

M. SC. (BIOTECHNOLOGY) PART II EXAMINATION, 2017

MEDICAL BIOTECHNOLOGY

PAPER - 2/4 A

Time : Four hours

Full Marks : 100

GROUP - A

Answer *any four* questions

1. a) How can FISH technique help in the detection of chromosomal abnormalities ? Give the strategy to develop the probes for chromosome painting ?
b) Outline the advantages of using DNA as diagnostic tool compared to monoclonal antibody. How DNA based diagnostic tool can be used to detect mutation which are located at different region of gene ? (5+3)+(4+4)=16
2. a) What is DNA vaccine ? How DNA vaccines are produced, Give schematic diagram ? How shigella flexneri can be modified to deliver such vaccine ?
b) How bacteria can be used for the delivery of antigen for the vaccination ? (2+6+3)+(5)=16
3. a) OKT3, the mouse monoclonal antibody was first approved in 1986, how does OKT3 help in transplantation ? What kind of problem a patient may face after administration of such drugs ?
b) How Alginate lyase can be produce a from Flavobacterium Sp. for the treatment of Cystic fibrosis ? Outline the characteristics of single chain antibody used for therapeutic purposes. (4+2)+(6+4)=16
4. a) What's the difference between mice with a 'knockout' and 'transgenic' mice ? Give one each application of transgenic animals and knock-out mice.
b) Discuss the several mechanisms that are now used to control transgene expression. Briefly mention working principle of Cre-Lox recombination system ? (2+6)+(5+3)=16
5. a) Out line the strategy to develop ex vivo gene delivery using retro virus mentioning the role of packaging cell line.
b) What is suicidal gene ? How does it work ? Why the phase I trial of such agent was failed ? How it was improved ? (6)+(2+3+2+3)=16
6. Short note (*any four*) : (4×4)=16
 - a) Si RNA versus Sh RNA
 - b) prodrug activation theory

- c) Oncolytic virus
- d) Dendrimer as therapeutic agent
- e) CRISPAR CAS as genome editing
- f) Cell penetrating peptide

GROUP - B

Answer **any two** questions (16 marks each)

6. a) Amphotericin B can be used therapeutically
 - i) In which class of Antibiotics does the above fall ? 1
 - ii) What are the characteristics of this class of antibiotics ? 2
 - iii) How does this antibiotic work ? 2
 - iv) What factor is responsible for its therapeutic use ? 1
 - v) What kind of infections are treatable by this antibiotic ? 8
- b) What is D value ? 2
7. a) Why is combination therapy useful ? Cite one example. 2
- b) Why is moist heat more effective than dry heat in destroying microbes ? 2
- c) An epidemiologist wants to assess the effect of tea drinking on blood pressure. He decides to do an intervention study. Which of the following measures does not increase the internal validity of the study ? 1
 - i) Careful monitoring of blood pressure during the study
 - ii) Inclusion of a control group
 - iii) Randomization
 - iv) Random selection of a participants from the general population
- d) You are given an overnight grown bacterial culture and several tubes each containing Penicillin, Streptomycin, Chloramphenicol, Ampicillin, Cephalosporin and Erythromycin.
Describe how you would determine which of the above antibiotic/(s) would check the growth of the given bacterial culture. 6
- e) Explain Tyndallization. 5

8. a) A scientist working in the laboratory falls ill and was diagnosed with anthrax disease.
 - i) At which biosafety level laboratory does the scientist work ? 1
 - ii) Mention three protective measures he should have taken while working at that level. 3
 - iii) What facility features should have been provided in such a laboratory ? 4
 - iv) Name another disease that would fall in this biosafety level. 1
- b) What is disease burden ? 2
- c) What are R plasmids and how are they different from regular plasmids ? Where are they used ? 3
- d) Why does Sulfa drugs develop resistance more quickly than the other drugs ? 2
9. a) The deficiency of the enzyme Glucose 6 phosphatase Acid Maltase causes a diseased state.
 - i) Name the disease. 1
 - ii) How many different types of this disease are known ? 1
 - iii) What is the cause of such a disease ? 1
 - iv) What are the symptoms of this disease ? 2
- b) What is Ultrahigh temperature sterilization ? Where is it used ? 2
- c) What do you mean by Biological warfare ? Describe the different Biological Warfare operations so far available. 5
- d) Define the following terms (*any two*) 2+2
 - i) Morbidity
 - ii) Outbreak
 - iii) Endemic
 - iv) YLD

[*neatness = 4 marks*]
