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Odd Semester-End term Examination (2023)
B.Sc.-M.Sc. Integrated Biotechnology (Semester III)

Paper Name: **Developmental Biology** Paper Code: **BBT-GE03 TH**
Time: **3 hours** Maximum Marks: **75**

Note: *This paper has 3 sections A, B, and C. Attempt all the three sections. Section A: Answer all the questions; Section B: Answer any 2 out of 4; Section C: Answer all the questions, each question has an internal choice*

Abbreviations Used CO- Course Outcome, PO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1- Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create.

Course Learning Outcomes

Upon completion of this course, students will be able to

CLOGE03.1: Gain a vast knowledge of gametogenesis and process of fertilization. **(Cognitive level: Remember and Understand)**

CLOGE03.2: Comprehend the concepts of embryonic development, morphogenesis and fate of early embryos. **(Cognitive level: Understand and Apply)**

CLOGE03.3: Describe about the differentiation and concept of embryonic induction. **(Cognitive level: Understand and Analyse)**

CLOGE03.4: learn and understand the basics of organogenesis. **(Cognitive level: Remember and Understand)**

SECTION A

Q. No	Briefly describe the following terms. Attempt all the Question 1 × 20 = 20 marks	CO	BTL
1.	Theory of Preformation and Epigenesis	1	2
2.	Meiosis	1	1
3.	Polar Body	1	1
4.	Structure of a human Sperm	1	2
5.	Spermiogenesis	1	1
6.	Blastocoel	2	1
7.	Blastodisc	2	1
8.	Cortical Rotation	2	2
9.	Primitive Streak	2	2
10.	Syncytium	2	2
11.	Genomic equivalence	3	2
12.	Role of Histone acetyltransferase	3	1
13.	Regulatory elements that control Gene expression	3	2
14.	Master Regulatory Transcription Factors	3	2
15.	Ribosomal Selectivity	3	2
16.	Cadherins	4	1
17.	Induction and competence	4	1
18.	Notochord	4	1
19.	Derivatives of intermediate mesoderm	4	2
20.	Placenta	4	2

SECTION B

Q. No	Attempt any TWO out of the four question 15 × 2 = 30 marks	CO	BTL
21.	Describe in detail the process of external fertilization. Tabulate the differences in prevention of polyspermy in external and internal fertilization.	1	3
22.	Analyze various morphogenetic movements of cells during process of gastrulation. Discuss the process of gastrulation in Sea Urchins and draw well labelled diagrams of same.	2	4
23.	Describe in detail the three modes of cellular specification. Discuss the experiments that demonstrated regulative mode of specification.	3	5
24.	Explain the process of neurulation with appropriate illustrations. What are the biomedical implications of neural tube closure?	4	5

SECTION C

Q. No	Attempt all questions. Every Question has an internal choice. 5 × 5 = 25 marks	CO	BTL
25.	What is Sperm Capacitation **OR** Explain the role of calcium in activation of Egg.	1	3
26.	What is holoblastic cleavage and describe different forms of it. **OR** What are Fate Maps and how are they generated?	2	4
27.	Explain the concept of genomic equivalence and mention the evidence to support it. **OR** Describe briefly all the levels where gene expression can be regulated in cells.	3	5
28.	What is neural crest? Mention the derivatives of this layer. **OR** Draw a schematics of the germ line derivation of the major tissue types in animals.	4	5
29.	What are extraembryonic germ layers? Discuss the organization and role of placenta in mammals. **OR** Contrast the meiotic process during male and female gametogenesis.	1	1

Table 1: Distribution of question and marks among the units of syllabus

Unit	Question Numbers	Total Marks
1	1,2,3,4,5,21,25,29	30
2	6,7,8,9,10,22,26	25
3	11,12,13,14,15,23,27	25
4	16,17,18,19,20,24,28	25

Table 2: Mapping between CLOs and questions

CLO/Unit	BTL	Question Numbers	Total Marks
1	2,1,1,2,1,3,3,1	1,2,3,4,5,21,25,29	30
2	1,1,2,2,2,4,4	6,7,8,9,10,22,26	25
3	2,1,1,2,2,2,5,5	11,12,13,14,15,23,27	25
4	1,1,1,2,2,5,5	16,17,18,19,20,24,28	25