

**P.G. 1st Semester-2018****ZOOLOGY****(Cell Structure & Function and Developmental Biology)****Paper : MZOOCCT104**

Full Marks : 40

Time : 2 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.***UNIT-I****(Cell Structure & Function)****[Marks : 20]**

1. Answer any **four** questions:  $1 \times 4 = 4$
- State the functions of centrin.
  - What are the classes of caspase involved in cell death?
  - What is a heterokaryon?
  - How katanin destabilizes microtubules?
  - What are TIMPs?
  - What are claudin and state its function?

2. Answer any **three** questions:  $2 \times 3 = 6$
- Describe cadherins and state its function.  $1+1$
  - The activity of kinase rise and fall in a cyclical fashion during cell division. Explain.
  - Give a short account on fibronectin.
  - What are GAGs and give a short account of it?
  - How do apoptosis and necrosis differ?
3. Answer any **two** questions:  $5 \times 2 = 10$
- What causes abrupt activation of cyclin cdk complexes? State the function of cohesin and condensin.  $2+3$
  - Explain how does nitrogen stimulates cell proliferation with a suitable diagram.  $4+1$
  - Explain extrinsic pathway of apoptotic death with a diagram.  $3+2$
  - How does proteoglycan influence embryonic development and wound healing? Proteolysis triggers sister chromatid separation. Explain.  $3+2$

*[Turn over]*

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**UNIT-II**  
**(Developmental Biology)**

**[Marks : 20]**

4. Answer any **four** of the following:  $1 \times 4 = 4$
- What is a homeotic gene?
  - What is epimorphosis?
  - What is T loop structure?
  - What is chromosomal diminution?
  - Define stem cell niche.
  - What is the function of *bicoid* protein in *Drosophila* embryo?
5. Answer any **three** of the following:  $2 \times 3 = 6$
- What will happen if you cut the nerve of a newt limb and then amputate the limb? What will happen if you treat this amputated limb with newt anterior gradient protein (nAG)?  
 $1+1$
  - Using a diagram explain how diethylstilbestrol (DES) disrupts development.
  - Briefly mention the different types of cellular specification.

- Briefly explain lineage and population based model of stem cell niche.
  - Briefly explain what fetal alcohol spectrum disorder is.
6. Answer any **two** of the following:  $5 \times 2 = 10$
- Briefly describe how ventral axis is determined in *Drosophila* embryo with diagram. Briefly state how Nanog gradient is established in *Drosophila* embryo.  $3+2$
  - What is capacitation? Using suitable diagram explain fast and slow block to polyspermy during sea urchin fertilization.  $1+4$
  - What is likely to happen if you over-express telomerase protein TERT in somatic cell? What is open and close state of telomere? Draw a concept map of explaining relationship between telomere shortening and aging.  $1+1+3$
  - Briefly state the role of epigenetic modifications in cellular differentiation. State the characteristics of a stem cell.  $3+2$