

KATHMANDU UNIVERSITY
End Semester Examination [C]
January, 2018

Marks Scored:

Level : B.Tech
Year : II

Course : BIOT 208
Semester: II

Exam Roll No.:

Time: 30 mins.

F.M. : 20

Registration No.:

Date JAN 17 2018

SECTION "A"

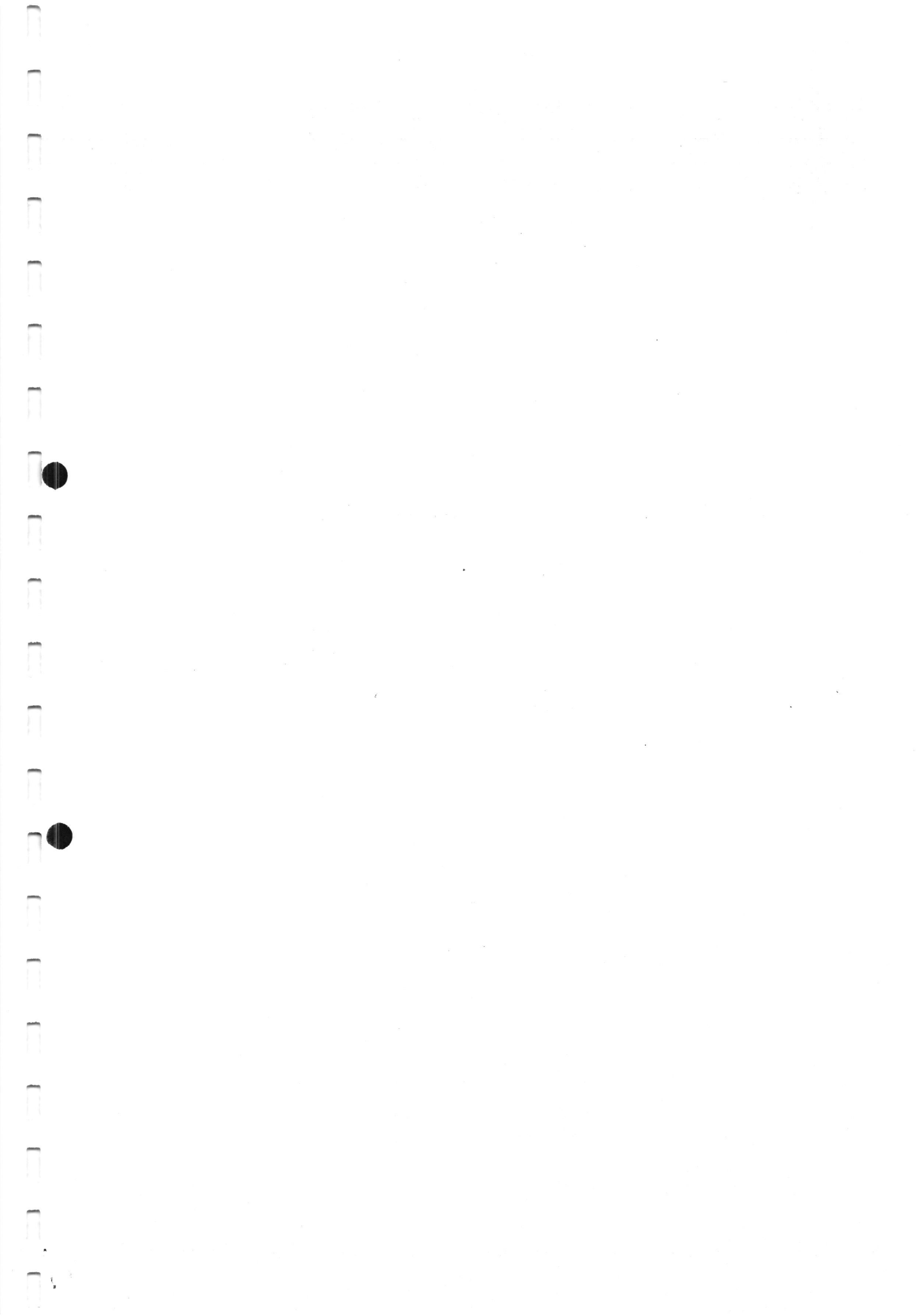
[20 Q.×1=20 marks]

Choose the most appropriate answer.

1. How would you expect HOX genes to be expressed in millipedes, where all segments bear similar legs, when compared to insects?
 the leg specifying HOX genes would be expressed in all leg-bearing segments
 millipedes probably do not have or use HOX genes to specify identity along the anterior-posterior axis
 HOX gene expression would be the same as in insects, but the interpretation of segmental identity would have evolved
 other genes would have to have evolved to specify legs in millipedes, since millipedes would form wings on thoracic segments if they express HOX genes
2. Epimorphosis is
 regeneration through repatterning of existing cells, as occurs in Hydra
 the reinitiation of division in existing cells, followed by patterning, as occurs in Hydra
 the reinitiation of division in existing cells, followed by patterning, as occurs in amphibians such as newts
 repatterning of existing cells, as occurs in amphibians
3. Recently, it was reported that adult, differentiated cells can be made to behave as pluripotent stem cells by the introduction of a few genes, one of which was Oct4. What was the rationale for this experiment?
 Oct4 is a master switch gene that turns on the stem cell program.
 the Oct4 gene produces a cell-cell signaling protein that is used by stem cells to stimulate cell division
 Oct4 expression is one of the requisites for the maintenance of pluripotent embryonic stem cells in culture
 Oct4 is only expressed in embryonic stem cells, and so its expression automatically reverses any differentiation that may have gone on in a cell
4. What is meant by the word "whorl" in discussing floral meristems?
 When leaf primordia first arise, they arise in a pattern described as a "whorl".
 Flowers consist of four different types of organs, which occur in concentric rings called "whorls"
 The floral meristem has to spin around during flower formation, giving the process the name "whorl"
 The six stamens in a dicot flower like that of *Arabidopsis* form a ring that is called the flower's "whorl".

5. A gap gene mutation might cause which of the following defects in the embryonic body plan?
- every other segment would be missing, resulting in T1, T3, A2, A4, etc. but no T2, A1, A3, and so on.
 - segments A2 through A6 would be missing, but the rest of the pattern is essentially normal
 - no segmentation would be evident
 - the identity of one or more segments would be transformed to that of a different segment, such that the T3 leg would transformed to a T2 leg
6. The establishment of the anterior-posterior or dorsal-ventral body axes is called
- pattern formation
 - differentiation
 - morphogenesis
 - growth
7. Amniotic fluid protects the fetus from
- Degeneration
 - Encystment
 - Jerks
 - none of the above
8. Which of the following genes control the final structures of appendages from each segment?
- Hox gene
 - Gap gene
 - Paired gene
 - Maternal gene
9. What is the role of stem cells with regard to the function of adult tissues and organs?
- Stem cells are undifferentiated cells that divide asymmetrically, giving rise to one daughter that remains a stem cell and one daughter that will differentiate to replace damaged and worn out cells in the adult tissue or organ
 - Stem cells are embryonic cells that persist in the adult, and can give rise to all of the cell types in the body.
 - Stem cells are determined cells that reside in fully differentiated tissues and can, when needed, differentiate to supply new cells for growth of the tissue
 - Stem cells are differentiated cells that have yet to express the genes and proteins characteristic of their differentiated state, and do so when needed for repair of tissues and organs.
10. Female gametophyte of angiosperms is represented by
- ovule
 - embryo sac
 - megaspore mother cell
 - nucellus
11. Which one of the following is surrounded by callose wall?
- male gamete
 - pollen grain
 - egg
 - microspore mother cell
12. In monoecious plants
- Male and female parts are borne by the same plant but not by the same flower
 - Male and female parts are borne by the same flower
 - Male and female parts are borne by different plant
 - None of the above
13. The synthesis of amylase in certain cereals is stimulated by
- IAA
 - Cytokinins
 - Ethylene
 - Gibberellins

14. According to the ABC model, which of the following arrangements of floral organs (from the outermost to the innermost whorl) would be predicted for a null mutation in B class genes?
- | | |
|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> Se Pe St Ca | <input type="checkbox"/> Se Se Ca Ca |
| <input type="checkbox"/> Se Pe Pe Se | <input type="checkbox"/> St St Ca Ca |
15. _____ is NOT a synthetic auxin
- | | | | |
|------------------------------|------------------------------|------------------------------|----------------------------------|
| <input type="checkbox"/> IAA | <input type="checkbox"/> IBA | <input type="checkbox"/> NAA | <input type="checkbox"/> 2, 4, D |
|------------------------------|------------------------------|------------------------------|----------------------------------|
16. _____ is the precursor of IAA (auxin)
- | | |
|-------------------------------------|--|
| <input type="checkbox"/> Tryptophan | <input type="checkbox"/> Glycine |
| <input type="checkbox"/> Methionine | <input type="checkbox"/> Isopentenyl pyrophosphate |
17. The Abscission layer is formed because the leaves
- | | |
|---|--|
| <input type="checkbox"/> Start forming Auxins | <input type="checkbox"/> Stop forming Auxins |
| <input type="checkbox"/> Start forming Gibberellins | <input type="checkbox"/> Stop forming Gibberellins |
18. A diploid female plant and a tetraploid male plant are crossed. The resulting endosperm shall be:
- | | | | |
|----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> diploid | <input type="checkbox"/> triploid | <input type="checkbox"/> tetraploid | <input type="checkbox"/> pentaploid |
|----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
19. Generative cell was destroyed by laser but a normal pollen tube was still formed because
- Vegetative cell is not damaged
 - Contents of killed generative cell stimulate pollen growth
 - Laser beam stimulates growth of pollen tube
 - The region of emergence of pollen tube is not harmed
20. In a comparison of plant and animal development, it is found that:
- animals evolved from plants, and animal developmental strategies are derived from those of plants.
 - fully differentiated cells of plants are still totipotent, and will readily form a complete fertile plant, whereas the differentiated state of animal cells is difficult to reverse.
 - gene regulation evolved later than the split between plants and animals, and is executed differently in the two kingdoms.
 - the developmental strategies of both plants and animals rely heavily on the migration of cells, such as occurs during gastrulation



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

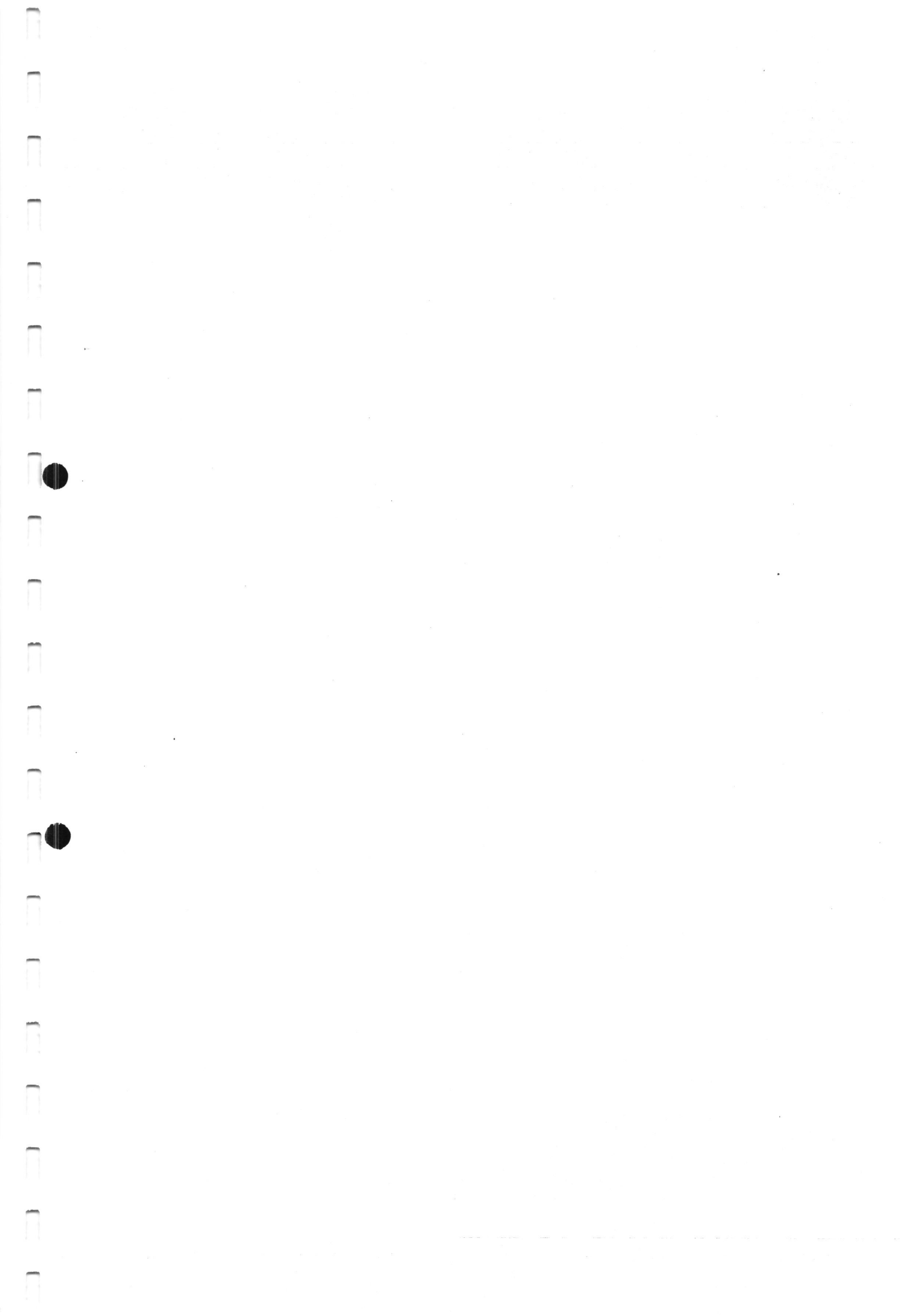
Course : BIOT 208
Semester: II
F.M. : 55

SECTION "B"

[11Q.×5=55 marks]

Attempt *ALL* questions.

1. Discuss in brief the various factors that prevent polyspermy in humans.
2. Enlist different hormones important for embryonic development and discuss in detail the role of thyroid hormone.
3. Compare and contrast the epimorphic and morphallaxis regeneration.
4. Discuss different theories related to ageing.
5. Explain with proper example the importance of transcription factors in animal growth and development.
6. Explain the process and significance of double fertilization in plants.
7. Discuss in brief the ABC model of flowering plants.
8. Write short note on reproductive self incompatibility in flowering plants.
9. Discuss the role of hormones in coordinated root and shoot development in plants.
10. Write short note on Parthenocarpy.
11. Discuss five differences between plant and animal development.



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Level : B.Sc./B.Pharm./B.Tech.
Year : II

Course : CHEM 212
Semester: II

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SECTION "A"

[20 Q. × 1 = 20 marks]

Select the most appropriate answer:

- Suppose that 50mg of precipitate is lost as a result of being washed with 200ml of wash liquid. If the precipitate weighs 500mg, the relative error due to solubility loss is
a. 1.0% b. -1.0% c. 0.1% d. -0.1%
- Which of the following *does not* promote the formation of CaC_2O_4 ?
a. Slow mixing of dilute solution
b. Decreasing (Q-S)/S
c. Precipitation at high pH
d. Digestion
- What will be the molarity (in mol/ltr.) of concentrated HCl having density 1.19 gm/ml and which is 37% by weight HCl.
a. 8.3 b. 3.65 c. 12.06 d. 0.126
- The hydrogen ion concentration in mol/L of a solution having pOH 7.7 is.
a. 5.0×10^{-7} b. 1.99×10^{-11}
c. 1.99×10^3 d. 5.01×10^{10}
- When 25 ml of 0.02M Ca^{2+} ion solution is titrated with 40 ml of 0.01 M EDTA solution, the color of the solution is
a. Wine red b. Pink c. Orange d. Blue
- When 100ml of 0.02M NaCl is mixed with 25ml of 0.1M AgNO_3 the ion strongly adsorbed on primary layer of the precipitate is
a. Cl^- b. Ag^+ c. NO_3^- d. Na^+
- The potential at equivalence point for the following titration reaction
 $\text{A}^{2+} + \text{B}^{4+} \rightleftharpoons \text{A}^{3+} + \text{B}^{3+}$ ($E^0_{\text{A}} = 0.68\text{V}$ and $E^0_{\text{B}} = 1.44\text{V}$)
a. 1.18V b. 2.13V c. 1.06V d. 0.76V
- Which of the following statements are true?
A) α_4 increases as the pH increases
B) α_4 increases as the pH decreases
C) $-\log \alpha_4$ increases as $[\text{H}^+]$ increases
D) $-\log \alpha_4$ increases as pH increases
a. [AB] b. [BD] c. [AC] d. [AD]
- A titration where the end point is found by observing the effect of titrant addition upon a measured current is termed as
a. Potentiometric titration b. Coulometric titration
c. Conductometric titration d. Amperometric titration

10. Which one of the following statement is NOT TRUE?
- Reference electrodes are used to calculate the potential of the indicator electrode
 - Half-cell potential of reference electrode is known and also constant
 - Reference electrode should maintain constant potential while passing small currents
 - Reference electrode responds to presence of analyte.

Fill in the banks by most appropriate VALUE or WORD

11. 50.00 ml of 0.500 M solution of the weak acid, HB, $K_a=1.0 \times 10^{-5}$, is titrated with 0.100M NaOH. The pH at the start of titration is _____
12. The potential at which the current is one half of the diffusion current is called _____
13. 50 ml of 0.01M EDTA and 50 mL of 0.01 M Ca^{2+} are mixed. The solution is buffered at pH 10. pCa at the establishment of equilibrium is _____ [Given $K_{eff} = 1.8 \times 10^{10}$]
14. The term "m" in the Ilkovic equation is _____ and it possess the unit _____
15. The *transition potential* is the potential at which _____
16. If cathode potential for the cell; SCE || HP(0.010M), NaP(0.040M) | Pt, $H_2(1\text{atm})$ is - 0.347V, the dissociation constant of the weak acid HP is _____
17. Composition for *corning 015* glass is _____
18. The percentage of infinite population which falls within the limit of $\mu \pm 2\sigma$ is _____
19. The ionic strength of solution containing the mixture of 0.2 M NaCl and 0.1 M Na_2SO_4 is _____
20. Dimethylglyoxime is a specific reagent that precipitates only _____ from alkaline solution.