Reg. No.										

MANIPAL ACADEMY of HIGHER EDUCATION

(Deemed to be University under Section 3 of the UGC Act, 1956)

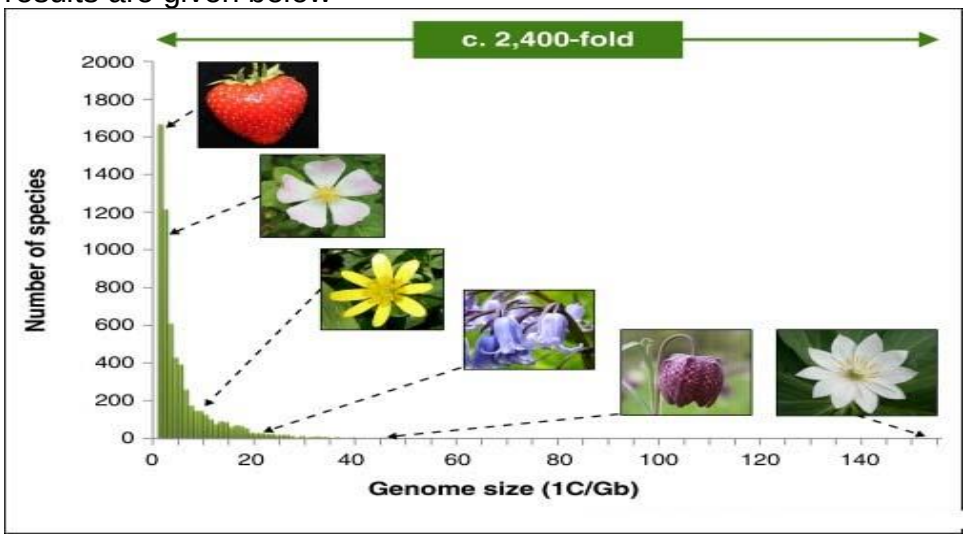
V SEMESTER B.TECH. (BIOTECHNOLOGY)

END SEMESTER EXAMINATIONS, NOV/DEC 2019

SUBJECT: ANIMAL, PLANT BIOTECHNOLOGY AND BIOETHICS [BIO 3101]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

1A.	Ms Asmitha was working with genome size comparison of various plants. The results are given below  (a) What can be the reasons for wide variation? (b) Do you thing that C value and N value in these species are different or same? Justify	**4M**
1B.	You have all the facilities and techniques for the creation of a new tailor-made plant. Design a chloroplast genome for this species. Give a drawing of your design and justify	**3M**
1C.	Given below is a table showing the ploidy levels of few agricultural crops? Analyze the table and answer the following questions **Common name** — **Ploidy** Maize — 2x=20 Wheat — 6x=42 Rice — 2x=24 Potatoes — 4x=48 Soybeans — 2x=40 Barley — 2x=14 Tomatoes — 2x=24 Bananas — 3x=33 Watermelon — 2x=22 Sugarcane — 8x=80 Sugar beet — 2x=18 Cassava — 2x=36 (a) What is the haploid basic chromosome number in wheat? (b) Can Banana reproduce sexually? Justify (c) What is the reason for different ploidy levels in plants?	**3M**

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2A.	Design a protocol for the genetic modification of the cotton plant for a) Ball worm resistance b) Edible cotton seeds	**4M**
2B.	You have 1 mg/ml solution of growth regulators BA and IAA. Propose a growth regulator regime to be added to 1 litre of MS media for (a) Axillary shoot proliferation (b) Callus formation from sweet potato (c) Rooting of microshoots of Pea	**3M**
2C.	In Neem cell suspension cultures, the accumulation of biomass is directly proportional to azadirachtin yield. (a) Prepare a possible growth and production curve graph (b) Azadirachtin is found to be accumulated in vacuoles. How will you release them into media? (c) What factors you will consider for scaling up of azadirachitin?	**3M**
3A.	Ms Ankita is having a novel process for the purification of the active metabolite from a wild pepper plant (a) Where she should approach for patenting? (b) What are the "searches" she should do during the filing of patent application? (c) Can she patent the wild pepper? Justify	**3M**
3B.	How will you modify the genome of a plant virus as a vector for plant transformation?	**2M**
3C.	Write a note on adhesion molecules	**3M**
3D	Ms. Ritu was culturing Breast cancer cells in her lab. For one of her experiment she seeded (1 X 10^5 Cells) in culture flask, containing media with 10% FBS. She incubated the flask in CO_2 incubator (5% CO_2 & 37°C). After 48 hours, complete media was evaporated from the flask. What could be possible reason for the observed problem and suggest a remedy.	**2M**
4A.	List out all the potential reasons for the below-mentioned problem and suggest a suitable/appropriate remedy a) Nature of the problem: Changed cell appearance after cryopreservation — Cause: — Remedy: — b) Nature of the problem: Slow growth of cells upon subculture — Cause: — Remedy: —	**4M**
4B.	Describe Enzymatic tissue disaggregation method	**3M**
4C.	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.	**3M**

	What will be the outcome of this experiment? Give your comments. Discuss a method which can be used to measure apoptotic cell population through flow cytometry. Write the principle of the method which you mentioned.	
5A.	To test cell counting/cell viability trypan blue & neutral red method separately used for the same cell suspension. Cultured cells were trypsinized, following detachment, effect of trypsin neutralized by the addition 4.8 mL culture medium with 10% FBS. From this 10µL cell suspension was mixed with 50µL of Neutral red for cell counting using improved Neubauer's chamber. For another 10 µL cell suspension mixed with 20µL of Trypan blue for cell counting using improved Neubauer's chamber. She counted both stained and unstained cells in both the methods separately and results are shown below. **<u>Trypan Blue method</u>** Total Stained & Unstained cells (Including 4 squares)- 300 No of stained cells- 10 (Including 4 squares) **<u>Neutral red method</u>** Total Stained & Unstained cells (Including 4 squares)- 152 No of stained cells- 145 (Including 4 squares) From the data given above answer the following questions a) Express the cell density/mL for both the methods (Neutral red & Trypan blue) b) Express the percentage of viability for both the methods (Neutral red & Trypan blue) c) Express the number of viable cells in the cell suspension (by both methods) d) Compare the findings of both the methods and give your comment.	**4M**
5B.	Ms. Roopa wanted to study the effect of radiation treatment on Neuroblastoma cells. She intended to use fluorescent microscopy for this experiment. a) If Roopa want to distinguish live and dead cells following radiation treatment, which will be the most appropriate fluorescent dye specific for dead/necrotic cells? b) Comment on disadvantages of fluorescence microscopy	**3M**
5C.	Name the three important criteria to award a patent. Mention the benefits and disadvantages of patenting.	**3M**