3. Answer any **two** of the following:

10×2 = 20

- With suitable example describe the various chromosomal aberrations based on structure and number. 10
- Explain the terms coupling and repulsion with examples. Write a note on mitochondrial mutations in *Saccharomyces* sp. 4+6
- Explain complete linkage with a suitable example. Describe the various factors affecting the strength of linkage. 5+5
- Describe the maternal inheritance governing the principles of extranuclear inheritance. Mention the four main characteristics of extranuclear inheritance. 7+3

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DSE-P4-MICROBIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

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**The question paper contains two sections DSE-7 and DSE-8.
The candidates are required to answer any *one* from *two* sections and
Candidates should mention it clearly on the Answer Book.**

DSE-7 (MICROBES IN SUSTAINABLE AGRICULTURE AND DEVELOPMENT)

1. Answer any *five* of the following: 1×5 = 5
 - (a) What is phytoremediation?
 - (b) What are PGPB?
 - (c) Name two organisms used as biocontrol agents.
 - (d) Define humus.
 - (e) What are biofuels?
 - (f) Name two genes that are introduced to produce golden rice.
 - (g) Give two examples of lignocelluloses-decomposing bacteria.
 - (h) What are greenhouse gases?

2. Answer any *three* of the following: 5×3 = 15
 - (a) What are non-symbiotic nitrogen fixers? Write down their group characteristics in relation to nitrogen fixation. 2+3
 - (b) Which vitamin is abundant in golden rice? What are the social advantages of golden rice? 1+4
 - (c) What is soil profile? Give a detailed account of soil microflora. 1+4
 - (d) Write down examples of different desirable traits that are introduced in GMOs. 5
 - (e) Discuss the infection process of *Frankia* in actinorhizal plants. 5

3. Answer any *two* of the following: 10×2 = 20
 - (a) Describe anaerobic digestion carried out in digester during biogas production. Mention its process parameter and disadvantages. 6+4
 - (b) Write short notes on: 5+5
 - (i) Mineralization of lignin and humus
 - (ii) Advantages and environmental aspects of transgenic animal.
 - (c) Write notes on characteristics and field application of VAM. 6+4
 - (d) Give a comparative account of biopesticides and chemical pesticides. Give a brief account of large-scale production and advantages of biofertilizers. 3+7