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BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – B.Sc.(BT)-Hons-2022

Course Name – Medical Biotechnology

Course Code - BBTD603C

(Semester VI)

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) Select among the following the primary purpose of animal cell culture.
 - a) Synthesis of inorganic materials
 - b) Study of cellular processes
 - c) Storage of data
 - d) Extraction of minerals
- (ii) Identify the type of culture that is established directly from tissues of an organism
 - a) Continuous cell culture
 - b) Primary cell culture
 - c) Suspension culture
 - d) Hybridoma culture
- (iii) Select an application of animal cell culture among the following.
 - a) Vaccine production
 - b) DNA sequencing
 - c) Protein electrophoresis
 - d) Plant hybridization
- (iv) Select the cell line used in recombinant protein production.
 - a) Primary fibroblasts
 - b) CHO (Chinese Hamster Ovary) cells
 - c) Vero cells
 - d) Hybridoma cells
- (v) Select the biosafety level (BSL) that is required for working with animal cells infected with pathogens.
 - a) BSL-1
 - b) BSL-2
 - c) BSL-3
 - d) BSL-4
- (vi) Describe the use of dry heat in sterilization process
 - a) Glasswares
 - b) Plastic wares
 - c) Culture media
 - d) Biological fluids
- (vii) Identify among the following that is NOT a sterilization method.
 - a) Boiling
 - b) Incineration
 - c) Filtration
 - d) Pasteurization
- (viii) Select the type of radiation that is used for sterilizing disposable medical equipment.
 - a) Ultraviolet (UV)
 - b) Infrared
 - c) Gamma rays
 - d) X-rays
- (ix) Choose among the following that is NOT a function of vaccine adjuvants.

- a) Enhancing antigen uptake by antigen-presenting cells
- b) Increasing the duration of antigen presentation
- c) Acting as a primary antigen
- d) Stimulating cytokine production
- (x) Determine the method commonly used to deliver DNA vaccines into cells.
 - a) Oral administration
 - b) Intramuscular injection with electroporation
 - c) Intravenous injection
 - d) Inhalation
- (xi) Determine the content of recombinant Hepatitis B vaccine.
 - a) Whole live virus
 - b) Surface antigen protein (HBsAg)
 - c) Attenuated viral particles
 - d) Lipopolysaccharide endotoxins
- (xii) Choose the conditions commonly treated with gene silencing therapy.
 - a) Cystic fibrosis
 - b) Huntington's disease
 - c) Hemophilia
 - d) Sickle cell anemia
- (xiii) Select the biggest challenge in gene therapy development among the following.
 - a) Lack of interest in genetic diseases
 - b) Delivery of genes safely and efficiently
 - c) Excessive success in all treatments
 - d) High levels of public opposition
- (xiv) Select among the following retroviruses that is most commonly used in gene therapy.
 - a) Human Immunodeficiency Virus
 - b) Rous Sarcoma Virus
 - c) Murine Leukemia Virus
 - d) Ebola Virus
- (xv) Choose the essential part of preclinical drug testing among the following.
 - a) Phase 1 clinical trials
 - b) In vivo and in vitro studies
 - c) Patient enrollment
 - d) Drug pricing analysis

Group-B

(Short Answer Type Questions)

3 x 5=15

(Answer any Five from the following)

- 2. Define cell synchronization and its significance in cell culture. (3)
- 3. Explain the role of antibiotics in animal cell culture. (3)
- 4. Discuss the role of standardized inoculum preparation in broth dilution procedures. (3)
- 5. Describe the role of restriction fragment length polymorphism (RFLP) in strain differentiation of bacterial pathogens. (3)
- 6. Evaluate the role of CRISPR-Cas9 technology in accelerating the identification of novel drug targets. (3)

OR

Evaluate the potential of nanotechnology-based drug delivery systems in improving drug bioavailability. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

(Answer any Six from the following)

- 7. Identify key methods for measuring cell viability in animal cell culture. (5)
- 8. Describe the working principle of ultrasonication in microbial control. (5)
- 9. Propose a combined gene and stem cell therapy approach for treating type 1 diabetes. (5)
- 10. Analyze the factors influencing zone size in diffusion tests. (5)
- 11. Analyze the role of bioinformatics and computational tools in predicting drug interactions with G-protein-coupled receptors (GPCRs). (5)
- 12. Compare the advantages and disadvantages of live-attenuated versus killed vaccines. (5)

OR

Critically assess the significance of WHO's role in global immunization initiatives. (5)