LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **ADVANCED ZOOLOGY AND BIOTECHNOLOGY**

THIRD SEMESTER – **APRIL 2023**

UAZ 3503 – DEVELOPMENTAL BIOLOGY

Date: 04-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

	SECTION A		
Answer ALL the Questions			
1.	**Choose the correct answer**	**(5 x 1 = 5)**	
a)	Certain groups of cells in the embryo that control the differentiation of the other cells to form the different body parts are called as (i) inducers (ii) fate determiners (iii) blastoporous cells (iv) organizers	K1	CO1
b)	The slow block to polyspermy triggers an increase in cytoplasmic _____ in the egg during fertilization. (i) sodium ions (ii) calcium ions (iii) DNA (iv) RNA	K1	CO1
c)	The type of regeneration seen in human organs is (i) epimorphosis (ii) compensatory(iii) fragment(iv) induction	K1	CO1
d)	The splanchnic mesoderm surrounds the endocardial tube to form the (i) epimyocardium(ii) artery (iii) sinus venosus (iv) sinoatrial node	K1	CO1
e)	The process by which an embryo is transferred to the womb of a female other than the biological mother is known as (i) capacitation (ii)trans-conception(iii) surrogacy (iv)ectopic pregnancy	K1	CO1
2.	**State whether True or False**	**(5 x 1 = 5)**	
a)	During spermatogenesis, primary spermatocytes undergo meiosis to form spermatids.	K1	CO1
b)	The type of cell cleavage seen in bird embryos is superficial cleavage.	K1	CO1
c)	The amnion is made of two layers of cells namely, the outer somatic mesoderm and inner ectoderm.	K1	CO1
d)	The optic vesicle is formed from the mesencephalon.	K1	CO1
e)	In ICSI, the sperm nucleus is injected into the cytoplasm of the egg.	K1	CO1
3.	**Fill in the blanks**	**(5 x 1 = 5)**	
a)	The process by which the changes brought about by differentiation become irreversible and the fate of the cell becomes fixed is _____	K2	CO1
b)	The part of the sperm which contains hydrolytic enzymes that help the sperm to penetrate the egg's zona pellucida is _____	K2	CO1
c)	_____ is the dividing mass of indistinguishable, dedifferentiated cells just beneath the apical ectodermal cap in regenerating salamander limb.	K2	CO1
d)	The _____ gland arises as an outgrowth from the roof of the gut and joins with the infundibulum from the floor of the diencephalon.	K2	CO1
e)	At the end of IVF, _____ blastocysts are transferred into the uterus of the mother.	K2	CO1

4.	**Match the following**	**(5 x 1 = 5)**	
a)	Spermatogenesis – morphogenetic movement	K2	CO1
b)	Epiboly –*in vitro* fertilization	K2	CO1
c)	Auditory vesicle–present in the skin	K2	CO1
d)	Somatic stem cells–utriculus and sacculus	K2	CO1
e)	Superovulation – seminiferous tubules	K2	CO1
	SECTION B		
Answer any TWO of the following in 100 words		**(2 x 10 = 20)**	
5.	Illustrate the various stages of oogenesis with appropriate explanations.	K3	CO2
6.	Examine the causes and consequences of conjoined twins.	K3	CO2
7.	Explain regeneration in hydra.	K3	CO2
8.	Establish the role of germ layers in the formation of the amnion and serosa/chorion.	K3	CO2
	SECTION C		
Answer any TWO of the following in 100 words		**(2 x 10 = 20)**	
9.	Categorize cell specification in the embryo into different types supporting it with explanations.	K4	CO3
10.	Explain the different types of assisted reproductive technology.	K4	CO3
11.	What are the distinguishing features of mammalian egg fertilization as compared to that in sea urchin?	K4	CO3
12.	Deduce how induced pluripotent stem cells overcome the ethical issues related to embryonic stem cells.	K4	CO3
	SECTION D		
Answer any ONE of the following in 250 words		**(1 x 20 = 20)**	
13.	Summarize the different types of stem cells and appraise their use in regenerative medicine.	K5	CO4
14.	Compare the gastrulation processes of frog and bird embryos with suitable diagrams.	K5	CO4
	SECTION E		
Answer any ONE of the following in 250 words		**(1 x 20 = 20)**	
15.	Environmental factors are responsible for congenital abnormalities. Justify this statement using valid examples.	K6	CO5
16.	Compose an essay to elaborate the changes leading to brain development in vertebrate embryos.	K6	CO5
