A.Y 2022-23

Date :

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Assignment No. 1

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class :- B.Sc. fy
sub. :- Biodiversity of chordates
zoology.

Date :

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Q. 2) Describe General characters of AVES.

1) Aves are birds. Birds are warm blooded flying vertebrates with beaks, wings and feathers.

2) They are chordates because the embryo develops a notochord.

3) The brain is encolosed in a cranium. So they are craniata.

4) They are vertebrates because they contain a vertebral colum.

5) They have jaws. so they are included in Gnathostomata.

6) They have 4 limbs. So they are called Tetrapods.

7) They develop amnion. So they are called Amniota.

8) The skin is dry and skin glands are absent.

9) The jaws are elongated into a beak or bill.

10) The fore limbs are modified into wings.

11) The teeth are absent.

12) The vertebrae are heterocoelous.

13) The ribs are double-headed.

* tell - शेपटी
tell is long and folded.

* thoras - पुढच्या पायाच्या वरचा भाग
thoras is the apper part of forlimp

* adbo abdomin :- मागच्या पायाच्या वरचा भाग / पोटाचा भाग
abdomin is the apper part of Hidlim. systime.

Assignment -I

Name :- Jadhav Rupali
class :- B.Sc. F.Y.
subject :- zoology

Q 1] Extarnal carected of rat :-

1] Extarnal corected of Habit and Habitark

* Rat :- Esualy lids a fossorial life
  - it can luave me burrous
  - it live in group of Habiliss
  - seam size and colour

1] House mouse - घरातले उंदीर
size 7 to 9 mm Head and body length 3 to 7 mm long colour gray and broun.

2] Coman Rat :- कुठेही राहणारे
colour is brounish graly body length 12 mm long

3] ship Rat :- काळे उंदीर
colour is Block size 14.5 to 20 mm Head and 12 mm long body length
it cosed by play dicess

* Digestive system consist of phyranx, intestine, excretory system consist of flame cells.
* Sense organs present.
* they are mostly hermaphrodite.
* Reproduction sexual and asexual, lifecycle simple.

Class II Trematoda :-

* Ectoparasitic and endoparasitic form, commonly called as flukes.
* Body shape is leaf like, dorsoventrally flattened.
* Body wall without epidermis and cilia.
* Body is not covered with cuticle.
* well developed suckers usually present.
* Digestive system incomplete consists of mouth, phonynx and forked intestine.
* Excretory system consists of flame cells.
* They mostly hermaphrodite.
* Life history simple or complicated.

Class III Cestoda :-

* Endoparasite in the intestine in vertebrates.
* commonly called as tapeworm's body without epidermis and cilia but covered with cuticle.
* Body usually divided into few to many proglottids.

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Date

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Subject :- Zoology
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* Anterior end (scolex) is provided with Adhesive structure (Hooks and sucker).

* mouth and digestive system totally absent.

* Each proglottids contain Complete Hermaphrodite reproductive system.

* Lifecycle require one or more hosts.

* Shell consists of single piece.
* Foot flat and ventral.
* Gills external and serially arrange
* Sexes are separate (dioecious).

Class IV Gastropoda :->

* Gastropods are marine, fresh water. terrestrial and few are Parasitic.
* Body unsegmented, asymmetrical.
* Head consist of tentacles, eyes and
* Foot ventral, broad, flat and muscular forming the creeping sole.
* Visceral mass spirally coiled.
* Digestive system consist of pharynx oesophagus stomach. intestine and anus.
* Respiration by gills (Ctenidia)
* Excretory organs are metanephridia
* Sexes are sparate in some form hermaphrodite.

animals intestine becomes 'U' shaped

* Generally the circulatory system is ope
* Respiratory organs are gills or ctenidi
  lungs are develops in terrestrial form.
* Excretory system consists of meta nephridia
* Nervous system consists of meta nephridia
* Nervous system consists of sexes usually separate but some are hermaphroditic.
* fertilization is external or internal
* Development is direct or indirect.
* Classification :->
* the classification is adopted from Hymen L.H. (1957) with modifica from parker and Haswell (1965).

Class I A Aplacaphora :-

* The body is worm like bilaterally symmetrical and

Development with larval stages:

Class V Scaphopoda:-

* Mostly marine forms.
* Body bilaterally symmetrical.
* Eyes tentacles absent.
* Foot is reduced used for digging.
* Heart rudimetary
* Sexes are separate.

Class VI Pelecypod :-

* Aquatic mostly marine some fresh water forms
* Body laterally compressed head fused pharynx, jaws absents.
* Mantle is bilobed.
* Gills are paired on each side.
* Coelom is reduced.
* Alimentary canal is coiled with digestive gland
* Heat is within pericardium consist of ventricle and two auricles.

are paired

again diff. w.r.to x

$$\frac{d^2y}{dx^2} = m^2 e^{mx}$$

$$\frac{d^3y}{dx^3} = m^3 e^{mx}$$

similarly

$$\frac{d^ny}{dx^n} = m^n e^{mx}$$

8) If $y = a^{\sin x}$ then find $\frac{dy}{dx}$

soln:-

$y = a^{\sin x}$

diff. w.r.to x

$\frac{dy}{dx} = a^{\sin x} \log e^a \cdot \cos x$

9) If $y = e^{\log[\sin x]}$ then find $\frac{dy}{dx}$

soln

$y = e^{\log[\sin x]}$

diff. w.r.to x

$\frac{dy}{dx} = e^{\log[\sin x]} \cdot \frac{1}{\sin x} \cos x$

$\frac{dy}{dx} = e^{\log[\sin x]} \cdot \frac{\cos x}{\sin x}$

$\frac{dy}{dx} = e^{\log[\sin x]} \cot x$

Name:- Shikka Vaibhavi
BSc f.y

Academic year - 2022 -23

1) If $y = \log[\sin ax]$ then find dy/dx

soln:-

$y = \log[\sin ax]$

Diff. with. x. to ax

$$\frac{dy}{dx} = \frac{1}{\sin ax} \cdot \cos ax$$

$$\frac{dy}{dx} = \frac{\cos ax}{\sin ax}$$

$$\boxed{\frac{dy}{dx} = \cot ax}$$

2) If $y = e^{ax+b}$ then find $\frac{dy}{dx}$

soln:-

$y = e^{ax+b}$

diff. w. x to ax

$$\frac{dy}{dx} = e^{ax+b} \cdot a$$

$$\boxed{\frac{dy}{dx} = a \cdot e^{ax+b}}$$

3) If $y = e^{\log[\cos ax]}$ then find $\frac{dy}{dx}$

soln:- $y = e^{\log[\cos ax]}$

Diff. w. x to ax

$$\frac{dy}{dx} = e^{\log[\cos ax]} \cdot \frac{1}{\cos ax} \cdot [-\sin ax]$$

$$\frac{dy}{dx} = -e^{\log[\cos ax]} \tan ax$$

If $y = \log(a^x)$

Soln:- $y = \log(a^x)$

diff. w.r. to x

$$\frac{dy}{dx} = \frac{1}{a^x} \cdot a^x \log e^a$$

$$\frac{dy}{dx} = \log e^a$$

14) If $y = \sqrt{x}$ then find $\frac{dy}{dx}$

Soln:- $y = \sqrt{x}$

diff. w. r. to x

$$\frac{dy}{dx} = \frac{1}{2\sqrt{x}}$$

15) Show that $F(x) = x|x|$ is differentiable at $x=0$

Soln:- $F(x) = x|x|$

$$|x| = \begin{cases} x & \text{if } x > 0 \\ -x & \text{if } x < 0 \end{cases}$$

$$f(x) = \begin{cases} x^2 & \text{if } x \geq 0 \\ -x^2 & \text{if } x < 0 \end{cases}$$

$$R^+ f(0) = \lim_{h \to 0^+} \left[\frac{f(x+h) - f(x)}{h} \right]$$

1) examine the function f where

$$f(x) = x\left(\frac{e^{-4/x} - e^{4/x}}{e^{-4/x} + e^{4/x}}\right) \quad x \neq 0$$

$$= 0 \quad x = 0$$

Soln :- $f(x) = x\left(\frac{e^{-4/x} - e^{4/x}}{e^{-4/x} + e^{4/x}}\right)$ $f(x) = \lim_{x \to 0}\left[\frac{f(x) - f(a)}{x - a}\right]$

$$f'(0) = \lim_{x \to 0}\left[\frac{x\left(e^{-4/x} - e^{4/x}\right)}{\left(e^{-4/x} + e^{4/x}\right)}\right]$$

$$f'(0) = \lim_{x \to 0}\left[\frac{e^{-2/x} - 1}{e^{-4/x} + 1}\right]$$

$$f'(0) = \lim_{x \to 0}\left[\frac{0 - 1}{0 + 1}\right]$$

$$\boxed{f'(0) = -1}$$

hence the given function is differintable at $x = 0$

2) <u>continivity</u> :-

1) Discuss the continivity of $f(x) = |x|$ at $x = 0$

Soln :- $f(x) = |x|$

$$\lim_{x \to 2^-} f(x) = \lim_{x \to 2^+} f(x) = 0$$

hence the function is continious at x

4) Discuss the derivability of a function

$$f(x) = \begin{cases} x & x < 1 \\ 2 - x & 1 \le x \le 2 \\ -2 + 3x - x^2 & x > 2 \end{cases}$$

Soln:-

$$f(x) = \begin{cases} x & x < 1 \\ 2 - x & 1 \le x \le 2 \\ -2 + 3x - x^2 & x > 2 \end{cases}$$

$$f'(a) = \lim_{x \to a} \left[\frac{f(x) - f(a)}{x - a} \right]$$

differinble

Now we discuss continuity at $x = 1$ $x = 2$

Let

$x = 1$

$$f'(a)^+ = \lim_{x \to a^+} \left[\frac{f(x) - f(a)}{x - a} \right]$$

$$f'(a)^+ = \lim_{x \to a^+} \left[\frac{2 - x - 1}{x - 1} \right]$$

$$f'(a)^+ = \lim_{x \to a^+} \left[\frac{x - x}{x - 1} \right]$$

$$f'(a)^+ = \lim_{x \to a^+} \left[\frac{1 - x}{} \right]$$

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

$$\lim_{x \to 0^+} f(x) = \lim_{x \to 0^+} x = 0$$

$$\lim_{x \to 0^-} f(x) = \lim_{x \to 0^-} |x| = \lim_{x \to 0^-} -x = 0$$

$$\lim_{x \to 0^+} f(x) = \lim_{x \to 0^-} f(x) = 0$$

hence the function is continious at $x = 0$

2) Discuss continivity of $f(x) = x|x|$ at $x = 0$

soln: $f(x) = x|x|$

$$|x| = \begin{cases} x & \text{if } x > 0 \\ -x & \text{if } x < 0 \end{cases}$$

$$f(x) = \begin{cases} x^2 & \text{if } x \geq 0 \\ -x^2 & \text{if } x < 0 \end{cases}$$

$$\lim_{x \to 0^+} f(x) = \lim_{x \to 0^+} x^2 = 0$$

$$\lim_{x \to 0^-} f(x) = \lim_{x \to 0^-} -x^2 = 0$$

$$\lim_{x \to 0^-} f(x) = \lim_{x \to 0^+} f(x) = 0$$

hence the function is continuous at $x = 0$

$f'(a)^+ = f'(a)^- = -1$

hence the function derivable at $x = 2$

5] If $f(x) = \dfrac{x e^{1/x}}{1 + e^{1/x}}$ $x \neq 0$

$= 0$ $x = 0$

Discuss the derivability

Soln:- $f(x) = \dfrac{x e^{1/x}}{1 + e^{1/x}}$

$$f'(a) = \lim_{x \to a^+} \left[\frac{f(x) - f(a)}{x - a} \right]$$

$$f'(0)^+ = \lim_{x \to a^+} \left[\frac{\frac{x e^{1/x}}{1 + e^{1/x}} - 0}{x - a} \right]$$

$$f'(0) = \lim_{x \to a} \left[\frac{e^{1/x}}{1 + e^{1/x}} \right]$$

$$f'(0) = \lim_{x \to a} e^{1/x} \left[\frac{1}{1 + \frac{1}{e^{1/x}}} \right]$$

$$f'(0) = \lim_{x \to a} 1$$

hence the function is derivbile at $x = 0$

diff. w. r. to y

$$\frac{dx}{dy} = \sinh x$$

$$\frac{dy}{dx} = \frac{1}{\sinh x}$$

squring on both side

$$\frac{dy}{dx} = \frac{1}{\sqrt{\sinh^2 x}}$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1-\cosh^2 x}}$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{x^2-1}}$$

$$\boxed{\frac{d}{dx}[\cos^{-1} hx] = \frac{1}{\sqrt{x^2-1}}}$$

→ Derivative of $y = \tan^{-1} hx$

Soln.

$$y = \tan^{-1} hx$$

$$x = \tanh y$$

diff. w. r to y

$$\frac{dx}{dy} = \operatorname{sech}^2 x$$

$$f'(1)^+ = \frac{f(x) - f(a)}{x - a}$$

$$f'(1)^+ = \frac{2x - 1}{x - 1}$$

$$f'(1)^+ = \frac{1 - 2x}{x - 1} \quad \text{---} \left(\frac{0}{0}\right) \text{form}$$

applying L-Hospital rule

$$f'(1)^+ = \frac{1 - x}{x - 1}$$

$$= \frac{0 - 0}{1 - 0}$$

$$= \frac{-1}{1}$$

$$\boxed{f'(1)^+ = -1}$$

$$f'(1)^- = \frac{f(x) - f(a)}{x - a}$$

$$= \frac{x - 1}{x - 1} \quad \text{---} \left(\frac{0}{0}\right) \text{form}$$

upping L-Hospital rule

$$f'(1)^- = \frac{x - 1}{x - 1}$$

$$= \frac{1 - 0}{1 - 0} = \frac{1}{1}$$

$$f'(1)^- = 1$$

* derivative of $y = \text{sech}^{-1} x$

soln:- $y = \text{sech}^{-1} x$

$x = \text{sech} y$

diff. w.r. to. y

$\frac{dx}{dy} = -\tanh x \cdot \text{sech} x$

$\frac{dy}{dx} = -\frac{1}{\tanh x \cdot \text{sech} x}$

$\frac{dy}{dx} = \frac{-1}{\sqrt{\tanh^2 x} \cdot \text{sech} x}$

$\frac{dy}{dx} = \frac{-1}{\sqrt{1 - \text{sech}^2 x} \cdot \text{sech} x}$

$\frac{dy}{dx} = \frac{-1}{\sqrt{1 - x^2} \cdot x}$

$\frac{dy}{dx} = \frac{-1}{x\sqrt{1 - x^2}}$

* Find derivitive of $\log(\cosh x)$

$y = \log(\cosh x)$

Diff. w. r to x

$\frac{dy}{dx} = \frac{1}{\cosh x} \sinh x$

$\frac{dy}{dx} = \tanh x$