

(7)



Rayat Shikshan Sanstha's

Sadguru Gadge Maharaj College, Karad (An Autonomous College)

021549



Information to be filled by Student (विद्यार्थ्याने भरावयाचा रकाना)

Day and Date : Monday, 3/11/2025Language of Answer : EnglishExamination : Bsc. Biotechnology Entire
Part III sem -5 (NEP)Question Paper Code No. : N-MJT-BT-504Subject : Developmental Biology
(Plant & Animal)Paper No. -Section : -

(Office Use)

Q. No.	Examiner Marks	Moderator Marks
1	08	
2	12	
3	15	
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Total	35/40	
Signature		

Q. C. J. K.

IMPORTANT

As per Maharashtra Act No. XXXI of 1982 (7 & 8) whoever is found in or near an examination hall by the invigilator or any other person appointed to supervise the conduct of the examination, copying answers to the question paper set at the examination, from any book, notes or answer papers of other candidates, or appearing at the examination for any other candidates or using any other unfair means, shall, on conviction, be punished with imprisonment for a term which may extend to six months, or with fine which may extend to five hundred rupees or with both.

Whoever abets any offence punishable under this Act shall be punishable with the punishment provided for the offence.
 धना : विद्यापीठ नियमानुसार जो कोणी परीक्षा हॉलजवळ किंवा हॉलमध्ये पर्यवेक्षकांना किंवा परीक्षेसाठी नेमलेल्या कर्मचाऱ्यांना उत्तरांची पुस्तक द्या किंवा अन्य विद्यार्थ्यांच्या उत्तरपत्रिकेतून नकल करताना आढळून येईल किंवा जवळ परीक्षा गैरव्यवहारासाठी वापरता येईल असे अक्षेपाईल हित्य बाळगत असेल तर सदरची बाब परीक्षा प्रमाद मानून संबंधित व्यक्ति शिक्षेस पात्र राहील.

महत्वाच्या सूचना

१. उत्तरपत्रिकेमध्ये अन्यत्र कोठेही बैठक क्रमांक (दिलेल्या जागेखेरीज) लिहू नये, तसेच अन्यत्र कोणत्याही प्रकारच्या खुणा करू अशा खुणा आढळल्यास तो ओळख पटविण्याचा प्रयत्न मानण्यात येईल व असा परीक्षा प्रमाद शिक्षेस पात्र राहील.
२. उत्तरास प्रश्न क्रमांक व उपप्रश्न क्रमांक लिहणे अनिवार्य आहे.
३. पूर्ण प्रश्नांचे उत्तर सलग व सुवाच्य अक्षरात लिहावे.
४. अवांचनीय अक्षरातील उत्तर शुन्य गुणासाठी ग्राह्य मानण्यात येईल.
५. आकृत्याखेरीज सर्व उत्तरासाठी फक्त निळ्या शाईचा वापर करावा.

IMPORTANT

1. Do not write seat number anywhere except at the space provided for it. If seat number or any marks, symbols which indicates identity is/are found anywhere, it will be treated as malpractice and lapse. Such malpractice will be punishable under Maharashtra University Act 1994.
2. It is necessary to write the Question No. and sub Question Number before answer.
3. Write the complete answer in sequential manner and then start the next question in readable handwriting.
4. Answer in an illegible & undecipherable handwriting are liable to be marked as zero.
5. Use of blue color ink (except diagrams) is permitted.

Q. No.	Verification Marks	Revaluation I
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Q. No.	1			TOTAL			TOTAL
Marks	08			08			

Q. No.

Q.1

- ① → The process of formation of male gametes in plant is called microgametogenesis.
- ② → Vegetative cell controls the growth of pollen tube.
- ③ → The entry of pollen tube into the ovule through micropyle is called porogamy.
- ④ → The diploid cells that initiate spermatogenesis are spermatogonia.
- ⑤ → Apical meristem responsible for increase in length.
- ⑥ → The fluid filled cavity inside a blastula is called Blastocoel.
- ⑦ → Polyembryony was first reported by Antony Van Leeuwenhoek.
- ⑧ → Regeneration refers to the ability of an organism to replace lost body parts.

Q. No.	2(2) + (3)	TOTAL				TOTAL
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Q. No.

Q. 2

- 2 → • Gametogenesis is the formation of gametes for fusion & zygote formation.
- In animals, two types of gametes are formed one is sperm & second is ovum.
 - The formation of sperm gamete is called as spermatogenesis.
 - The formation of ovum gamete is called as oogenesis.

① spermatogenesis:

- Through this process male gamete sperm is formed.
- It consists of 3 phases:
 - ① Multiplication phase
 - ② Growth phase (prophase)
 - ③ Maturation phase.

- The sperm is formed from the cell which is diploid in nature called as spermatogonium.
- The process of spermatogenesis results in the formation of haploid in nature that is spermatozoa.
- The structure of sperm contains head, neck and tail.
- Tail is present for the movement of the sperm.

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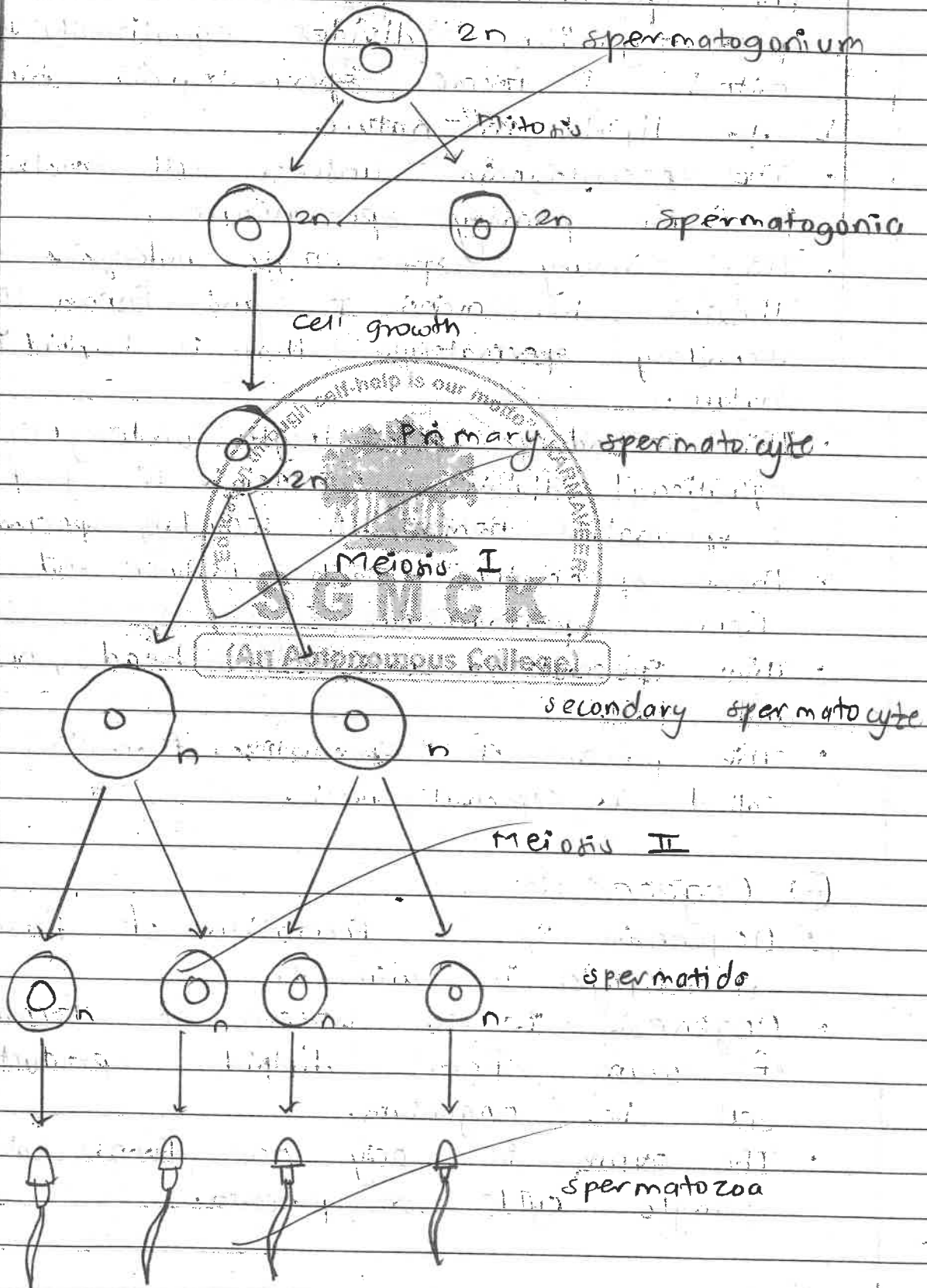


Fig. spermatogenesis.

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Q. No.

- The reproductive diploid cell i.e. the spermatogonium divides equationally by mitosis & forms spermatogonia which is also diploid in nature.
- These spermatogonia undergo cell growth & forms primary spermatocyte.
- This primary spermatocyte undergoes reductional division i.e. meiosis I and forms the secondary spermatocyte that is haploid in nature.
- This secondary spermatocyte undergoes equational division i.e. Meiosis II & forms 2 spermatids from each secondary spermatocyte.
- These spermatids each mature and forms spermatozoa.
- This spermatozoa consists of head, neck and tail.
- This process of spermatozoa formation is called as spermatogenesis.

② Oogenesis :-

- Oogenesis is a formation of female gametophyte in animals.
- Oogenesis is a process of formation of ovum from diploid reproductive cell i.e. oogonium.
- The ovum is only one forms at a single cycle or process.

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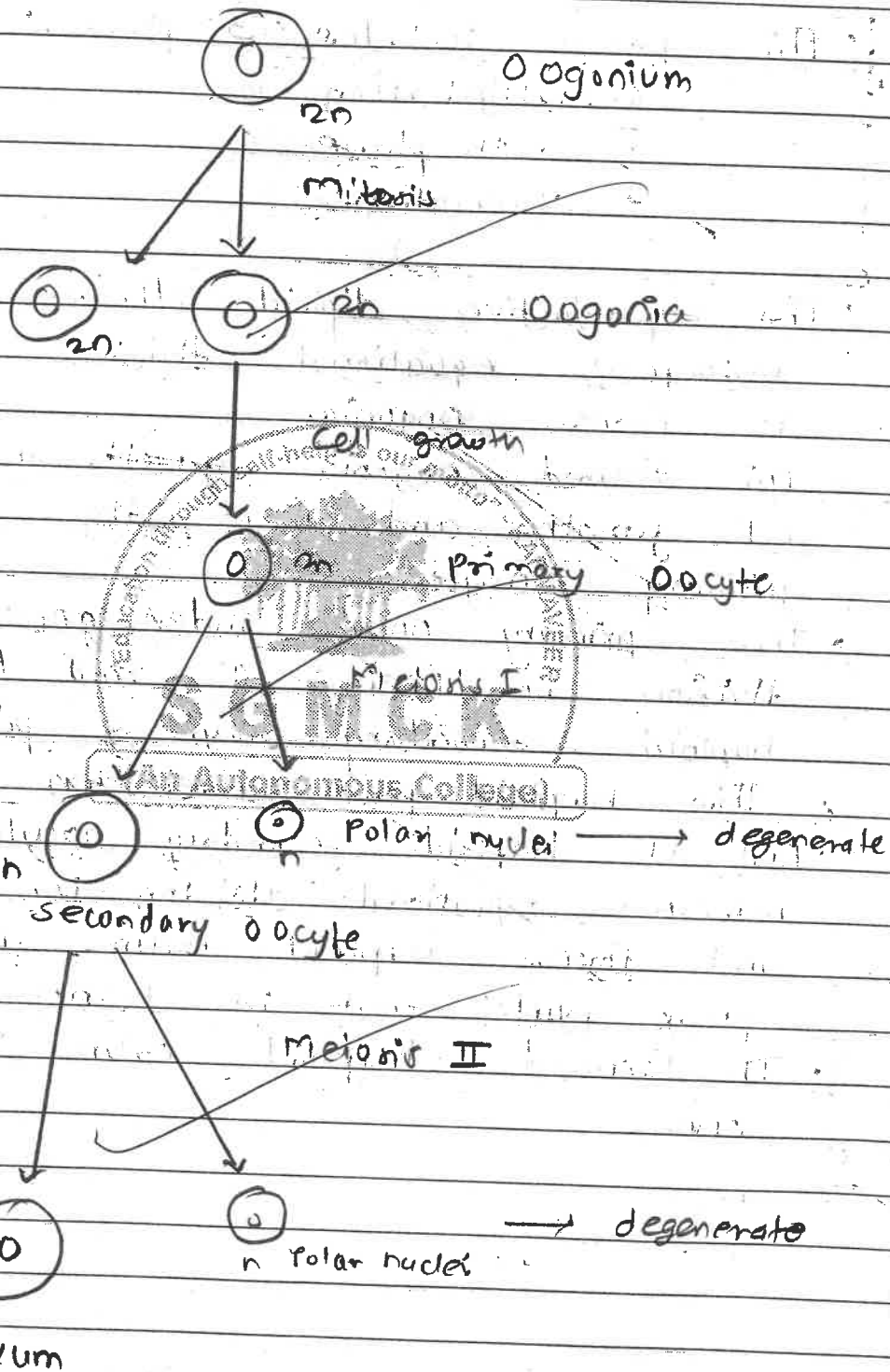


Fig. Oogenesis in animals.

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Q. No.

• This process includes 3 phases.:

- ① Multiplication
- ② Growth phase
- ③ Maturation.

• The reproductive diploid cell, i.e. Oogonium undergoes equational division i.e. mitosis to form Oogonia.

• This formed Oogonia ~~growth~~ under go cell growth and form the diploid primary oocyte.

• The primary oocyte under goes reductional division i.e. Meiosis I and forms haploid secondary oocyte & polar nucleus.

• This haploid polar nucleus then degenerates.

• And the haploid secondary oocyte then undergoes equational division i.e. Meiosis II and forms haploid ovum and polar nuclei that is degenerated.

• The formed haploid ovum is functional one.

06

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Q. No.

③ → Meristems:-

Meristems are the mass of undifferentiated cells and proliferating cells that have ability to form tissues. This is responsible for growth of plants in length, thickness & regeneration of plant body.

Classification of meristem:-

Meristems are classified into different types on the basis of origin and position on the plant body.

on the basis of origin types of meristem are:

- ① Primary meristem
- ② Secondary meristem.

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① Primary Meristem:-

- It is meristem that present right at the embryonic stage.
- It is active throughout the life of the plant.
- It helps in the primary growth of plants.
- It is responsible for the formation of primary permanent tissues in the plant body.
- It is also responsible for primary growth of primary organs in plants.

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Q. No.

② Secondary meristem:-

- It is meristem present later on the life cycle of plants.
 - It is responsible for secondary growth in plants.
 - It is also responsible for the ~~seen~~ formation of secondary permanent ~~tissue~~ tissues or organs in the plant body
eg. secondary xylem & secondary phloem.
 - Organs like cork cambium & vascular cambium forms.
- On the basis of position on the plant body there are 3 types of meristems:-

- ① Apical meristem
- ② Intercalary meristem
- ③ Lateral meristem.

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① Apical meristem:-

- It is meristem present at the tip of the root & shoot called as the root apex & shoot apex respectively.
- It constitutes actively in the primary growth.
- It is responsible for the growth of plants in increasing in length.

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Q. No.

② Intercalary meristem :-

- It is a meristem found between the nodes usually at the base of nodes of leaves or top of the nodes (especially in grasses).
- It is responsible for the elongation of internodes.
- It helps in regrowth of plant part after grafting or cutting.
- It is responsible for the growth in grasses etc.

③ Lateral meristem :-

- It is a meristem present on the along sides of the plants in both sides.
- It helps in the growth in thickness and girth of the plant.

06

Q. No.	3(1) + (2) (03)	TOTAL				TOTAL
Marks	04 + 04 + 04 + 03					15

Q. No.

Q. 3

1 → Apomixis :-

- It is derived from greek word 'apo' means without & 'mixis' means mixing.
- Apomixis is the formation of embryo or seeds without fertilization.
- It is a asexual reproduction which mimics the sexual reproduction.

Types:-

① Gametophytic apomixis:- It is formation of female gametophyte without meiosis.

It has two types:-

① Diplospory :- An unreduced somatic cells develops into embryo.

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② Apospory :- A development of embryo from ~~diplo~~ directly from diploid ~~and are~~ unreduced somatic cells.

③ Sporophytic apomixis :- Forms embryo without formation of gametes.

④ Vegetative apomixis :- flower replaced by the vegetative bulbils & forms new plants.

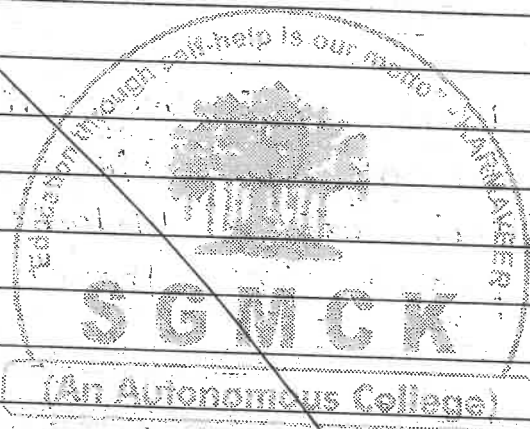
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Significance:

- ① Uniformity.
- ② Preserves hybrid vigor.
- ③ Horticulture
- ④ Plant propagation.

06



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Q. No.

② → Types of eggs are based on amount of yolk, distribution of yolk, presence or absence of shells & patterns of development.

A) Based on amount of yolk :- Two types

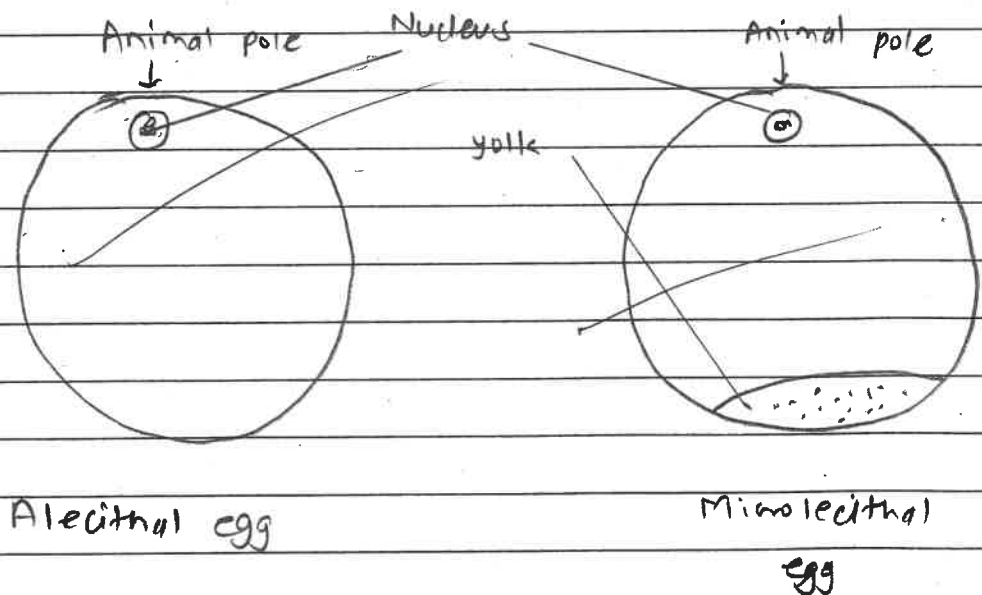
① Alecithal egg :- In this types of eggs the yolk is absent or present in little amount.

② Lecithal eggs :- In this types 3 types are formed

i) Microlecithal egg :- Very little amount of yolk is present in this type of egg.

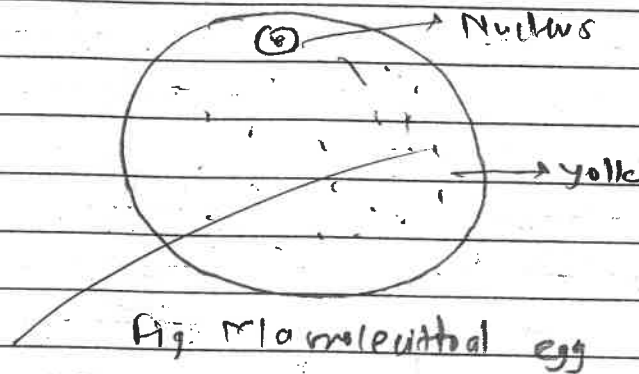
ii) Mesolecithal egg :- Moderate amount of yolk is present in these types of eggs.

iii) Macrolecithal egg :- Large amount of yolk is present in these type of eggs.



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B) On the basis of distribution of yolk:-
There are two types.

① Homolecithal eggs:- The yolk is evenly distributed in these type of eggs.
Also known as isolecithal eggs.

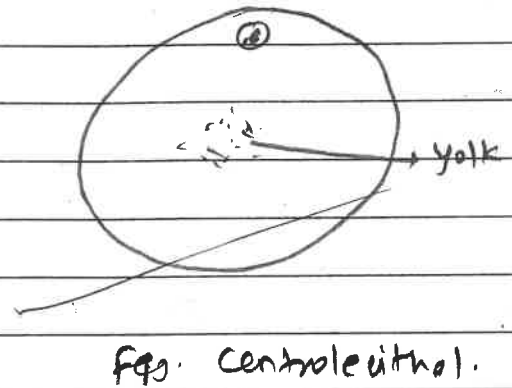
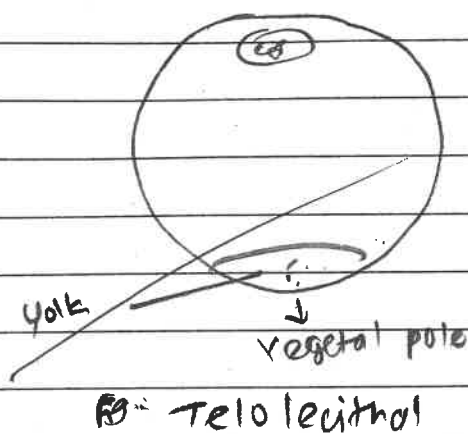
② Heterolecithal egg:- The yolk is unevenly distributed in these type of eggs. It is divided in two types.

i) Telolecithal eggs:- The yolk is present at the vegetal pole of the egg at the end.

ii) Centrolecithal eggs:- The yolk is present at the center of egg surrounded by the cytoplasm.

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E) Based on presence of absence of shell :-
It has two types

- ① Cleidoic egg :- In this type of egg the shell is made of calcareous substance.
- It is hard (non-motile)
 - The terrestrial or land animals have this type of shell.
 - It prevents the egg from damage & desiccation.

② Non - Cleidoic egg :-

- In this type the shell is made up of jelly coat.
- It is present in aquatic animals.
- eg. fishes, etc.



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**Sadguru Gadge Maharaj
College, Karad**
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Information to be filled by Student
(विद्यार्थ्याने भरावयाचा रकाना)

Day and Date : Monday, 3/11/2025Language of Answer : EnglishExamination : Bsc. Biotechnology Entire
Part - III sem-5 (NEP)Question Paper Code No. : N-MST-BT-504Subject : Developmental Biology
(Plant & animal)Paper No. —Section : —

(Office Use)

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ना : विद्यापीठ नियमानुसार जो कोणी परीक्षा हॉलजवळ किंवा हॉलमध्ये पर्यवेक्षकांना किंवा परीक्षेसाठी नेमलेल्या कर्मचाऱ्यांना उत्तरांची पुस्तके किंवा अन्य विद्यार्थ्यांच्या उत्तरपत्रिकेतून नकल करताना आढळून येईल किंवा जवळ परीक्षा गैरव्यवहारासाठी वापरता येईल असे अक्षेपार्ह हेतू बाळगता असेल तर सदरची बाब परीक्षा प्रमाद मानून संबंधित व्यक्ति शिक्षेस पात्र राहील.

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Q. No.

d) Based on the patterns of development 2 type

① Mosaic / determinate egg :-

- It is predetermined
- If a portion of embryo is removed then the organism developed lacks the particular organ.

② Regulated / Indeterminate egg :-

- It is not predetermined.
- If a portion of embryo is removed then the organism can develop well, without lacking any organ.

Q

Q. No.				TOTAL				TOTAL
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2. No.

③ → factors affecting pollen germination?

① Pollen:- If the pollen is of different species then the stigma rejects it & germination doesn't occur.

② Nutrient supply:- Nutrients like sugars are (sugars) responsible for osmotic pressure balance.

- Calcium required for elongation of pollen tube.

- Boron is responsible for the maintaining the cell wall.

- Phenolic compounds, and ~~moisture~~ moisture is also important for pollen germination.

③ Humidity:- High humidity is required for pollen germination.

④ pH:- For pollen germination the pH needs to be slightly alkaline or neutral.

⑤ Temperature:- The optimum temperature is required for germination i.e. upto 20°C to 35°C .

⑥ Self incompatibility:- If the pollen is of ~~same~~ same species then only the pollen is germinated.

⑦ Stigma:- If the stigma is dry then the pollen won't stick and the ~~poll~~ stigma is wet the pollen will stick & germinate.

⑧ Chemicals or pesticides:- Harmful chemicals can affect pollen germination.

05

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2. No.

5) → Regeneration is the ability of organism to replace, restore & regain the lost tissue or organs in original body pattern.

Mechanism: ① Wound healing: Immediate closure of wound through epithelium migration.

- Formation of wound epithelial (apical epithelia cap).
- Prevent infection & desiccation.

② Dedifferentiation: The specialized cells near wound lost their differentiation & regains the more potentially stem cells and embryonic state.

- This forms blastema cells.

③ Formation of blastema: Blastema are mass of undifferentiated progenitor cells.

- It serves as the growth center for regeneration.

④ Pattern - Formation & Redifferentiation:

- The blastema cells receives positional information controlled by morphogens like retinoic acid, wnt & fgf signals.

- The structure of functional organs forms as original body.