BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – M.Sc.(MB)-2023
Course Name – Pharmaceutical Microbiology
Course Code - MMBE204
(Semester II)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Define microbial limit testing in pharmaceutical microbiology.

a) Determining the total number of microorganisms present in a pharmaceutical product or raw material within specified limits
b) Identifying specific microorganisms responsible for contamination in pharmaceutical manufacturing facilities
c) Assessing the effectiveness of antimicrobial agents against a broad spectrum of pathogens
d) Evaluating the stability of pharmaceutical formulations under different storage conditions

(ii) Find the primary purpose of conducting validation studies in pharmaceutical microbiology.

a) To establish the efficacy of a new antimicrobial agent against known pathogens
b) To ensure that pharmaceutical products meet regulatory requirements for microbial quality and safety
c) To investigate the genetic diversity of microbial populations within a manufacturing environment
d) To determine the optimal pH and temperature conditions for microbial growth in a culture medium

(iii) Select the microbial source posing the highest risk to pharmaceutical products during the manufacturing process.

a) Skin flora
b) Raw materials
c) Airborne contaminants
d) Packaging materials

(iv) How did the discovery of the medicinal properties of plants contribute to early chemotherapy?

a) Derived new treatments
b) Improved surgical techniques
c) Increased mortality rates
d) Developed new vaccines

(v) Which chemical element was a key component of early chemotherapy drugs derived from minerals?

a) Arsenic
b) Iron
c) Calcium
d) Zinc

(vi) Define the main goal of implementing GMP standards in pharmaceutical manufacturing?

a) Consistency in quality
b) Minimizing competition
c) Maximizing advertising
d) Streamlining bureaucracy

(vii) How do GMP regulations impact the final pharmaceutical product?

a) Ensures safety and efficacy
b) Reduces shelf life
c) Increases production costs
d) Decreases marketability

(viii) Identify the primary target site of action for antibiotics in bacterial cells.

a) Ribosomes
b) Cell membrane
c) Mitochondria
d) Nucleus

(ix) A prodrug is:

a) An inactive drug that is transformed in the body to an active metabolite
b) An inactive drug that is transformed in the body to an active metabolite
c) The oldest member of a class of drugs
d) A drug that is stored in body tissues and is then gradually released in the circulation

(x) Choose among the given lubricants which is not used in oral tablets

a) Talc
b) Magnesium stearate
c) Boric acid
d) None

(xi) Compare the advantages and disadvantages of the Etest method versus the broth microdilution method for determining MIC

a) Precision of MIC measurement
b) Requirement for specialized equipment
c) Sensitivity to fastidious organisms
d) Ability to detect heterogeneous resistance

(xii) Estimate the impact of high MIC values on the efficacy of antibiotic therapy.

a) Increased likelihood of treatment failure
b) Reduced risk of antibiotic resistance
c) Accelerated bacterial clearance
d) Minimized adverse effects

(xiii) Assess the advantages and limitations of next-generation sequencing (NGS) techniques for microbial content testing in food products.

a) Resolution for taxonomic identification
b) Cost-effectiveness
c) Sensitivity to environmental contaminants
d) Turnaround time for results

(xiv) Justify the use of ATP bioluminescence assays over traditional plating methods for rapid microbial content testing in water samples.

a) Ability to detect viable but non-culturable (VBNC) cells
b) Sensitivity to specific microbial species
c) Precision of microbial quantification
d) Speed of analysis

(xv) Compare the advantages and disadvantages of flow cytometry versus microscopy for microbial content testing in clinical specimens.

a) Resolution for morphological characterization
b) Speed of analysis
c) Ability to differentiate between live and dead cells
d) Requirement for specialized training

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Select one type of raw material commonly used in pharmaceutical production and tell how its skin flora can impact product quality. (3)
3. Choose one method used to assess antimicrobial preservation efficacy and show how it works. (3)
4. Define microbial content testing and select one common method used for this purpose in the pharmaceutical industry. (3)
5. Choose different types of microorganisms occurring in pharmaceutical products (3)
6. Explain the procedure involved in determining the Phenol coefficient of a disinfectant using the Rideal-Walker method. (3)

OR

Determine the purpose of the Phenol coefficient assay in evaluating the efficacy of nonmedicinal antimicrobials. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Distinguish between Gram positive and Gram-negative bacterial cell wall (5)
8. Prepare an experimental utilization of pharmacogenomics with example. (5)
9. Evaluate the importance of pharmacokinetics (5)
10. Summarize the significance of microbial stability evaluation in pharmaceutical formulations, and interpret how it aids in ensuring product safety and regulatory compliance. (5)
11. Interpret the role of accelerated stability studies in evaluating microbial stability, and summarize how they expedite product development and quality assurance processes. (5)
12. Justify the significance of understanding the biochemical and genetic basis for antibiotic resistance in developing targeted therapies. (5)

OR

Compare the efficacy of vertical transmission versus horizontal gene transfer in disseminating antibiotic resistance genes. Estimate the impact of each mechanism on the evolution of multidrug-resistant bacteria. (5)

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