

Time: 3 Hours

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Core Subject : Second Semester : Paper – I

CHORDATES-I

Under CBCS – Credit 4

Max.	Marks:	75
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SECTION – A

Answer ALL	Answer ALL Questions : $(10 \times 1 = 10)$						
1. Part of Herdmania embedded in sand is							
a. Test	b. Foot	c. Tunic	d. a and c				
2. Notochord occurs in the adult animal of							
a. Osteichth	yes	b. Chondrichtl	b. Chondrichthyes				
c. Protochor	data	d. Amphibian					
3. Frog hiberna	te during						
a. Winter	b. Spring	c. Summer	d. Autumn				
4. The oil gland of Pigeon is called							
a. parotid gla	and	b. Uropygial g	b. Uropygial gland				
c. Sweat gla	c. Sweat gland		d. Maxillary gland				
5. Photophores	are otherwise called						
a. Digestive	organ	b. Luminescer	b. Luminescent organ				
c. Respirator	ry organs	d. None of the	d. None of these				
6. Chemical breakdown of food into small organic fragments for absorption							
by digestive	epithelium is called						
a. Digestion	b. Respiration	c. Circulation	d. All of these				

7. Which part of the mammalian brain controls the muscles coordination?a. Cerebrum b. Cerebellum c. Corpus callosum d. Medulla						
8. Muscles are:a. Thermoreceptorc. Chemoreceptor		b. Mechanoreceptord. Photoreceptor				
9. The centrum of 8th vertebraa. Amphicoelius b. Procoe	e	d. Opisthocoelus				
10.Which animal is uricotelic? a. Bird b. Fish	c. Frog	d. Man				
	SECTION – B					
Answer any FIVE Question	<u>15</u> :	$(5 \times 2 = 10)$				
11. Define Cephalochordata.	11.Define Cephalochordata.					
12. Comment on Herdmania.						
13. What is Metatheria?	13. What is Metatheria?					
14. Write short notes on crainat	a.					
15. Explain the functions of Integument.						
16. List out the role of RBC.						
17. State the components of Axial skeleton.						
SECTION – C						
<u>Answer ALL Questions</u> : $(5 \times 5 = 25)$						
18.a). Explain the general char	racters of Amphioxus.					
[OR]						
b). Illustrate the Retrogressive metamorphosis in Ascidian.						

19.a). Write an account on Petromyzon.

[OR]

- b). Classify the Phylum vertebrata upto class level.
- 20.a). Discuss the comparative similarities of digestive system between Amphibian and Mammals.

[OR]

- b). Explain the respiratory system of birds.
- 21.a). General Characteristic features of Phylum Chordates and mention its Significance.

[OR]

b). Briefly explain Structural similarities of Heart among vertebrates.

22. a). Explain General Characteristic features of Balanoglossus.

[OR]

b). Discuss is detail the Morphological features of shark..

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

23. Describe the Affinities of Balanoglossus.

24. With suitable sketches, explain the morphology of Frog.

25. Write an essay about comparative Digestive system in vertebrates.

26. Discuss the integument systems of vertebrate and its significance .

27. Give detailed account on the morphological features of Calotes with suitable diagram.



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B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Core Subject : Second Semester : Paper – II

CHORDATES-II

Under CBCS – Credit 4

Time: 3 Hours

Max. Marks: 75

SECTION – A

Answer ALL Questions :

 $(10 \times 1 = 10)$

- 1. _____ were the first true vertebrate
 - a) Shark b) Hippocampus c) Ostracoderms d) Balanoglossus
- 2. _____ shows a mixture of amphibian and reptilian characters
 - a) Cotylosauria b) Seymouria c) Humerus d) Cotylosaur
- 3. ____builds a nest in weeds and lays the egg in the nest
 - a) Myatus aor b) Pipe fishes
 - c) Osphronemus gourami d) Butter fishes
- 4. Long travels within fresh water is called
 - a) Potamodromous migration b) Ocenodromous migration
 - c) Catadromous migration d) Andromous migration
- 5. Which of the following exhibit direct caring by the parents.
 - a) Hylafaber b) Heptadactylusocellatus
 - c) Desmognathusfucus d) Phyllomedusa

6. The poison glands of poisonous snake are modified _____

a) Buccal glands.b) Palantine glands.c) salivery glands.d) Lacrymal glands.

7.	Birds	fly	with	help	of	
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a) Pategium. b) Wings. c) Feathers d) Limbs.

Birds are described as
 a. Glorified reptiles

b. Ratitae

- c. Feathered reptiles d. Primitive reptiles
- 9. Cleidoic and megalecithal egg is present in
 - a) Metatheria b) Prototheria c) Eutheria d) All the above

10. The first mammals are coming under the ordera) Docodontab. Theriodontac. Therapsidad. Synapsida

<u>SECTION – B</u>

 $(5 \times 2 = 10)$

 $(5 \times 5 = 25)$

Answer any FIVE Questions :

11. Define Phylogeny.

- 12. Comment on Aves.
- 13. What is Air bladder?
- 14. Write short notes on causes of fish migration.
- 15. Explain the importance of Neoteny.
- 16. List out the types of accessory respiratory organs fishes.
- 17. What is synsacrum?

<u>SECTION – C</u>

Answer ALL Questions :

18.a). Explain the phylogeny of Amphibia.

[OR]

b). Illustrate the Phylogeny of Reptilia.

19.a). Write an account on Parental care in fishes.

[OR]

- b). Classify the Migration in fishes.
- 20.a). Discuss the Neoteny in Amphibian.

[OR]

b). Explain the types of nests in parental care in Amphibia.

21.a). Comment on Flightless birds.

[OR]

- b). Briefly explain the flight Adaptation in birds.
- 22. a). Enumerate the types of Migration in fishes.

[OR]

b). What are the types of bird Migration.

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

- 23. Describe the phylogeny the birds.
- 24. Explain the accessory respiratory organs of fishes.
- 25. Write an essay on origin and phylogeny of vertebrates.

26. Elucidate the Migration in birds.

27. Write an essay on phylogny of reptilia.



(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.A. & B.Sc. Degree (Semester) Examinations, April 2020 Part – IV : Non Major Elective Subject : Second Semester : Paper – I

FOOD AND NUTRITION

Under CBCS – Credit 2

Max. Marks: 75

SECTION – A

Answer ALL Questions :

Time: 2 Hours

 $(10 \times 1 = 10)$

- 1. Which one is the cheapest source of energy in food?
 - a) Carbohydrate b) Protein c) Fat d) Vitamins
- 2. Which one is the basic unit of carbohydrate?
 - a) Glucose b) Amino acid c) Fatty acid d) Enzyme
- 3. Minerals do not include
 - a) Iodine b) calcium c) sodium d) Protein
- 4. In chicks, the embryonic mortality is caused by the deficiency of
 - a) Vitamin E b) Vitamin C c) Vitamin D d) Vitamin K
- 5. Deficiency of iodine leads to
 - a) anaemia b) tetany c) goitre d) fluorosis

6. Which disease is caused by the deficiency of vitamin A?

a) Xerophthalmia b) Scurvy

c) Beriberi d) Pellagra

7. Kwashiorkor is caused by the deficiency of

a) Proteins b) carbohydrates c) Minerals d) Vitamins

8. The technique is used to preserve milk is

a) Drying b) Salting c) Pasteurization d) Smoking

9. Which of the following is a food infection?

a) Salmonellois b) Botulism c) Malaria d) Marasmus

10. Which one of the following is common insect contaminating food?a) House flyb) Honeybeec) Grasshopperd) Mosquito

<u>SECTION – B</u>

 $(5 \times 2 = 10)$

Answer any FIVE Questions :

11. Expand and comment on FAO.

12. Expand RDA.

13. What are nutrients?

14. State the functions of lipids.

15. Give the biochemical name of vitamin C and its functions.

16. Comment on Obesity.

17. What is food spoilage?

<u>SECTION – C</u>

Answer ALL Questions :

 $(3 \times 9 = 27)$

18.a) Describe the physiological role of carbohydrates and proteins.

[OR]

b) Write short note on sources and physiological functions of Vitamin B complex.

19.a) Comment on the physiological importance of any two minerals.

[**OR**]

- b) Narrate the sources and functions of vitamin C.
- 20. a) Explain the controlling measures for insects and rodents.

[OR]

b) Comment on RDA. How can it be used?

<u>SECTION – D</u>

Answer any TWO Questions :

 $(2 \times 14 = 28)$

- 21. Give an elaborate account on functions of food.
- 22. Write an essay on sources, functions and deficiency disorders of fat soluble Vitamins.
- 23. Describe the various food preservation techniques.
- 24. Critically comment on the disorders of malnutrition.



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B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Core Subject : Fourth Semester : Paper – I

DEVELOPMENTAL BIOLOGY

Under CBCS – Credit 4

Time: 3 Hours

Max. Marks: 75

SECTION – A

<u>Answer ALL Questions</u> :

 $(10 \times 1 = 10)$

a)Ectoderm b) Primordial gem cells c) Spermatozoa d) Ooplasm 2. The sperm cell was first discovered by a. Leeuwenhock b. Golgi c. Galen d. William Harvey 3. The male hormone is produced in the testis by the cells of a. Sertoli cells b. Epithelial cells c. Spermatoztes d. Leydig 4. The cavity of blastula is called					
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 3. The male hormone is produced in the testis by the cells of a. Sertoli cells b. Epithelial cells c. Spermatocytes d. Leydig 					
a. Sertoli cells b. Epithelial cells c. Spermatocytes d. Leydig					
4 The cavity of blastula is called					
The early of cluster is called					
a. Blastoderm b. Blastocoel c. Coeloblastula d. Gastrocoel					
5. Gastrulation in Amphioxus occurs by a process of					
a.Hyperboly b.Hypoboly c.Delamination d.Invagination					
6. The excretory organs of vertebrates are originated fromregion of					
coelomiccavity					
a. Distal b. Lateral c. Facial d. Proximal					
7. The hormone is responsible for pregnancy is					
a. Estrogen b. Ammonic c. Progesterone d. Pro estrogen					

- 8. The chief anatomical changes observed during Amphibian metamorphosis are
 - a. Head b. Limbs c. Tail d. All the above
- - a) Lateral axis b) Middle axis
 - c) Antero posterior axis d) Neurula
- 10. In Indian context the danger period for the birth control in menstrual cycle

of women is	to	days of mensus
a) 1^{st} to 5^{th} day		b) 13^{th} to 18^{th} day
c) 19^{th} to 23^{rd} days		d) 23^{rd} to 28^{th} day

<u>SECTION – B</u>

Answer any FIVE Questions :

 $(5 \times 2 = 10)$

- 11. Differentiate alecithal from microlecithal egg. Give Example.
- 12. What is meant by meroblastic cleavage?
- 13. What are the functions of amnion?
- 14. What do you mean by retrogressive metamorphosis?
- 15. Define placenta
- 16. Differentiate mensus and menopause.
- 17. Write any two merits of test tube baby methods.

<u>SECTION – C</u>

Answer ALL Questions :

18. a) . Highlight Baer's law on comparative embryology.

[OR]

- b). With a neat diagram, describe the structure of human sperm.
- 19. a). What is fate map? Draw a flow chart for blastula of frog.

[OR]

- b). Enlist the significance of parthenogenesis.
- 20. a). Comment on foetal membranes of Chick.

[**OR**]

- b). Write notes on development of eye.
- 21. a). Write short notes on pregnancy.

[OR]

b). Enumerate the functions of placenta

22. a). Analyse the causes of infertility.

[**OR**]

b). Examine the types of metamorphasis.

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

- 23. Explain the process of Oogenesis.
- 24. Give an account on physiological and biochemical changes occur during fertilization.
- 25. Describe hormonal control of puberty & pregnancy.
- 26. Explain various birth control measures.
- 27. Demonstrate the process of test tube baby method. Add a note on its demerits.

 $(5 \times 5 = 25)$



Time: 3 Hours

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B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Core Subject : Fourth Semester : Paper – II

PHYSIOLOGY

Under CBCS – Credit 4

Max. I	Marks:	7	5
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SECTION – A

Answer ALL Questions : $(10 \times 1 = 10)$ 1. Deficiency of iodine leads to a) anaemia b) tetany c) goitre d) fluorosis 2. Which of the following is associated with absorption? b) small intestine c) Gall bladder a) pancreas d) liver 3. Chemically the blood clot is a) Fibrin b) Thrombin c) Prothrombin d) Fibrinogen 4. The RQ value for carbohydrates is a) 5 b) 3 c) 7 d) 1 5. During osmosis, solvent moves through semi permeable membrane a) From the region of higher free energy to lower free energy b) From low free energy to high c) From the region of higher solute concentration to the lower d) All the above 6. Hibernation refers to a) Winter dormancy b) Summer dormancy c) Suspension of development d) Impairment

	7. Nerve impulse is in fact, a process in which is associated with						
	a) Electrical	b) Chemical	c) Electrochemic	al d) Physical			
	8. Muscle get fatigue due to accumulation of						
a) Lactic acid			b) ATP	b) ATP			
	c) Phosphate mo	olecules	d) Carbon dioxid	d) Carbon dioxide			
	9. Which of the following are involved in the maintenance of equilibrium of						
	the body?						
	a) Vestibule and	semicircular cana	l b) Cochlea			
	c) Round windo	w	d) Pupil				
	10.All of the following are hormones of the anterior pituitary expect						
	a) GH	b) FSH	c) PTH d) TSH			

<u>SECTION – B</u>

Answer any FIVE Questions :	$(5 \times 2 = 10)$
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- 11. What is night blindness?
- 12. Name any four enzymes involved in carbohydrate digestion.
- 13. What is meant by myogenic heart?
- 14. Define Osmoregulation.
- 15. What is respiratory quotient?
- 16. What is retina?
- 17. Expand. FSH and TSH.

<u>SECTION – C</u>

 $(5 \times 5 = 25)$

Answer ALL Questions :

18.a). Explain the biological importance of Vitamin C.

[OR]

- b). Explain the role of enzymes in carbohydrate digestion.
- 19.a). List out the functions of blood.

[**OR**]

- b). Explain how conduction of heart beat occurs in human heart.
- 20. a). With a neat sketch explain the structure of eye.

[**OR**]

- b). Give an account of osmoregulation in fishes.
- 21.a). Give an account on themoregulation with illustrations.

[OR]

b). Explain blood clotting mechanism.

22. a). Explain the human ear with sketch.

[OR]

b). Give an account on hormones of pituitary gland.

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

- 23. Write an account on sources functions and deticiency disorders of fat souble vitamins.
- 24. Give a detailed account of oxygen transport.
- 25. Give an elaborate account on functions of food.
- 26. Exemplify osmoregulators.
- 27. Write note on a) Hibernation, b) Aestivation, c) Diapouse.



Time: 2 Hours

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – IV : Skill Based Subject : Fourth Semester : Paper – I

CLINICAL LAB TECHNOLOGY

Under CBCS – Credit 2

Max. Marks: 75

SECTION – A

Answer ALL Qu	<u>estions</u> :	()	$10 \times 1 = 10)$		
1. pH of normal s	perm is	·			
a. 7.2 to 8	b. 7 to 7.5	c. 8 to 9	d. 7.2 to 7.8		
2. Which one of t	he following micro	scope is used to obse	erve living cells and		
tissues?					
a. Binocular	b. Dark field	c. Phase contrast	d. Compound		
3. CT scan is also	known as	•			
a) CAT scan	b) CBT scan	c) CCT scan	d) CDT scan		
4. Expand WHO					
a) World Healt	h Organization	b) World Health	Office		
c) World Healt	h Observation	d) World Health	d) World Health Organism		
5	is a medical Ultra-	Sonography.			
a) Doppler scar	n	b) X-rays			
c) CT scans		d) Ultra sound			
6. Haemometer is	also known as	·			
a) EEG		b) ECG			
c) Haemoglobi	nometer	d) Haemocytome	ter		

7 is used to count the bacterial cells in broth culture.		<u>SECTION – C</u>				
a) Chromatography b) Colorimeter		Answer ALL Questions :	$(3\times9=27)$			
c) Electrophoresis d) All the above		18.a) Write a note on biomedical waste manage	ement.			
8. Counting chamber of RBC is small squares.		[OR]				
a. 70 b. 60 c. 50 d. 80						
9. Lipid profile i	is a panel of blood	tests used for scre	ening tool for	b) Describe the mode of transmission, patho	ogenisity & control measures of	
abnormalities	of	·		jaundice.		
a. Cholesterol		c. Mineral	d. Vitamins	19.a) Explain the techniques of paper chromate	ography.	
10. The soft X-ray is easily absorbed in.a) H2Ob) Petrolc) Aird) Earth		[OR]				
				b) Critically comment on haemocytometer.		
				20. a) Elucidate the medical importance of stoo	l examination.	
<u>SECTION – B</u>		[OR]				
Answer any FIVE Questions : $(5 \times 2 = 10)$		b) Write the principle and uses of autoclave in research laboratories.				
11. What is Dopp	oler scan?					
12. Expand: ESR	& AFM			<u>SECTION – D</u>	<u>)</u>	
-				Answer any TWO Questions :	$(2 \times 14 = 28)$	
13. Write any two	o uses of colorimete	er		21. Write an essay on urine profile examination.		
14. What is diabe	etes?			22. Discuss the role of Magnetic Resonance Im	aging (MRI) scan.	
15. Mention the role of TEM.				23. Briefly explain the principle and applications of centrifuge.		
16. What is bleed	ing disorders?			24. Describe the medical importance of ECG.		
17. Comment on Risk Groups-2				ΥΥΥΥ		



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B.Sc. Botany Degree (Semester) Examinations, April 2020 Part – III : Allied Subject : Fourth Semester : Paper – I

BIOLOGY AND HUMAN WELFARE

Under CBCS – Credit 4

Max. Marks: 75

SECTION – A

Answer ALL Questions :

Time: 3 Hours

 $(10 \times 1 = 10)$

1.	1. Minor symptoms of polio include which of the following?						
	a) cough	b) Fever	c) Headache	d) A rash			
2. The HIV infects							
	a) DNA	b) RNA	c)T helper cell	d) Capsid			
3.	Bacterial cell wall	l composed of					
	a) Cellulose	b) peptidoglycan	c) Lipid	d) Chitin			
4.	4. What is the pathogen that causes tetanus?						
	a) Babesiamicroti b) Trypanosoma cruzi						
	c)Clostridium teta	ani	d) Toxoplasma	gondii			
5. Which is the primary host of plasmodium?							
	a) Man	b) Pig	c) Cat	d) Female Anopheles			
6. Which one is the vector of Wucheraria?							
	a) Man	b) Culex	c) Pig	d) Anopheles			
7.	Pisciculture is cul	ture of					
	a) Frogs	b) Fishes	c) Prawns	d) Birds			

	8. The useful microorganism present in vermicasting is						
	a) Antibiosis	b)Mutualism	c)Symbiosis	d)Parasitism			
	9. Which season is best for the growth of the fungus						
	a) Rainy	b) Summer	c) Winter	d) All the above			
	10. Which is the unfertile female of the honey comb?						
a) Queen b) Worker c) Drone d) Wax mot							

SECTION – B

Answer any FIVE Questions :

- 11. Mention the symptoms of AIDS.
- 12. What is tetanus? How it is treated?
- 13. What are the symptoms of ancylostomiosis?
- 14. List the diseases of silkworm and briefly explain how it is caused?
- 15. What is nauptial flight?
- 16. What are the uses of biogas?
- 17.List out the uses of honey.

Answer ALL Questions :

SECTION - C

$(5 \times 5 = 25)$

above

 $(5 \times 2 = 10)$

18.a). Summarize the cause, clinical symptoms and control of polio.

[**OR**]

b). Outline the clinical features of rabies.

19.a). Explain the biology of *Vibrio cholera*.

[**OR**]

- b). Show the clinical manifestations of tuberculosis.
- 20.a).Explain the pathogenesis of Entamoeba histolytiea.

[**OR**]

- b). Describe the life cycle of Wuchereria.
- 21.a). Classify and briefly explain the various methods of silkworm rearing.

[**OR**]

- b). Give an account on cycle of Ross.
- 22.a). Describe the morphology of Indian Oyster mushroom.

[**OR**]

b). Describe the biology of honey bee.

SECTION – D

Answer any THREE Questions :

 $(3 \times 10 = 30)$

- 23. Construct a structure of a typical virus and explain it with a neat labeled diagram.
- 24. Illustrate a find structure of a typical bacterium with a diagram.
- 25. Identify the causes, clinical symptoms, treatment and control measures of malaria.
- 26. Organize the life cycle of Bombyx mori and explain the changes that take place at every stage.
- 27. Build an appropriate method for the production of biogas.

YYYY



(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Core Subject : Sixth Semester : Paper – I

EVOLUTION

Under CBCS – Credit 4

Time: 3 Hours

Max. Marks: 75

<u>SECTION – A</u>

Answer ALL Questions :

 $(10 \times 1 = 10)$

- 1. The first scientist to hypothesise the life formation is
 - a. Oparin b. Miller c. Richter d. Cuvier
- 2. The theory of use and disuse of organs was given by
 - a. Jean Baptistie De Lamarck b. Alfred Russell Wallace
 - c. TR Malthus d. Charles Darwin
- 3. Darwin during his Voyage around the world, he observed the flora and fauna of:
 - a. Greenland b. Channel Islands
 - d. Queen land
- 4. Genetic Drift is also known as

c. Galapagos Island

a. Founder effect

c. Bottleneck effect

- b. Sewall Wright effect
- d. Gene migration
- 5. Formation of new species from pre-existing ones is
 - a. Mutation b. Speciation c. Isolation d. Polyploidy

- 6. Sewall Wright has modified his genetic drift theory into
 - a. Sampling error theory b. Shifting balance theory
 - c. Natural selection theory d. Punctuated equilibrium theory
- The geological time scale has been broadly divided into ----- major divisions

d. 7

- a. 4 b.5 c. 6
- 8. The first land vertebrate appeared during the
 - a. Cambrian period b. Ordovician period
 - c. Jurassic period d. Devonian period
- 9. The region on the earth considered as cradle of human evolution isa. Central Asiab. North America c. South Africad. Australia
- 10. Which one of the following appears to be an evolutionary link between the old forest- dwelling horses and Morden plains- dwelling grazers?
 - a. Mesohippus b.Miohippus c.Parahippus d.Merychippus

<u>SECTION – B</u>

Answer any FIVE Questions :

 $(5 \times 2 = 10)$

- 11. Define- Vestigial organs.
- 12. What do you mean by Atavism?
- 13. Comment on intra-specific struggle.
- 14. What is species?
- 15. Mention any three salient features of Batesian mimicry.
- 16. List any three conditions essential for Fossilization.
- 17. Comment on Equus.

<u>SECTION – C</u>

Answer ALL Questions :

 $(5 \times 5 = 25)$

18.a) . Explain the biochemical evidences of evolution with reference to visual pigments.

[OR]

b). Illustrate the principles of Lamarckism.

19.a). Give a brief account on Hardy-Weinberg law.

[OR]

- b). Enlist the evolutionary significance of genetic drift.
- 20. a). Write short notes on Allopatric speciation.

[OR]

- b). Elucidate the types of colouration.
- 21.a). List out the types of Fossils.

[OR]

- b). Briefly explain the continental Drift hyphothesis.
- 22.a). What is mimicry? Discuss its significance in adaptation of animal. [OR]
 - b). Analyse the adaptive radiation in Mammals.

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

- 23. Describe the embryological evidences for Evolution.
- 24. Discuss the principles of Darwinism with examples.
- 25. Elaborate the types of pre-zygotic isolation with examples.
- 26. Give a detailed account on Geological time scale.
- 27. Explain in detail about Biological evolution of man.





Time: 3 Hours

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B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Core Subject : Sixth Semester : Paper – II

MICROBIOLOGY & IMMUNOLOGY

Under CBCS – Credit 5

Max. Marks: 75

SECTION – A

Answer ALL Questions : $(10 \times 1 = 10)$ 1. The first virus was discovered by Ivanowski in a) 1896 b) 1897 c) 1898 d) 1899 2. Actinomycetes is an intermediate link between a) Bacteria and fungi b) Bacteria and virus c)Bacteria and Algae d) Bacteria and yeast 3. Biological nitrogen fixation requires b) ATP a) Hydrogen c) Leg haemoglobin d) All 4. MPN method is used for the confirmation of a) Coliform bacteria b) Halococcus c) Methanococcus d) Spirillum 5. Which one is responsible for tuberculosis? b) Mycobacterium a) Bordetella c) *Corynebacterium* d) *Streptococcus* 6. HIV infects the cells of immune system. b) B cells c) RBC d) T_C cells a) T_H cells

7.	The	name	antibody	was	coined	by
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a) Von Behring b) Jules Bordet c) Stewart Douglass d) Koch

8. Virulence reduce microbes used for vaccination are considered as

a) Toxoid b) Dormant c) Avirulent d) Attenuated

9. Lymphocytes causing the graft rejection are found mainly in

a) Spleen b) Lymph nodes c) Blood d) All the above

10. Which of the following is of no use for screening hybridma clones?

a) RIA b) ELISA

c) Indirect hemagglutination d) Precipitation test

<u>SECTION – B</u>

Answer any FIVE Questions :(5 × 2 = 10)11. What is microbes? Give examples?12. What is meant by T4 bacteriophage.13. Explain food poisoning.

14. What is MPN?

15. What does a viral disease mean?

16.GALT - Explain.

17. What are major targets of immune system?

<u>SECTION – C</u>

Answer ALL Questions :

 $(5 \times 5 = 25)$

- 18.a) . Write a brief account on the scope of microbiology.
 [OR]
- b). Empirical medium Explain.19.a). Explain food spoilage.

[OR]

b). Give a brief account on soil microbes.

20. a). List out the functions of Ig.

[OR]

- b). Describe tuberculosis.
- 21.a). Explain physical and mechanical factors of innate immunity.

[OR]

- b). Write a short account on Lymph node.
- 22. a). Give a detailed account on vaccination schedule.

[OR]

b). What are the types of immunoglobulin?

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

- 23. Write a detailed account on isolation of pure culture techniques?
- 24. Describe the physiology of nitrogen fixation.
- 25. Give a detailed account on secondary lymphoid organs.
- 26. Describe primary lymphoid organs.
- 27. Double immuno deffusion Discuss.

75



Time: 3 Hours

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Elective Subject : Sixth Semester : Paper – I

DAIRY FARMING

Under CBCS – Credit 4

Max.	Marks
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SECTION – A

Answer ALL Questions : $(10 \times 1 = 10)$ 1. Ongole is the general utility breed of a) Bihar b) Gujarat c) Andhra Pradesh d) Kerala 2. The milk of which exotic breed is with high content fat? a) Jersey b) Holstein-Friesian c) Brown Swiss d) Gurunsey 3. Basic function of amino acids is b) photosynthesis c) growth and repair d) digestion a) Respiration 4. A typical rumen contains volatile fatty acids normally in the greatest quantity is a) Acetic b) Propionic c) Butyric d) Lactic 5. The cow with milk fever show the signs of a. Hypersensitivity b. Restlessness c. Head bobbing d. All the above 6. Mode of transmission of FMD are a) Close animal-to-animal contact b) long-distance aerosol

c)	feed	supplement	ts containing	infected	animal	products
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d) All the above

7. The percentage of immunoglobulin is much higher in

a. Milk b. Fresh milk c. Dried milk d. Colostrum

8. The byproduct of milk made out of skim milk is

	a. Dahi	b. Butter	c. Ghee	d. Ice cream
9. The main limitations of artificial insemination is				
	a) Trained operato	or	b) low cost	
	c) size & weight of	of cow	d) old bulls	
10	.The commercial n	ame of Tamilnadu	milk union mar	keting products is

a) Milima b) Nandini c) Aavin d) Arogyaa

<u>SECTION – B</u>

Answer any FIVE Questions :(5 × 2 = 10)11.Brief on inbreeding.12.Comment on Milk fever.

13. What is Blot?

14. Comment on Hybrid vigour.

15. Define colostrum.

16. Write about liquid nitrogen method

17. Holstein friesian.

SECTION – C

Answer ALL Questions :

 $(5 \times 5 = 25)$

18.a) Enlist the scope of dairy farming.

[OR]

b) Give a brief account on the nutritive value of cattle feeds.19.a) Describe on food additives and silage preparation.

[OR]

b) Give a detailed account on feeding schedule for cow and calf. 20. a) Write on predominant viral diseases in dairy farming.

[**OR**]

b) Brief about metabolic diseases of cattle.

21.a) Narrate the techniques need to follow for the production of quality milk.

[OR]

b) Explain any six milk by-products you have studied.

22. a) What are equipments need for dairy farming.

[**OR**]

b) Explain the role of co – operative societies in milk marketing.

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

23. Write an essay on artificial insemination.

24. Explain about anatomy of udder and physiology of milk production.

25. Enlist and explain on bacterial diseases prone to cattles.

26. Give an account an the composition of milk & colostrum.

27. Explain the characteristics of any five milch breeds of cow in India.



Time: 3 Hours

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – III : Elective Subject : Sixth Semester : Paper – II

ENVIRONMENTAL BIOLOGY

Under CBCS – Credit 5

Max. Marks: 75

SECTION – A

Answer ALL Que	<u>stions</u> :	$(10 \times 1 = 10)$					
1. The specific heat of water is							
a. 1 ⁰ C	b. 2 ⁰ C	c. 3 ⁰ C	d. 4 ⁰ C				
2. The biological et	ffect of temperature	e is					
a. metabolism	b. growth	c. development	d. All				
3. The release of w	ater vapour from th	e leaves of trees is	called				
a. Evaporation	b. Precipitation	c. Condensation	d. Transpiration				
4. Which of the fol	lowing organisms i	s an autotroph?					
a. Algae	b. beer	c. cheetah	d. fish				
5. Succession that l	begins from fresh w	ater habitat is calle	d				
a. Hydrosere	b. Xerosere	c. Psammosere	d. All the above				
6. The population g	growth in man is for	und to be maximum	1 in				
a. Tropical coun	tries	b. Temperate cou	ntries				
c. North Americ	a	d. Tropical and su	ub – tropical countries				
7. The Coniferous	rees occur in						
a. River Delta	b. Himalayas	c. Both A and b	d. None of the above				

8.	Filter	feeding	is	a charac	teristic	feature	of
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a. Tubicolous life b. Terrestrial life c. Detritus life d. Burrowing life

9. Bhopal episode is caused by

a. Mercury b. Carbon dioxide c. DDT d. Methyl isocyanate

10. Indian rhinoceros is the most important protected species in

a. Gir National Parkb. Corbett National Parkc. Bandipur National Parkd. Kaziranga National Park

<u>SECTION – B</u>

Answer any FIVE Questions :

11. Define buoyancy?

12. Short notes on water properties?

13. Explain ecological niche?

14. What is energy flow?

15. Comment on any two adaptations of cave animals.

16. Explain interspecific relationship?

17. Define pedology?

<u>SECTION – C</u>

Answer ALL Questions :

 $(5 \times 5 = 25)$

 $(5 \times 2 = 10)$

18.a). Write an account on soil profile.

[OR]

b). Explain the account of Poikilothermic animals with suitable examples?

19.a). Give a brief account on food chain & food web?

[OR]

- b). Explain commensalism with suitable examples.
- 20.a). Give an account of logistic growth. How does it differ from exponential growth?

[OR]

b). Brief notes on age pyramids.

21.a). Write an account on estuarine adaptation.

[OR]

b). Give a detail account on parasitic adaptations?

22. a). Pond as an eco system – Discuss.

[**OR**]

b). Give Short notes on environmental pollutants?

<u>SECTION – D</u>

Answer any THREE Questions :

 $(3 \times 10 = 30)$

23. Describe the light and effects of light on animals?

24. Explain Nitrogen cycle.

25. Write an essay on ecological succession.

26. Give an account of the desert adaptation of animals.

27. Give a detailed account on wild life conservation and its management.

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Time: 2 Hours

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – IV : Skill Based Subject : Sixth Semester : Paper – I

FISH CULTURE

Under CBCS – Credit 2

٩ax.	Marks:	75
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SECTION – A

Answer ALL Que	$(10 \times 1 = 10)$					
1. Pisciculture is a culture of						
a. earth worm	b. Prawns	c. Fishes	d. silkworm			
2. The important fo	od fish is					
a. Rohu	b. Catla	c. Wallago	d. Clarius			
3. Which one of the	e following is integ	grated fish farming	2			
a. Paddy cum fis	h culture	b. monoculture				
c. Monosex cultu	ıre	d. Polyculture				
4. The optimum ter	nperature for fish	is				
a. $20 - 25^{\circ}$ C	b. $30 - 35$ ⁰ C	c. $35 - 40^{\circ}$ C	d. 15 - 20 ⁰ C			
5. Induced breeding is effective in which of them?						
a. Pisciculture	b. Sericulture	c. Apiculture	d. Lac culture			

6. Indian Major Carps are cultured in

a. pond	b. river	c. dam	d. All		
7. The optimum pH	for Indian Major C	Carps are			
a. 6 to 7	b. 7 to 8	c. 8 to 9	d. 9 to 10		
8. The common nam	ne of Cyprinus carp	pio			
a. angel fish	b. fighter	c. gourami	d. koi		
9. Simplest method	of curing fish is				
a. Drying	b. Salting	c. Freezing	d. Smoking		
10. Dropsy disease in	fishes is caused by	у			
a. Pseudomonas	b. Bacillus	c. Vibrio	d. Aeromonas		
	<u>SECTIO</u>	<u> ON – B</u>			
Answer any FIVE	Questions :		$(5 \times 2 = 10)$		
11.List out the scope					
12. Define intensive culture					
13. What is sluice gate?					

14.Define polyculture

15. What is homoplastic?

16. Write the symptoms of gill rot disease

17. What is artificial feed?

<u>SECTION – C</u>

Answer ALL Questions :	$(3 \times 9 = 27)$
18.a) Discuss monosex culture with examples	
[OR]	
b) Describe the maintenance and management	of fish pond
19.a) Explain integrated fish farming with suitable	e example
[OR]	
b) Write a short note on site selection for fish f	arming
20. a) Enumerate the salient features of gold fish	
[OR]	
b) Describe the setting an aquarium.	
<u>SECTION – D</u>	
Answer any TWO Questions :	$(2 \times 14 = 28)$
21. Give an account on water properties of fish cul	ture with suitable
illustrations	
22. Explain the induced breeding technique in fish	
23. Describe the biology of Indian Major Carps	
24. Write an essay on symptoms and treatments of	fungal and helminth
diseases of fish.	

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(Autonomous & Residential) [Affiliated to Madurai Kamaraj University]

B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – IV : Skill Based Subject : Sixth Semester : Paper – II

VERMITECHNOLOGY

Under CBCS – Credit 2

Time: 2 Hours

Max. Marks: 75

<u>SECTION – A</u>

Answer ALL Questions : $(10 \times 1 = 10)$ 1. *Eisenia fetida* is an exotic species of ----. a) India b) China c) Australia d) New Zealand 2. The bottom of the basal layer of the vermibed is constituted by a) Bricks or pebbles b) coconut husk c) coarse sand d) loamy soil 3. Earthworms act as a) Pollinators b) pollutants c) Detoxifying agents d) None of these 4. The ingredients of vermiwash are a) Coelomic fluid b) Mucus c) Enzymes d) All the above 5. The plant growth hormones produced by microbes in vermicompost are b) Gibberellins c) Cytokinins d)All the above a) Auxins 6. The mixture of diluted 10% vermiwash and neem extract act as effective a) Fungicide b) Pesticide c) Rodenticide d) Herbicide 7. Earthworms found on the surface of soil are called a) Epigeic (epigenic) b) Endogeic (endogenic) c) Annecic d) Hygienic

8. Duration of vermicomposting is

- a) 6 8 weeks b) 10 12 weeks
- c) 15 20 weeks d) 2 3 weeks
- 9. Tunneling activity of earthworms improves
 - a) Soil aeration b) Porosity c) Permeability d) All the above
- 10. Expansion of KVIC is
 - a) Karnataka state khadi and Village Industries Corporation
 - b) Kerala Village Income Certificate
 - c) Kollam Victory Instagram Corporation
 - d) Kolkata Visitor's Information Centre

<u>SECTION – B</u>

Answer any FIVE Questions :

 $(5 \times 2 = 10)$

- 11. How do the exotic species of earthworms superior than indigenous species for vermicomposting?
- 12. Name the African and Indian earthworms commonly used in vermicomposting.
- 13. Interpretate the term vermicomposting.
- 14. Specify the chemical composition of vermicasts.
- 15. Name the method of vermiwash application for inducing flowering in crops.
- 16. What is horticulture?
- 17. Mention the role of funding agencies in establishing vermicomposting unit.

<u>SECTION – C</u>

Answer ALL Questions :

 $(3 \times 9 = 27)$

18.a) What are measures to be taken in selection of food for earthworms in vermicomposting?

[OR]

b) What are the steps involving in the preparation of vermibed for vermiculture?

19.a) Define and characterize vermicasts.

[OR]

b) Write down the procedure for the preparation of vermiwash.

20.a) Give an account on economics of vermicompost.

[OR]

b) Enumerate the applications of vermiwash.

<u>SECTION – D</u>

Answer any TWO Questions :

 $(2 \times 14 = 28)$

- 21. Enumerate the characteristic features of indigenous and exotic species of earthworms with appropriate illustrations.
- 22. Elaborate various methods of vermicomposting.
- 23. Enumerate the applications of vermicomposting in agriculture and horticulture.
- 24. Mention the measure to be taken in the management of vermicomposting.



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B.Sc. Zoology Degree (Semester) Examinations, April 2020 Part – IV : Skill Based Subject : Fourth Semester : Paper – III

ZOOLOGY FOR COMPETITIVE EXAMINATION

Under CBCS – Credit 2 Time: **2** Hours Max. I

Max. Marks: 75

<u>SECTION – A</u>

<u>Answer ALL Questions</u> :

 $(75 \times 1 = 75)$

1. The group amniota includes

a) Birds and mam	a) Birds and mammals		b) Birds and reptiles		
c) Reptiles and m	ammals	d) Reptiles, bire	ds a	and mammals	
2. In the course of ev	volution, the true c	oelom appeared	firs	t in	
a) Aschelminthes	b) Annelid	c) Arthropods		d) Echinodermata	
3. Radial symmetry	is seen in				
a) Mollusca	b) Star fishes	c) Sponges		d) Fishes	
4. Canal system is for	ound in				
a) Hydra	b) Sponges	c) Sea anemone	e	d) Sea urchin	
5. Tube feet are the	locomotory organs	found in			
a) Protozoans	b) Arthropods	c) Echinoderma	ata	d) Molluscs	
6. Which of the follo	owing is homother	mous?			
a) Lizard	b) Frog	c) Rabbit	d)	Cuttle fish	
7. The basic unit of	taxonomy is				
a) Genus	b) Order	c) Class	d)	Species	
8. The trophozoite o	f Plasmodium live	s in			
a) Erythrocytes of	f man	b) Liver cells			
c) Stomach of mo	osquito	d) Blood plasm	a		

9. The first invertebrates to develop a true nervous system are		18. In Ascaris, the excretory organs are			
a) Sponges b) Coelenterates	c) Annelids d) Arthropods	a) Nephridia	b) Kidneys		
10. Hydra respires through		c) Excretory cells	d) Flame cells		
a) Mesoglea	b) General surface	19. Pheretina is			
c) Pellicle	d) Gastrodermis	a) Sterile	b) Unisexual		
11. Coral reef formation is mainly rela	ted to	c) Hermaphrodite	d) Radial symmetrical		
a) Sponges b) Anthozoans	c) Molluscs d) Hydrozoans	20. Nephrostomes are found in			
12. Scolex is a characteristic of		a) Integumentary nephridia	b) Septal nephridia		
a) Flatworms b) Tapeworms	c) Roundworms d) Earthworms	c) Pharyngeal nephridia	d) None of these		
13. Free living platyhelminthic forms b	elong to the class	21.Lac is a product of			
a) Turbullaria b) Cestoda	c) Trematoda d) Nematode	a) Faecal matter of Lac insect	b) Excess of oozing out of body		
14. Nutrition in Taenia is		c) Secretion from the body d) Excretion from t			
a) Holozoic b) Holophytic	c) Saprozoic d) Mixotrophic	22. Green glands are			
15.Roundworms differ from flatworms	s in having a	a) Organs of excretion in crustacea	ans		
a) Bilateral symmetry	b) Cuticle	b) Organs of excretion in insects			
c) Longitudinal nerve cord	d) Pseudocoel	c) Endocrine glands of insects			
16. Infection of Ascaris usually occurs by		d) Part of reproductive organs of insects			
a) Mosquito bite		23. Internal shell is present in			
b) Tse-tse fly		a) Sepia b) Lamellidens	c) Chiton d) Pila		
c) Imperfectly cooked porkd) Contaminated water and vegetables		24. A characteristics of Echinodermata is			
		a) Bilateral symmetryc) Water vascular system	b) Metamerismd) Schizocoel		
17. Sense organs of Ascaris are		25. Stone canal in star fish is associate	,		
a) Epidermal cords	b) Spicules	a) Digestive system b) Water vascular system			
c) Papillae and amphids	d) Circumcentric ring	c) Canal system	d) None of these		

26. Study of sharks and rays is known as					
a) Saurology	a) Saurology		b) Traumatology		
c) Torpedology		d) Ichthyology	d) Ichthyology		
27. Parental care by r	males is found in				
a) Hippocampus	b) Labeo	c)Anabas	d) None of these		
28. The flying fish Ex	xocoetus belongs to	o the class			
a) Dipnoi	b) Osteichthyes	c) Cyclostomat	a d) Chondrichthyes		
29. Salmon is an exam	mple of				
a) Anandromous	a) Anandromous migration		b) Catadromous migration		
c) Cartilaginous fish		d) None of these			
30. Cod liver oil is a rich source of					
a) Vitamin A	a) Vitamin A		b) Iron		
c) Calcium		d) Vitamin B complex			
31. The swim bladder in a fish is an organ of					
a) Digestion	b) Buoancy	c) Respiration	d) Food storage		
32. Tooth shaped scales are					
a) Cycloid	b) Ctenoid	c) Ganoid	d) Placoid		
33.Lung fish is					
a) Protopterus	b) Coelacanth	c) Scoliodon	d) Labeo		
34. Nostrils are not connected with mouth cavity in					
a) Frogs	b) Fishes	c) Lizards	d) Pigeons		

35. The adult amphibians possess a) Pronephric kidney b) Mesonephric kidney c) Metanephric kidney d) Both a and b 36. A limbless amphibian is a) Cryptobranchus – hell blender b) Necturus – mud puppy c) Uraeotyphlus – blind worm d) Alytes - midwife toad 37. A urinary bladder is absent in a) Chameleon b) House lizard d) Crocodile c) Snake 38. A bat is b) Reptile c) Bird d) Fish a) Mammal 39. Birds have a) Sharp eyesight b) Keen smelling power c) Both a and b d) Sharp eyesight and poor smelling power 40. The largest living bird is d) Elephant bird a) Ostrich b) Albatros c) Penguin 41. Connecting link between reptiles and birds is a) Archaepteryx b) Dimetrodon c) Sphenodon d) Dodo 42. Remiges are quill feathers attached to a) Head of peacock b) Wings of modern birds c) Tail of modern birds d) None of these 43. In rabbit, the danger signal is given by a) Sound b) Tail c) External ear d) Fore limbs

44. Monkey, Apes and Man belong to the order			55. Deficiency of vitamin D in children is				
a) Lemuroidea	b) Anthropoidea	c) Primates	d) Any of these	a) Beri-beri	b) Pellagra	c) Rickets	d) Osteomalacia
45. Ovoviviparity is found in				56. Digestion of carbohydrates is enhanced by			
a) Echidna	b) Shrew	c) Dolphin	d) Kangaroo	a) Repsin	b) Pepsin	c) Amylopsin	d) Trypsin
46. Scientific name o	f man is			57. Starch is convert	ed into maltose by		
a) Dolphins		b) Oracto logu	s cuniculus	a) Invertase	b) Zymase	c) Diastase	d) Lipase
c) Homo sapiens	fossilis	d) Homo sapie	ns sapiens	58. The enzymes are	chemically speakir	ıg	
47.Red bone marrow	is found in			a) Proteins	b) Lipids	c) Vitamins	d) None of these
a) Man	b) Fish	c) Lizard	d) Frog	59. When a man star	ves, he first of all co	onsumes stored	
48. Umbilical cord is	an example of			a) Fats	b) Proteins	c) Glycogen	d) Carbohydrates
a) Mucous conne	ctive tissue	b) Adipose tiss	sue	60. Basic unit of pro-	tein is		
c) Fibrous tissue		d) Areolar tissu	le	a) Helical strand	b) Peptones	c) Amino acids	s d) Glucose
49.Life of RBC is				61. The end product	of fat digestion is		
a) 130 days	b) 120 days	c) 128 days	d) 122 days	a) Amino acids	b) Starch	c) Fatty acids	d) Glucose
50. The smallest type	of leucocyte in the	e blood of huma	n adult is	62. Quick energy we	get, is stored in the	e form of	
a) Monocytes	b) Microcytes	c) Lymphocyte	es d) Eosinophils	a) Glucose	b) ADP	c) ATP	d) DNA
51.Fat soluble vitam	ins are			63. Increased heat pr	oduction is caused	in humans by in	creased activity of
a) A, D and E	b) B, C and D	c) E, D and B	d) A, B and C	a) Liver	b) Brain	c) Heart	d) Skeletal muscle
52. Synthesis of vitamin A takes place in		64. The major site of gluconeogenesis is					
a) Blood	b) Spleen	c) Pancreas	d) Liver	a) Muscles	b) Kidney	c) Liver	d) Brain
53. The deficiency of	vitamin A causes			 65. Normal growth and development of an organism depends of a) A balanced diet b) Rich carbohydrate c) Rich protein diet d) Rich fatty diet 			
a) Anaemia	b) Scurvy	c) Rickets	d) Xerophthalmia			•	
54. Wound healing is enhanced by vitamin			66. Citric acid cycle was proposed by				
a) A	b) C	c) D	d) E	a) H.J.Muller	b) T.Caperson	c) F.Sanger	d) H.A.Kreb
					-	-	

67. Air directly enters the tracheae via the				
a) External nares	b) Pharynx	c) Larynx	d) Bronchi	
68. In all vertebrates	, the oxygen transp	ort is through		
a) Haemocyanin	b) Haemoglobin	c) Myoglobin	d) Haemoerythrin	
69. Expiration after f	full inspiration is ca	lled		
a) Vital capacity		b) Lung capaci	ity	
c) Tidal volume		d) Residual vo	lume	
70. Oxygen dissociat	tion curve of Hb is			
a) Hyperbolic	b) Sigmoid	c) Linear	d) Stationary	
71. During hibernation	on the frog respires	by		
a) Skin only		b) Lungs only		
c) Partly by lungs and partly by skin d) Both skin and lungs				
72. Pacemaker of the heart is				
a) S.A. node	b) A.V.node	c) A.V.Septum	d) I.A.septum	
73. Urea is synthesized in				
a) Kidney	b) Lungs	c) Intestine	d) Liver	
74. Vitamin excreted in urine by higher vertebrates is				
a) A	b) B	c) K	d) C	
75. ADH influences the reabsorbtion of				
a) Glucose	b) Proteins	c) Water	d) Salts	
ΥΥΥΥ				