KATHMANDU UNIVERSITY
End Semester Examination
August/September, 2017

Mark Scored :

Level : B. Tech.
Year : II

Course : BIOT 208
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date : SEP 13 2017

SECTION "A"
[10 Q. × 1 = 10 marks]

Choose the appropriate answer.

1. An Arabidopsis line that produced flower with carpel identity in all four whorls will most likely have mutation(s) in
   [ ] A class genes only
   [ ] B class genes only
   [ ] C class genes only
   [ ] A and B class genes

2. Implantation of blastocyst occurs on
   [ ] 4^{th} day [ ] 5^{th} day [ ] 6^{th} day [ ] 7^{th} day

3. When the blastema forms after amputation of a newt (an amphibian) limb, what processes must the cells undergo in order for regeneration to occur?
   [ ] The cells must simply dedifferentiate in order for regeneration to occur
   [ ] The overlying wound epidermis takes on a role similar to that of the apical ectodermal ridge in normal limb development, and limb regeneration can then occur.
   [ ] Some cells in the blastema will transdifferentiate after amputation, and this allows regeneration to proceed.
   [ ] Dedifferentiation, cell division, transdifferentiation, and formation of an AER-like function are all involved.

4. In general, the hierarchical order of gene expression in early Drosophila development is
   [ ] Maternal Effect, Gap, Pairrule, Segment Polarity.
   [ ] Maternal Effect, Pairrule, Segment Polarity, Gap.
   [ ] Gap, Maternal Effect, Segment Polarity, Pairrule.
   [ ] none of the above.

5. Which one of the following provides rapid block to polyspermy during sea urchin fertilization?
   [ ] Wave of calcium release
   [ ] Cortical granules release the contents
   [ ] Depolarization of egg membrane
   [ ] Formation of fertilization envelope

6. Sporophyte is dominant and gametophyte is small and reduced but separate as well as independent. This development shows
   [ ] heteromorphic alternation of generation
   [ ] automorphic alternation of generation
   [ ] homoomorphic alternation of generation
   [ ] hypomorphic alternation of generation

7. The notochord is a ___ structure in vertebrate embryos that lies under the ___, and is flanked by ___.
   [ ] mesodermal, neural tube, somites
   [ ] ectodermal, neural tube, mesoderm
   [ ] mesodermal, ectoderm, endoderm
   [ ] endodermal, epidermis, blastocoels

8. The hormone that regulates flowering in plants is _____
   [ ] IAA [ ] Cytokinins [ ] Ethylene [ ] Gibberellins

9. If expression of all copies of a particular Hox gene were knocked out, what would the expected result be regarding the identity of the affected region?
   [ ] The region would take on the identity of the next most anterior region.
   [ ] The region would take on the identity of the next most posterior region.
   [ ] The region would revert to a default identity (i.e. would not differentiate into any structure)
   [ ] None of the above.

10. Differentiated cells express the genes and proteins characteristic of their final identity in the adult and that identity can be altered only under special circumstances. How does the concept of differentiation, as described here, differ from the concept of determination?
   [ ] Determined cells have begun to differentiate, but are not fully differentiated.
   [ ] Determined cells are embryonic cells that will give rise to all the cell types of the adult organism, but have not yet begun to express the genes and proteins characteristic of their final fates.
   [ ] Determined cells will continue to follow their fate if grafted into a different place in a host embryo, even though they do not yet express the genes and proteins characteristic of their final fate.
   [ ] Determined cells are embryonic cells that will form certain cell types and structures if development is allowed to proceed normally, but will alter their development in response to their location if transplanted to a different place in a host embryo.

SECTION "B"
[5 Q × 1 = 5 marks]

Fill in the blanks:

11. Embryo sac is to ovule as _____is to anther.

12. The establishment of the anterior-posterior or dorsal-ventral body axes is called _____

13. _____ is the precursor of IAA (auxin).

14. Fertilizin is a chemical substance produced from_____

15. Primary neurulation occurs in _____ .

SEP 1 3 2017

SECTION "C"

[5 Q × 1 = 5 marks]

Define the following:

16. Acrosomal reaction:

17. Dioecious plants:

18. Parthenocarpy:

19. Compensatory regeneration:

20. Endosperm:

KATHMANDU UNIVERSITY
End Semester Examination
August/September, 2017

SEP 1 3 2017

Level : B. Tech.
Year : II
Time : 2 hrs. 30 mins.

Course : BIOT 208
Semester : II
F. M. : 55

SECTION "D"
[7Q × 5 = 35 marks]

Attempt *ALL* questions.

1. Discuss with proper example the role of Hox gene in animal development.
2. Discuss three major factors that influence the intrauterine growth of fetus.
3. Elaborate on the role of different genes in establishing the axes in embryo.
4. Plant hormones act synergistically as well as antagonistically for proper growth and development of plants. Explain.
5. Discuss with clear diagram the detailed structure of angiospermic ovule.
6. Discuss the process and consequences of sperm capacitation in animals.
7. Define neurulation. Discuss the process of neural tube formation.

SECTION "E"
[5Q × 2=10 marks]

8. Give *TWO* major differences between (*ANY FIVE*).
   a. Epimorphic and Morphollactic regeneration
   b. Microgametogenesis and Megagametogenesis
   c. Polyphenism and Reaction norms
   d. Homomorphic and Heteromorpic self incompatibility.
   e. Wet stigma and Dry stigma
   f. Basifixed and Versatile anther

SECTION "F"
[5Q × 2=10 marks]

9. Explain *WHY/HOW* for the following *(ANY FIVE).*
   a. Mutations in mitochondria leads to ageing
   b. Blood meal triggers egg production in mosquitoes.
   c. Pollen grains are released from anthers in a partially dehydrated stage.
   d. Polyspermy is prevented to obtain a viable zygote.
   e. Blastopore is known as primary organizer of an embryo.
   f. Removal of apical bud allows the growth of lateral buds.