

TOPIC: ANIMAL GROWTH AND DEVELOPMENT

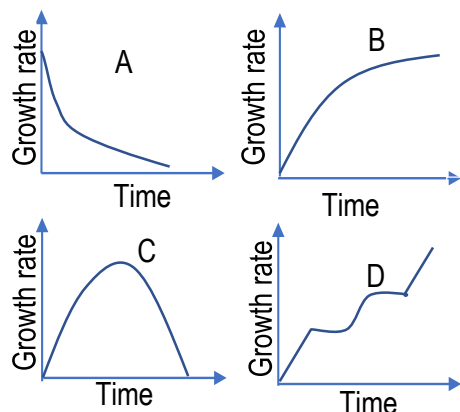
Time: 2 ½ hours

Attempt all questions in this paper

SECTION	MARKS
A	
B	
TOTAL	

SECTION A (40 MARKS)

- Which one of the following groups of organism undergo isometric growth pattern?
 - Mammals and amphibians
 - Fish and insects
 - Amphibians and fish
 - Insects and mammals
- The following occur during senescence except.
 - Hardening of arteries
 - Shrinking body size
 - Increased sensitivity
 - Mental senility
- Which one of the following graphs in the figure below correctly represents the growth rate of multicellular organism?



- Which one of the following is not a role of the larval stage in animal's development?
 - Dispersal
 - Asexual reproduction
 - Feeding
 - Sexual reproduction
- Worker bees and queen bee are polymorphic forms which differ in fertility as a result of
 - Feeding on different diet
 - Worker's eggs not being fertilized
 - Workers being produced parthenogenetically

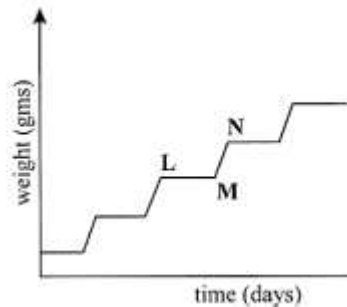
- The queen having diploid cells while workers have haploid cells
- Ecdysone is an insect hormone. What life process involved this hormone?
 - Moulting
 - Delays metamorphosis
 - Synthesis of brain hormone
 - Regulates water balance
- Worker bees are.
 - Sterile females developed from fertilized eggs
 - Fertile male developed from unfertilized eggs
 - Sterile females developed from unfertilized eggs
 - Fertile female developed from unfertilized eggs
- Which one of the following is not a role of larval stage in animal development?
 - Dispersal
 - Feeding
 - Asexual reproduction
 - Sexual reproduction
- The hormone that triggers insect metamorphosis from larva to adult is
 - Ecdysone
 - Juvenile hormone
 - Epidermal growth factor
 - Prothoracic hormone
- For a given animal species, which of the following would be the same size?
 - Zygote and eight-cell stage embryo
 - Zygote and blastula
 - Eight-cell stage and blastula
 - All of the above

- Animals and choanoflagellates both possess genes that encode for
 - Photosynthesis enzymes
 - Adhesive proteins
 - Cleavage
 - Gastrulation
- A zygote and blastula
 - Consist of the same number of cells
 - Exhibit both endoderm and mesoderm
 - Are the same size
 - Are solid in cross section
- Which of the following are the first animals with amniotic eggs?
 - Amphibians
 - Mammals
 - Turtles, lizards, snakes
 - Birds
- The cell formed by the union of a sperm cell and an oocyte is called a
 - Blastula
 - Morula
 - Zygote
 - Blastocele
- The connecting stalk seen early in human development later becomes the
 - Placenta
 - Amniotic sac
 - Umbilical cord
 - Yolk sac
- Typically, how many times do insects moult?
 - 2
 - 3
 - 0
 - Many times
- The earliest development stage at which one can see a fluid-filled extracellular cavity is

- A. Morula
 - B. Blastula
 - C. Zygote
 - D. Fetus
18. The organ in which maternal and fetal blood exchange materials is the
- A. Umbilical cord
 - B. Placenta
 - C. Amniotic sac
 - D. Amniotic cavity
19. In which of the following animals does the notochord persist in adult stage?
- A. Mammals
 - B. Reptiles
 - C. Insects
 - D. Amphioxus
20. The process by which a baby is born is called
- A. Gestation
 - B. Pregnancy
 - C. Differentiation
 - D. Parturition
21. The chorion is derived from the
- A. Trophoblast
 - B. Blastocoel
 - C. Inner mass cell
 - D. Vegetal pole
22. In insects, an instar is..
- A. The period between moults
 - B. The period after an egg laid but before it hatches
 - C. The flexible membrane between insect body segments
 - D. The portion of the body segment between the flexible membranes
23. All larva forms of organisms have the following basic features except being
- A. Different from adults
 - B. Independent
 - C. Dependent
 - D. Incapable of sexual reproduction.
24. Which one of the following is false for cleavage during development?
- A. Reduction in cytoplasmic content
 - B. Increase in cytoplasmic content
 - C. Blastula is formed at last stage.
 - D. Blastomeres form
25. The embryo develops around a thickened line in the endoderm called the
- A. Trophoblast
 - B. Inner mass cell
 - C. Notochord
 - D. Primitive streak
26. Which statement is TRUE about the prenatal heart?
- A. In the developing fetus, blood is shunted from the left atrium to the right atrium
 - B. The fetus has greater pulmonary arterial pressure than the newborn
 - C. The interatrial septum forms a solid, fused wall between left and right atrium by 8 weeks of development
 - D. The prenatal left atrium is the first heart chamber to receive oxygenated blood.
27. From which of the following layers of gastrula is the nervous system formed
- A. Ectoderm
 - B. Endoderm
 - C. Mesoderm
 - D. None of them
28. Oxygenated blood travels from the placenta to the fetus through the
- A. Umbilical vein
 - B. Umbilical artery
 - C. Aorta
 - D. Ductus arteriosus
29. Which of the following is the outer layer of the insect integument?
- A. Epidermis
 - B. Endocuticle
 - C. Exocuticle
 - D. Epicuticle
30. Which one of the following is an exception in terms of development?
- A. Amphibians and reptiles
 - B. Fish and amphibians
 - C. Amphibians and insects
 - D. Mammals and insects
31. Holometabolous insects undergo
- A. a complete metamorphosis
 - B. an incomplete metamorphosis
 - C. both metamorphic cycles
 - D. no metamorphosis
32. Which one of the following is the correct order of the stages during animal development?
- A. Cleavage→ organogenesis→ gastrulation
 - B. Gastrulation→cleavage→ organogenesis
 - C. Organogenesis→ gastrulation→cleavage
 - D. Cleavages→gastrulation→organogenesis
33. The foreman ovale in the fetal heart connects
- A. Right and left atria
 - B. Right and left ventricle
 - C. Right chambers
 - D. Left chambers
34. Which one of the following groups has related insects?
- A. Butterflies, moths, beetles and flies.
 - B. Locusts, cockroaches, grasshoppers and flies
 - C. Termites, butterfly, moths and locusts
 - D. Beetles. Flies, locusts and butterflies.
35. The main hormones concerned with growth in humans are secreted from
- A. Thyroid gland
 - B. Hypothalamus
 - C. Pituitary gland
 - D. Adrenal gland
36. Which one of the following statements is true for pupal stage of the insect?
- A. Very active form

- B. Forms a nymph
 - C. Involves tissue breakdown and rearrangement.
 - D. Similar to larva
37. Arthropods show a notable exception in the smooth growth curve typical of most animals because.
- A. Presence of cuticle
 - B. Metamorphosis
 - C. Moulting
 - D. Growing faster
38. Limited growth differs from unlimited growth in that, in the former,
- A. The growth curve flattens out or even declines prior cell death.

- B. Growth continues throughout life.
 - C. Occurs in invertebrates
 - D. Occurs in fish
39. The graph below illustrates intermittent growth in insects.



Which one of the following is the correct description for the above graph?

	LM	MN
A	Growth	Growth
B	Growth	Moulting
C	Moulting	Growth
D	Modulating	Moulting

40. The major problem associated with using fresh weight to measure growth is that
- A. Masses are different at different stages of growth.
 - B. Affected by environmental factors
 - C. The mass is affected by fluctuations of the amount of water in the organism.
 - D. Mass increases faster in short time.

SECTION B (60MARKS)

41. (a) Giving examples in each case, distinguish between the following terms.

(i) Growth and development

(3marks)

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(ii) Limited and unlimited growth

(2marks)

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(iii) Allometric and isometric growth.

(2marks)

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(3marks)

Age (years)	Curve A (%)	Curve B (%)	Curve C (%)	Curve D (%)
0	0	0	0	0
2	40	50	25	5
4	70	70	35	8
6	100	85	45	10
8	130	95	50	12
10	170	98	55	15
12	190	99	60	18
14	160	100	75	20
16	130	100	90	40
18	110	100	98	80
20	100	100	100	100

(2marks)

(8marks)

[illegible][illegible]

(b) How is growth measurement different in using fresh mass and dry mass of an animal. (3marks)

(3marks)

(c) State three advantages and two disadvantages that occur when using fresh mass to determine growth rate.

Advantages (3marks)

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Disadvantages (2marks)

(2marks)

(c) What is the best parameter for measuring growth and why? (1mark)

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(1mark)

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44. (a) Distinguish between growth rate and relative growth rate. (1mark)

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(1mark)

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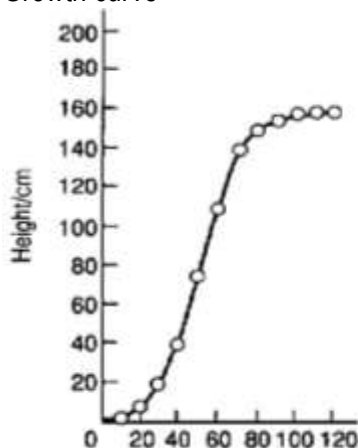
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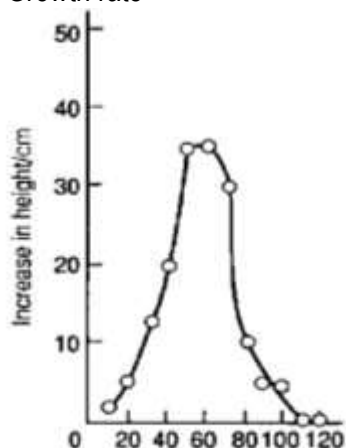
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(b) Three graphs showing curve, growth rate and relative growth rate of an animal are shown below. The graphs are draw in the same scale. Use them to answer questions that follow.

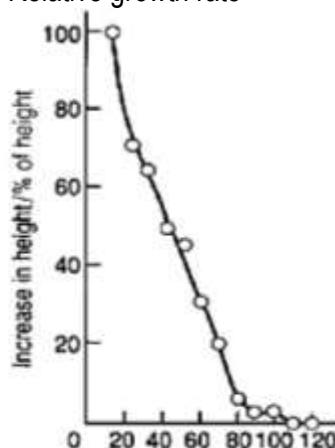
Growth curve



Growth rate



Relative growth rate



Age in days

Age in days

Age in days

Explain the trends in each graph

(i) Growth curve

(4marks)

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(ii) Growth rate

(2marks)

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(iii) Relative growth rate

(3marks)

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45. (a) Explain fully the role of the following structures towards the metamorphic development of insects.
(i) Neurosecretory cells (3marks)

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(ii) Corpus allatum (2marks)

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(b) In most organisms that undergo metamorphosis, larval forms exhibit different physiological and behaviour mechanisms. Explain the significance of these differences. (5marks)

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46. Explain the role of each of the following hormones in regulating growth and development in vertebrates.
(a) Thyroxine. (3marks)

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[illegible][illegible]

END