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VII SEMESTER B.TECH. (BIOTECHNOLOGY ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: ANIMAL AND PLANT BIOTECHNOLOGY

[BIO401]

REVISED CREDIT SYSTEM
(11/11/2015)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitable assumed.

1A.	After observing mt DNA in a wheat plant, the student writes as "mt DNA in the wheat plant is organized as different circles". Will you logically accept this statement? Justify your reasoning.	**3**
1B.	Prof Raghu was working with cp genome of plants. He found a sequence similarity of cp genome with a bacterial genome which can fix carbon. How can you explain his findings?	**3**
1C.	Ms. Geetha wants to insert a retinol gene (size 3 Mb) into a rice plant. (i) What are the ethical regulations she should follow? (ii) Which method she can use for this gene transfer. Explain (iii) Once she successfully transfers, how she can protect her patent rights? (iv) Now Ms. Geetha wants to insert this gene into a GI tagged rice plant and patent it. After this, whether she gets a patent for this? Explain	**4**
2A.	Dr. Praveen wants to know the phenotype of an allele named 'r'. He is having a plant Rr showing a specific phenotype. (i) Is it possible to find out the phenotype of 'r' using tissue culture method? Explain (ii) Which explant is best for this? Justify your choice. How will you proceed further?	**3**
2B.	Dr. Vijay is working on plant cell suspension cultures. His grant is already exhausted except some contingency fund. Now he realizes that the following equipments are not working. (a) Autoclave (b) UV Microscope for viability testing. Suggest a temporary idea he can overcome these difficulties without hindering much of his work. Justify your reasoning.	**3**
2C.	*Sida* is a medicinal herb and ephedrine is one of its active constituent. Cell suspension cultures were successfully raised for *in vitro* production of ephedrine from this plant. (i) Ms. Rose wants to prepare a "growth and production curve". Help her (ii) She finds that much of the ephedrine is accumulated in vacuoles. She want it to be released into the culture medium without sacrificing the cells. Suggest a strategy (iii) Mr. Jack is specialized in	**4**

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	plant biotechnology and holds an MBA. He is looking for scaling up. What are the factors he should consider?	
3A.	Mr. John want to combine the characters of his plant varieties A and B. With the help of a flow chart, illustrate how he can do this.	**3**
3B.	The DNA contained within *Paris japonica* dwarves all other plant and animal genomes that have been analyzed so far. It is 50 times longer than the human genome. The working of human system is comparatively more complex than that of a plant, but human genome is small compared to a plant here. How will you justify this?	**2**
3C.	Mention the disadvantages (any six) of serum in a culture medium	**3**
3D.	Write applications of Intrinsic fluorophores in fluorescence microscopy	**2**
4A.	Dr. Pradeep wanted his student Ms. Shwetha to perform MTT assay following treatment with anticancer compound. He has given the protocol to her to perform the assay. Detail protocol followed by Ms. Shwetha for MTT assay is given below. Breast cancer cells were seeded in 96 well plate (at appropriate density), allowed to attach overnight. Following which cells were incubation with 30µg of anticancer compound (dissolved in appropriate solvent) for 24 h. After the incubation, anticancer compound was removed, and cells were incubated with MTT for 3-4 hr. After the incubation, she measured the absorbance at 540-570 nm. However, she could not get any absorbance reading due to lack of color formation/development. When she discussed this with her mentor Dr. Pradeep, he wanted to observe her 96 well culture plate. Upon observation under microscope, he could able to see the crystal formation within the cells which indicates the reduction of MTT to formazan. a) Although there was reduction of MTT to formazan in the cells, why Ms. Shwetha could not get absorbance reading or lack of color formation? b) Write the principle of MTT assay c) What do you mean by IC_{50}	**4**
4B.	a) Compare and contrast Adherent and suspension cells b) Comment on BrdU assay	**3**
4C.	Dr. Rosy received Keratinocyte and fibroblast cell line in frozen form from ATCC. She asked her recently joined student Mr. Roopesh to maintain the cell line. While sub culturing the cells, he used Biological safety cabinet I. a) Why the cell lines are shipped in the frozen form? Write the general composition of freezing medium. b) What will happen if he uses Biological safety cabinet I for the cell culture? c) Which class of Biological safety cabinet will be suitable for cell culture procedures? Justify	**3**
5A.	Dr. Natarajan was interested to investigate induction of programmed cell death in colon cancer cells by snake venom from *Vipera lebetina turanica*. To this end, colon cancer cells were incubated with appropriate concentration of snake venom for 3 h. Following incubation, treated colon cancer cells were stained with Propidum iodide to measure the apoptotic cell population through flow cytometry. Is it possible to measure the population of apoptotic cells through only PI staining? Give your comments. Discuss a method which	**4**

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	can be used to measure apoptotic cell population through flow cytometry. Write the principle of the method which you mentioned.	
5B.	Mention the disadvantages of using antibiotics in routine maintenance of cell culture. Why it is advised to supplement antibiotics in culture medium during primary culture?	**3**
5C.	Write a note on following a) Enzymatic tissue disaggregation b)Mechanical tissue disaggregation	**3**
6A.	Explain the role of these chemicals in plant biotechnology research (a) PEG (b) Tween 80 (c) Mercuric chloride	**3**
6B.	*Vanda* is an orchid. What is the ideal strategy for its mass multiplication?	**2**
6C.	Dr. Rakesh has recently published a book on “Industrial Biotechnology”. Suggest a method for him to protect his Intellectual property	**2**
6D.	Write a note on patent. Name the three important criteria to grant a patent. Mention the benefits and disadvantages of patenting.	**3**