

**FIJI NATIONAL UNIVERSITY**

College of Agriculture, Fisheries &amp; Forestry

Bachelor of Science in Agriculture, Trimester II Final Examination - 2017

**HOR 704: Breeding of Horticultural Crops****Time Allowed: 3.00 hours (including reading time) Total Marks: 100****INSTRUCTIONS:**

1. This paper consists of **seven** pages including **two** pages of Answer Sheets.
2. Please check to see that all your paper is complete.
3. Answer all the Objective Type Questions on the Answer Sheets and Descriptive Type Questions in the Answer Booklet only.
4. **NO** written or printed material and mobile phones are allowed in the examination hall.
5. Marks allocated for each question appears at the side of each question so allocate your time accordingly.
6. This paper is divided into **Two (2)** parts. First part contains Objective Type Questions which is having **four (4)** Sections – A, B, C and D. Second part is Descriptive Type which is having **six (6)** questions. All questions are compulsory.

**I. OBJECTIVE TYPE QUESTIONS (40 Marks)****To be answered only on the Answer Sheet.**

Section A: Fill in the blanks. (10 Marks)

Section B: Multiple choice Questions. (10 Marks)

Section C: Write True or False. (10 Marks)

Section D: Match the following. (10 Marks)

**II. DESCRIPTIVE TYPE QUESTIONS (60 marks)**

There are **six (6)** descriptive type questions, please provided short and precise answers. Please write on the Answer Booklet according to the order of the questions. Answer every question from a new page to facilitate evaluation.

## I. OBJECTIVE TYPE QUESTIONS

**Note: Answer only on the Answer Sheet.**

**Time: 60 Minutes**

**Total Marks: 40**

**A. Fill in the blanks.**


**(10x1=10 Marks)**

1. \_\_\_\_\_ refers to plant tissues developed from unusual points of origin, such as shoot or root tissues, from callus or embryos, from sources other than zygotes.
2. Selecting plants with \_\_\_\_\_ for propagation is one of the approaches in plant breeding.
3. Increased \_\_\_\_\_ to viruses, fungi and bacteria is one of the traits that breeders have tried to incorporate into horticultural plants.
4. \_\_\_\_\_ is a cell characteristic, in which the potential for forming all the cell types in the adult organism are retained.
5. A typical growth curve for cultured cells displays a \_\_\_\_\_ pattern of proliferation.
6. Some of the plant \_\_\_\_\_ can be released into the air when plants are attacked by insects; these compounds attract parasites and predators that kill the herbivores.
7. \_\_\_\_\_ is used to assist in the development of plant embryos that might not survive to become viable plants.
8. \_\_\_\_\_ refers to the deliberate modification of the characteristics of an organism by manipulating its genetic material using biotechnology.
9. \_\_\_\_\_ is defined as the climatic or environmental adaptation of an organism, especially a plant, to a new environment.
10. \_\_\_\_\_ is especially important in sexually incompatible plants and in cases where conventional methods of breeding fails to operated.

**B. Multiple choice questions: Select the correct answer. (10x1=10 Marks)**

11. The pH of the culture medium is generally adjusted to which level before sterilization?
  - a. 7.6-7.8.
  - b. 6.6-6.8.
  - c. 5.6-5.8.
  - d. 4.6-4.8.
12. Which of the following is the backbone of modern plant biotechnology?
  - a. Plant physiology.
  - b. Plant tissue culture.
  - c. Plant secondary metabolites.
  - d. All of above.

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13. The process of immersion of flower buds in 70% ethanol for 10 seconds followed immediately by 10 minutes in 2% (v/v) sodium hypochlorite is called?
- Surface redecoration.
  - Surface sterilization.
  - Surface prettification.
  - Surface purification.
14. In plant breeding, enhancement of which property would equip crop plants with better ability to overcome challenges from climate change?
- Drought.
  - Salinity.
  - Extreme temperature.
  - All of above.
15. For differentiated cells or calli to undergo organogenesis, they must acquire which of the following first during the initial phase of dedifferentiation?
- Competence.
  - Consistence.
  - Compensation.
  - Competition.
16. Which of the following technique can produce doubled haploids lines (homozygous) through chromosome doubling, thus reducing the time required to produce inbred lines?
- Anther culture.
  - Pollen culture.
  - Meristem culture.
  - Both a and b.
17. Which of the following is a well-known plant secondary metabolite used to treat cancer?
- Anthocyanin.
  - Beta-carotene.
  - Naringinen.
  - Paclitaxel.
18. Comparing tissue culture- and field-grown plants, the stomata may be different in which of the following?
- Morphology of guard cells.
  - Stomatal density.
  - Impaired stomatal functioning.
  - All of above.

19.  The picture shows a restriction fragment after digestion. Which of the following best describe this fragment?
- Blunt end.
  - Sticky end.
  - Blown end.
  - Extended end.

20. Which of the following best describe the process where organelles, cells, tissues, extracellular matrix, organs or any other biological constructs are preserved by cooling to very low temperatures?
- Hyperpreservation.
  - Micropreservation.
  - Cryopreservation.
  - None of above.

**C. Check 'True' or 'False'.**

**(10x1=10 Marks)**

	Statement
21.	Explant refers to tissue taken from its original site and transferred to an artificial medium for growth or maintenance.
22.	Plant growth regulators (PGRs), generally synthetic, with a small amount in which can induce potent responses, are chemicals that regulate plant growth or promote differentiation
23.	Organogenic potential of the polypoidy callus tissue is highly correlated with chromosome stability.
24.	Most tissue cultures are grown successfully at temperatures around 30°C (25), but the usual environmental temperatures of the species concerned should be taken into account.
25.	Single enzyme is normally dissolved in culture media together with an osmotic stabilizer during a protoplast isolation procedure.
26.	A bioreactor may refer to any manufactured or engineered device or system that supports a biologically active environment.
27.	Callus culture is a type of culture in which single cells or small aggregates of cells multiply while suspended in agitated liquid medium.
28.	A cloning vector is a small piece of DNA, taken from a virus, a plasmid, or the cell of a higher organism, that can be stably maintained in an organism, and into which a foreign DNA fragment can be inserted for cloning purposes.
29.	Tissue culture-grown plants usually develop strong cuticle layers on the leaves.
30.	<i>Agrobacterium tumefaciens</i> the causal agent of crown gall disease, and it contains a tumor inducing DNA called T-DNA.

**D. Match the following**

**(10x1=10 marks)**

31.	Origin of replication (ORI)	A	Cell density
32.	Terpenoids	B	Vector
33.	Protoplast	C	Inactivity
34.	Hemocytometer	D	Opines
35.	Naringinen	E	Haploid
36.	Contamination	F	Plant secondary metabolite
37.	<i>Agrobacterium</i>	G	Fungus
38.	Quiescent	H	Restriction enzyme
39.	Androgenesis	I	Citrus
40.	EcoRI	J	Cell wall

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## II. Descriptive type Questions

(60 Marks)

Note: Please provide short and precise answers. Each question is ten marks.

1.	Please describe the methods of acclimatization of tissue cultured plants.	10
2.	Please describe the phases in a typical cell growth curve.	10
3.	Why do plants produce secondary metabolites?	10
4.	Please describe how you can create a GMO plant.	10
5.	Briefly explain the 5 steps of plant regeneration via somatic embryogenesis.	10
6.	Please provide formulas to calculate the following. Boric acid ( $H_3BO_3$ ), (B=11, H=1, O=16). a) What is the molecular weight of boric acid? b) Preparing a 500 ml of 10 M boric acid stock solution, how much boric acid will be needed? c) Make a dilution to obtain 100 ml of 1 M boric acid, how much 10 M stock solution will be needed?	10

The End

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