BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
SECOND SEMESTER 2016-17
BIO G524 ANIMAL CELL TECHNOLOGY
COMPREHENSIVE EXAMINATION

Max. Marks: 40CB + 40OB
Time: 180 min

Date: 13/12/16

Note: Answer Part A (Closed Book) and Part B (Open Book) is separately in the same answer sheets. Equal time and marks are allotted to both parts, however you may complete the Closed book paper earlier and take the next part.

PART A
CLOSED BOOK

Q1. What are 4 important disadvantages of deriving information from a subculture as compared to from a primary culture? (4)

Q2. Draw a representative picture of cell cycle labeling the following: (5)

(i) Restriction points
(ii) Phases
(iii) Cyclins
(iv) Cdks activated by regulatory genes
(v) Resceptor kinase interaction with mitogen

Q3. Mention the name of 6 biohazardous chemicals used in ACT and their possible side effect. (3)

Q4. Graphically Depict the standard growth cycle with routine passage . (3)

Q5. Answer in one line each (4)

(i) Why are secretary epithilia dome shaped?

(ii) Mention the most suitable imaging technique for real time *in vitro i*maging of cells. Justify.

(iii) Which type if cell is the basis of the most predominant type of cancers?

(iv) Suggest a suitable parameter to compare the cytoxicity of 2 different drugs.

Q6. What is DNA bar coding? Why is it used? (2)

PTO

Q7.Given below is a figure in which cytotoxicity was performed by 3 different methods.

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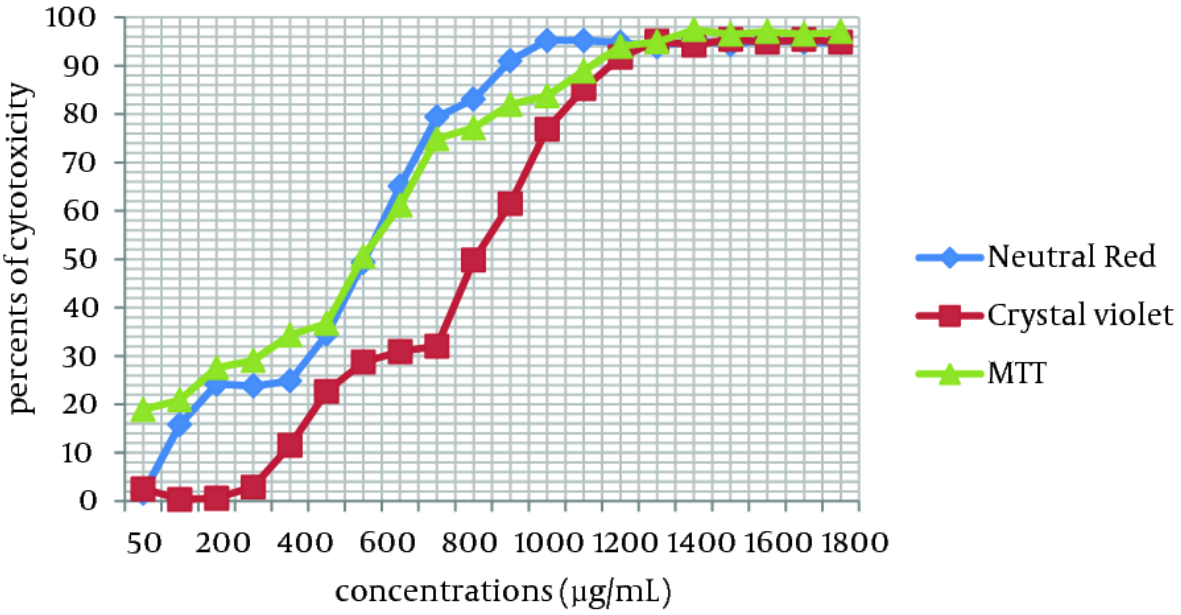

(i) Which of these methods is least suitable and Why? (2)

(ii) Which will be the most suitable range of concentration for MTT assay.

Q8. Draw a labeled representative picture of a bioreactor with relevant process control systems. (2)

PART B

Q9. Why is the need to feed cells during cloning debatable ? Mention the possible advantages and disadvantages**.** **(2)**

Q10.Oxo acids such as pyruvate or α-oxogluterate are sometimes added in media. What is the role of these? (2)

Q11. When and why is a flotation medium such as Flurochemical FC-43 sometimes used? (3)

Q12. Give two examples of antibody based techniques for cell sorting, with explanations. (2)

Q13. What do the substances selenium, transferring, albumin, estrogen, ethanolamine, EGF, FGF, PDGF, etc. have in common as far as use in culture is concerned**.** (2)

Q14.What are the sequential steps before transportation of cells from one lab to another. (2)

Q15. Give five reasons for freezing cell lines. (2)

END

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PART B
OPEN BOOK

Q1. Briefly differentiate between the following terms giving one example of each. (6)

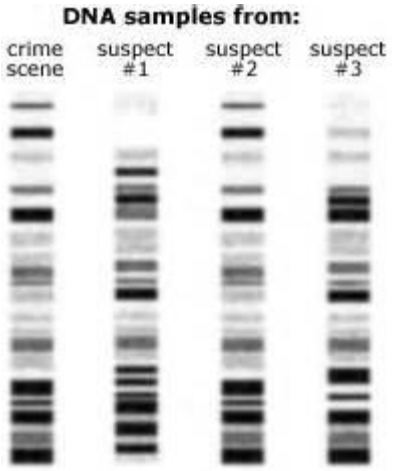
A. (i) In Vitro (ii) In Vivo (iii) Ex Vivo (iii) In Situ
B. (i) Autologous (ii) Syngeniec (iii)Allogeniec (iv)Xenogeniec

Q2. Ramnath, a post doctoral research scholar needs to work on HIV, whereas, his friend Shyamnath needs to work on Ebola. What is the difference in the biosafety measures that are required to be taken by Shyamnath as compared to Ramnath. Justify your answer. (4)

Q3. Suppose you are maintaining a adherent cell Line, ABC, but its rate of growth is not appropriate what are the various options (any 6) which you can follow to rectify the situation. (4)

Q4. If you suspect cross contamination in your culture what suitable action should you take? (4)

Q5. A band pattern as given in lane 1 was obtained. Identify the suspect from the crime scene. Justify. (2)



Q6. Suggest a radioactivity based method for estimating cytotoxicity of Lymphocytes against a target cell line. Draw a flow diagram to elucidate the same. (2)

PTO

Q7. What would there be any disadvantage of using the following monolayer scaling up procedures for non adherent Cells. Justify. (3)

(i) Roller culture bottles
(ii) Microcarriers

SECTION B

Q8. During monoclonal antibody production a student decided to decrease the number of serial dilutions so that the probability of getting an expressing clone would increase. Was this action justifiable? Explain with reasons. (3)

Q9. During an immunoprecipitation experiment using polyclonal antibodies, 2 distinct bands were detected after gel autoradiography from a cell lysate. These bands were of different sizes. Under the conditions used to prepare the cell lysates both increased as the temperature was increased from 30- 42 ^{o}C. You initially expected one band. What could be the possible reasons for such an observation?(3)

Q10.Where do you use an underlay in animal cell culture? What is the purpose for the same? (3)

Q11.What are the 2 different methods for preparing density gradients manually. Explain with the aid of diagrams. (3)

Q12. During subculture of monolayer cells the indicator in the medium still indicates rise in pH after 1 hour although the medium already had a 5% CO2 gas phase. What could be an immediate solution and what could be a long term solution to stabilize the pH. (3)

GOOD LUCK