

PLUS TWO – ENGLISH MEDIUM
ZOOLOGY & BIO – ZOOLOGY
TEXT BOOK QUESTIONS
&
ANSWERS
(1 MARK and 3 MARKS)

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ZOOLOGY (Long Version)

Weightage of Forms & Questions	Essay	Short Answer	Very Short Answer	Object - ive	Total
No. of Questions	4	7	15	30	56
Marks allotted	(4 x 10) 40	(7 x 5) 35	(15 x 3) 45	(30 x 1) 30	150
Time	58 Min.	42 Min.	32 Min.	48 Min	180 Min .

WEIGHTAGE TO CONTENT

Sl. No.	Chapters	Ojject-ive	Very Short Ans.	Short Ans.	Essay	Total
		1 Mark	3 Marks	5 Marks	10 Marks	
1	Human Physiology	11 (11)	21 (7)	10 (2)	30 (3)	72
2	Microbiology	1 (1)	3 (1)	10 (2)	10 (1)	24
3	Immunology	3 (3)	3 (1)	5 (1)	<i>Nil</i>	11
4	Modern Genetics	3 (3)	6 (2)	<i>Nil</i>	10 (1)	19
5	Environmental Science	1 (1)	3 (1)	10 (2)	10 (1)	24
6	Applied Biology	6 (6)	15 (5)	10 (2)	10 (1)	41
7	Theories of Evolution	2 (2)	3 (1)	5 (1)	<i>Nil</i>	10
8	Aquaculture	3 (3)	6 (2)	10 (2)	10 (1)	29
Total		30	60	60	80	230

BIO - ZOOLOGY (Short Version)

Weightage of Forms & Questions	Essay	Short Answer	Very Short Answer	Object - ive	Total
No. of Questions	2	3	8	16	29
Marks allotted	(2 x 10) 20	(3 x 5) 15	(8 x 3) 24	(16 x 1) 16	75
Time	30 Min.	20 Min.	25 Min.	15 Min	90 Min .

WEIGHTAGE TO CONTENT

Sl. No.	Chapters	Object-ive	Very Short Ans.	Short Ans.	Essay	Total
		1 Mark	3 Marks	5 Marks	10 Marks	
1	Human Physiology	4 (4)	6 (2)	5 (1)	20 (2)	35
2	Microbiology	3 (3)	3 (1)	5 (1)	<i>Nil</i>	11
3	Immunology	1 (1)	6 (2)	5 (1)	<i>Nil</i>	12
4	Modern Genetics	2 (2)	9 (3)	5 (1)	<i>Nil</i>	16
5	Environmental Science	2 (2)	3 (1)	<i>Nil</i>	10 (1)	15
6	Applied Biology	3 (3)	6 (2)	<i>Nil</i>	10 (1)	19
7	Theories of Evolution	1 (1)	3 (1)	5 (1)	<i>Nil</i>	9
Total		16	36	25	40	117

Unit - 1. Human physiology (72 Marks)

1 mark → 11 Questions

5 mark → 2 Questions 51,52

3 mark → 7 Questions 31- 37

10 mark → 3 Questions 63 - 65

Part - I

Choose the correct answer :

- Intake of less amount of protein leads to the deficiency disease called
 a) Beri Beri b) Rickets c) Anaemia **d) Kwashiorkar**
- Each gram of lipid is capable of yielding.
a) 9.3 calories b) 8.2 calories c) 7.1 calories d) 6 calories
- Deficiency of vitamin D causes
 a) Nyctalopia b) Xerophthalmia **c) Osteomalacia** d) Pellagra
- The calorie requirement for IRM at heavy work during occupational activities is
 a) 1100 calories b) 750 calories **c) 2200 calories** d) 460 calories
- The normal BMI (Body mass index) range for adults is
 a) 10 - 15 b) 12 - 24 c) 15 - 20 **d) 19 - 25**
- The normal blood glucose level during fasting is
a) 70 to 110 mg/dl b) 80 to 200 mg/dl c) 100 to 150 mg/dl d) 200 to 250 mg/dl
- During emulsification, the bile salts convert bigger fat particles into smaller globules called
 a) granules b) oil **c) chylomicrons** d) millimicrons
- During root canal treatment, the cavity of the tooth is filled with a sealing paste made of
 a) chitin b) calcium carbonate c) iodised salt **d) gutta-percha resin**
- The type of hernia occurs in the part of the groin is called
 a) inguinal hernia b) umbilical hernia c) scotic hernia **d) femoral hernia**

10. The gall stones are formed of

- a) calcium b) growing infected tissue c) cholesterol d) sodium crystals

11. A fracture can be caused by

- a) shock b) loss of blood supply c) impact of force d) malnutrition

12. The granulation of tissues around the site of fracture is called

- a) nodule b) papilla c) rudiment d) callus

13. An inflammation of synovial membrane is called as

- a) infective arthritis b) osteoarthritis
c) rheumatic arthritis d) mechanical arthritis

14. During the contraction of muscle the ATP molecules bind with the active site of

- a) myosin filament b) myofibrils c) nerve endings d) actin filaments

15. Ca ions necessary for the contraction of muscles are released from

- a) blood b) protoplasm
c) synovial membrane d) sarcoplasmic reticulum

16. What is the substance that destroys the muscle protein during rigor mortis

- a) proteolytic enzymes b) mitochondrial enzymes
c) lysosome enzymes d) esterases

17. The surface area of skin in our body is

- a) 1.1-2.2m² b) 2.2-3.3m² c) 1-2m² d) 0.5-1.5m²

18. An oily substance called sebum is secreted by

- a) sweat gland b) sebaceous gland c) thyroid gland d) tear gland

19. Albinism is an extreme degree of generalized

- a) hyperpigmentation b) hypopigmentation
c) failure of pigmentation d) perioral pigmentation

20. Partial albinism causes

- a) leucoderma b) vitiligo c) melanoma d) dermatitis.

21. Excessive exposure to U V-rays can cause

- a) vomiting b) redness of eyes c) colour change d) skin cancer

22. Rag weed plant causes allergic responses and results in

- a) photo dermatitis b) herpetiformis dermatitis c) dermatitis artefacta d) all the above

23. The amount of urea present in blood

- a) 0.02gms/100ml b) 0.04gms/100ml c) 0.06gms/100ml d) 0.08gms/100ml

24. Urea biosynthesis takes place in

- a) blood b) liver c) cerebro-spinal fluid d) kidney

25. Number of ATP molecules spent to convert ammonia to urea is

- a) four b) two c) three d) one

26. During glomerular filtration the malpighian body acts like a

- a) structural unit b) biological filter c) biological buffer d) acid-base balancer

27. The amount of blood supplied to the kidneys is about

- a) 20-25% of cardiac output b) 25-30% of cardiac output
c) 30-35% of cardiac output d) 35-40% of cardiac output

28. Net filtration force which is responsible for the filtration in glomerulus is

- a) 25mm Hg b) 50mm Hg c) 75mmHg d) 80 mm Hg

29. The amount of urea reabsorbed in the urinary tubules is

- a) 5gm b) 17gm c) 21gm d) 20gm

30. Area responsible for reabsorption of water, glucose, sodium phosphate and bicarbonates is

- a) glomerulus b) proximal convoluted tubules
c) collecting duct d) descending limb of Henle's loop

31. The volume of water found in the glomerular filtrate is

- a) 170 lit b) 168.5 lit c) 165 lit d) 162.8 lit

32. In recent days insulin resistant diabetes is commonly noticed in the age group of

- a) 10-15years b) 40-50years c) 35 - 40 years d) 20-25years

33. The type of diabetes that develops due to heavy viral infection belongs to the category called

- a) Insulin dependent diabetes b) non-insulin dependent diabetes
c) inflammator diabetes d) harmful diabetes

34. Which of the following is called artificial kidney?

- a) donar kidney
- b) dialyzer
- c) tissue-matched kidney
- d) preserved kidney

Part - II

1. Define carbohydrates and mention their compositions.

Carbohydrates are organic compounds composed of carbon, hydrogen and oxygen in the ratio of 1:2:1 $(CH_2O)_n$. They are of three types namely monosaccharides, disaccharides and polysaccharides

2. Classify different types of monosaccharides .

Depending on the number of carbon atoms, Carbohydrates are classified into trioses, tetroses, pentoses, and hexoses.

Trioses ($C_3H_6O_3$) – (eg. glyceraldehydes)

Pentoses ($C_5H_{10}O_5$) – (eg. ribose and deoxyribose)

Hexoses($C_6H_{12}O_6$) – (eg. glucose, fructose and galactose)

3. What are polysaccharides ? Give examples.

Polysaccharides are complex carbohydrates formed by polymerisation of a large number of monosaccharides.

(eg. Chitin , Cellulose) – structural components

(eg. Starch , Glycogen) – storage food materials

4. What are essential aminoacids ? List out the essential aminoacids.

Essential amino acids can not be synthesised in our body. Hence they should be made available through food. The **essential amino acids** are arginine, valine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine and tryptophan.

5. What is kwashiorkar? Mention its symptoms.

Reduction in the intake of protein leads to protein malnutrition called **kwashiorkar**. The symptoms in kwashiorkar are

1. Wastage of muscles.
2. Face and feet will have oedema.
3. The belly region will appear enlarged.

5 a . What is Marasmas ? Mention its symptoms .

Marasmas is a protein deficiency disorder . The symptoms are

1. The child loses weight
2. Severe diarrhoea
3. Body muscles get wasted
4. It appears like the bones are covered by the skin .

6. State the functions of lipids?

1. Lipids are important cellular constituents.
2. They are important storage food.
3. They are energy rich compounds.
4. They serve as an insulating material.
5. Fat beneath the skin adds to beauty.
6. Steroidal hormones are produced from certain lipids.

7. What is PUFA ? Mention its significance.

PUFA means **Poly Unsaturated Fatty Acids** . They easily breakdown in oxidation . They are favoured for persons having high blood pressure and other related ailments . These fatty acids are abundant in sunflower oil and safflower oil .

8. Name different types of vitamins.

The vitamins are complex organic compounds which are essential for growth and other physiological activities . They are two types namely

1. Water soluble vitamins – eg .vitamins **B** and **C**
2. Fat soluble vitamins – eg . vitamins **A, D, E** and **K**

9. Write down the expansions of IRM and IRW? and their characteristic features.

IRM :- Indian Reference Man

25 years of age, 1.62 sq.mt of body surface, 55 kg body weight and remains healthy.

IRW :- Indian Reference Women

25 years of age, 1.4 sq.mt of body surface, 45 kg body weight and remains healthy.

10. What is obesity?

Obesity is the storage of excess of body fat resulting a variety of diseases. A level of 10 % above the standard weight for subjects of same age and sex is considered as obesity .

11. Define BMI.

The degree of obesity is assessed by the **Body Mass Index (BMI)** . It is calculated as weight in Kg. divided by the square of height in meters . Normal BMI range for adults is 19 – 25 .

12. Write down the symptoms for hypoglycemia.

The symptoms of hypoglycemia are

1. Hunger , increased heart rate , nervousness and sweating
2. Headache , confusion , uncoordination and slurred speech
3. Convulsions (epilepsy) and coma

13. What are chylomicrons ?

During emulsification, the bile salts convert bigger fat particles into smaller globules called **chylomicrons** .

14. Name the substances used in treating the tooth decay.

The substances used in treating the tooth decay are

- (i) Antibiotic paste
- (ii) gutta-percha resin mixed with zinc and bismuth oxides and
- (iii) cement

15. What are the benefits of root-canal treatment.

1. It is a modern dental procedure.
2. Untreatably diseased tooth can be saved.
3. Tooth extraction can be avoided

16. What does peptic ulcer refer to ?

Ulcer refers to an eroded area of the tissue lining in the stomach or duodenum. If the mucous layer is damaged by the HCl acid, it may cause inflammation and erosion of the lining. It is known as peptic ulcer. Peptic ulcer is of two types namely, gastric ulcer and duodenal ulcer.

17. What is gall stone made up of ?

The Gall stones are formed by bile. Bile is made up of cholesterol, pigments and several salts. Any alteration in the composition of the bile can cause the formation of stones. The gall stones are mostly formed of cholesterol.

18. State the main symptoms for appendicitis.

Appendicitis is the inflammation of the appendix. The main symptoms are severe abdominal pain and blockage in the intestine.

19. What is meant by hepatitis?

Hepatitis is the inflammation of the liver due to viral infection or excessive alcohol consumption.

20. Mention the symptoms of hepatitis .

The symptoms of hepatitis are –
Fatigue, poor appetite, nausea, vomiting, fever and discomfort in right side of the abdomen.

21. What is meant by stress fracture ?

Stress fracture is a fracture occurring at a site in the bone, due to repeated minor stresses over a long period of time.

22. Define the term physiotherapy.

Physiotherapy is the therapeutic exercise to make the limbs work normally. The wasting of muscles and stiffness of joints can be rectified by gradual physiotherapeutic exercises.

23. What does the term orthopedics refer to ?

Orthopedics deals with all bone deformities occurring in children as well as adults. These disorders are corrected by physiotherapy, splinting, plaster cast and wedging. The deformities may be congenital or acquired

24. Name the fluids in the chambers of the eye.

- 1 . **Aqueous humour** is a colourless watery fluid .
(Between the cornea and the lens.)
- 2 . **Vitreous humour** is made of a gelatinous mucoprotein .
(Between the lens and the retina.)

25. Name the parts involved in altering the curvature of the lens.

The parts involved in altering the curvature of the lens are –

1. Suspensory ligament,
2. Ciliary muscle and
3. Ciliary body.

26. What is short sightedness?

Light rays entering the eye are refracted more than necessary. Consequently light is focused in front of the retina. The image perceived is thus blurred. The condition is called **short-sightedness** or Myopia. The objects near the eye are clearer than those further away.

27. How do you name the problems related to retina?

The problems related to retina are

- (1). Diabetic retinopathy
- (2). Hypertensive retinopathy and
- (3). Nictlopiia or night blindness

28. Identify two reasons for cataract.

The reasons for cataract formation are

- (1). aging,
- (2). Sun light exposure,
- (3). smoking,
- (4). poor nutrition,
- (5). eye trauma,
- (6). diseases like diabetes mellitus,
- (7). German measles and
- (7). Certain steroid medicines .

28. What is CLR?

Clear Lens Replacement (CLR) is a procedure of removing the natural lens of the eye and replacing it with an intraocular lens (IOL) implant.

30. What is nyctalopia?

Nyctalopia or night blindness is the first sign of vitamin A deficiency . Prolonged deficiency of vitamin A leads to degeneration of rods and cones and nervous layers of the retina.

31. What is a Stye ?

- A stye is an acute infection in the glands of the eyelid margin.
- There is swelling , pain, itching and redness in the eyelid margin.
- Treatment is warm compresses on the eye.

32. What is Reissner's membrane?

The cochlea is divided into three compartments by **the basilar** and the **Reissner's membranes** . The waves in the perilymph deflect the Reissner's membrane and this in turn produces disturbances in the basilar membrane

33. Which region of brain perceives sound?

Auditory cortex of cerebrum perceives sound .

34. What is a bone conduction hearing aid ?

People with conductive deafness due to an infection or discharge in the ear canal may be given a bone conduction hearing aid. This type of hearing aid may be fitted to a glass frame or hair band.

35. Give two reasons for loss of hearing.

The loss of hearing may be caused due to –

- ❖ Congenital ,
- ❖ Middle ear fluid ,
- ❖ Head injury,
- ❖ Listening to very loud music through headphones,
- ❖ Repeated exposure to loud sounds,
- ❖ Blockage of the external auditory meatus with wax,
- ❖ Perforation of ear drum by a nearby explosion and
- ❖ Malfunction of the cochlea

36. Name the causes for noise pollution.

The causes of noise pollution are classified into

1. Industrial sources – Noise due to functioning of machineries in the industries.
2. Non- industrial sources – Noise due to urban development , road , air and rail transport , loud speakers , radio and television stations , construction sites and neighbourhood .

37. Define permissive noise level.

The industrial noise survey of India recognized noise levels from 81dB to 120dB as permissible levels.

38. What happens during ventilation in the lungs?

Ventilation is the breathing in of air with more oxygen into the lungs (inspiration) . It is followed by expulsion of air with more carbon-di-oxide (expiration) .

39. Name the muscles involved in respiration.

The following muscles involved in respiration .

- (i) External intercostal muscles
- (ii) Internal intercostal muscles and
- (iii) Diaphragm .

40. Write down the composition of inhaled and exhaled air.

	Oxygen	carbon-di-oxide	water vapour
Inhaled	21.00	0.04	variable
Exhaled	15.7	3.6	saturated

41. What is Herring - Breuer reflex?

When the alveoli are stretched at the height of inspiration, the receptors send stimuli to the expiratory center of the medulla through the vagus nerve which inhibits further respiration. This sequence of events is called **Herring - Breuer reflex**.

42. Name the microbes that cause pneumonia.

Inflammation of the lungs due to infection is called **Pneumonia**. Pneumonia is caused by

- (i) Viruses – Adenovirus, respiratory syncytial virus or a coxsackic virus.
- (ii) Bacteria – Pneumococcal pneumonia and
- (iii) Mycoplasmas – an intermediate organism between a bacterium and a virus

43. What is pleurisy?

Inflammation of the Pleura membrane due to pneumonia or viral infection of the pleura is called **Pleurisy**.

44. What is pulse rate?

The number of expansion of an artery per minute, when blood flows through it, is known as pulse rate. The pulse rate usually corresponds to the heart beat rate.

45. What is meant by myocardial infarction?

Myocardial infarction is a coronary artery disease which involves the sudden death of part of the heart muscle due to blockage in the coronary artery. It may cause severe unremitting chest pain.

46. Mention the reason for doing an angiogram.

Angiogram is a special contrast X ray. It can be used to detect an abnormality such as a narrowing or blockage of a large artery.

47. What is coronary angioplasty?

Coronary angiography is a technique , used to image the narrowing or blockage in the coronary arteries that supply blood to the heart muscle , which are not visible on a normal X-ray.

48. What is done during Echo cardiography ?

Echo cardiography is usually done by using an ultrasound transducer (probe) placed on the chest directly over the heart . In some cases , a small probe is passed down the oesophagus.

It is done to image the interior of heart . It is used to diagnose disorders of the heart and the heart valves.

49. What is artherosclerosis?

Atherosclerosis is narrowing of the arteries . It is caused by deposition of fats on their inner linings . These plaques disrupt the normal blood flow. It also encourages the formation of thrombus and embolus

50. How can pulse rate be calculated ?

The pulse rate is calculated by counting the number of beats in a set period (minimum 15 to 20 seconds) and multiplying to give the total number of beats per minute . The pulse rate usually corresponds to the heart rate

51. Write down the importance of cardio – pulmonary resuscitation.

Cardio - pulmonary resuscitation is the life - saving measures of external cardiac compression massage and mouth to mouth resuscitation (Artificial respiration) . It is done to someone collapsing with Cardiac arrest , to restore the circulation of oxygenated blood to the brain as quickly as possible .

52. Classify the lymphocytes of blood and mention their key function.

Lymphocytes are two types namely

B - lymphocytes (B –cells) and **T –lymphocytes** (T-cells) .

- ✓ The **B-cells** can produce **antibodies** to destroy the bacteria .
- ✓ The **T-cells** protect us against viruses by attacking and destroying the cells in which viruses are reproducing.

53. What are called coagulation factors?

The clotting of blood depends on several proteins in the plasma . They are called **coagulation factors** . After injury, these inactive proteins are activated to produce a clot.

54. Differentiate embolus from thrombus.

The blood clot formed within an intact blood vessel is called **thrombus** . The portion of a thrombus clot that becomes fragmented and enters in the circulating blood , it is called **embolus**.

55. What is menstrual cycle?

The rhythmical series of changes occur in the female reproductive system for about 28 days , throughout the reproductive life of women , from puberty to menopause (except during times of pregnancy) is called the **menstrual cycle**.

56. What is corpus luteum ?

After ovulation , the empty follicle is transformed into a transitory endocrine gland called **corpus luteum** .The corpus luteum releases a large quantity of **progesterone** and a small amount of oestrogen into the blood.

57. What is corpus albicans?

If there is no fertilization , the corpus luteum degenerates and is reabsorbed by the ovary . At the end of menstruation , the corpus luteum is converted into a scar tissue called **corpus albicans**.

57. With whom does the technique of in vitro fertilization adopted?

The so called test tube babies are produced by the technique of in vitro fertilization (**In vitro** = outside the body) .This technique is adopted with couples who are not able to achieve fertilization in the normal way

58. What is meant by GIFT?

Gamete Intra fallopian transfer (GIFT) is a newer method in which the fertilized ova are introduced into the fallopian tube . Then they move to the uterus for implantation.

59. What is meant by Vasectomy ?

Vasectomy is the method of permanent birth control in male. In which , a part of the vas deferens is removed and ligations are performed . Male sterilization is not immediately effective. The seminal vesicles may contain sperm after the operation . So condom must be used until semen analysis shows that no sperm are left.

60. What is meant by Tubectomy?

Tubectomy is the method of permanent birth control in female . In which a portion of fallopian tube is cut off and the cut ends are ligated to prevent fertilization. Female sterilization is effective immediately, but the risk of ectopic pregnancy is slightly increased.

61. Give reasons for the development of Hernia .

Hernia is commonly called “ruptures”. Hernia develops

- 1 . Due to increased pressure in the abdomen, the muscles become stretched at the weak point.
- 2 . The pressure may be due to lifting heavy weights, continuously

62. How can Hernia be corrected ?

Hernia can be corrected by a simple surgery . It is done by using local or general anaesthesia.

EXTRA Q & As

63 . Name the three pairs of salivary glands found in the mouth .

The saliva is secreted by three pairs of salivary glands namely

- (i) the parotid (the largest)
- (ii) the submandibular
- (iii) the sublingual

64 . What are the causes of peptic ulcer ?

The ulcer is mostly due to

- (i) infection of Helicobacter pylori (Bacterium)
- (ii) uncontrolled usage of drugs like Aspirin and Ibuprofen
- (iii) smoking , alcohol , coffiene and psychological stress .

65 . What is meant by Rigor mortis ?

Several hours after death , all the muscles of the body attain a state of contracture called Rigor mortis . This is due complete depletion of ATP in muscle fibres . The muscles remain in rigor , until the lysosome enzymes completely destroy all muscle proteins . This will take place 15 – 25 hours after death .

66 . What is Plasma pheresis ?

Myasthenia Gravis disease can be cured by removal of the thymus gland and by a blood – cleaning process called *plasmapheresis* , that removes the destroying antibodies .

67 . What is meant by heart attack ?

Loss of blood supply to part of the heart muscle due to a blockage in a coronary artery is known as heart attack or coronary thrombosis .

68 . What is meant by heart block ?

Complete failure of the system that conducts electrical impulses from the upper to the lower heart chambers is called the heart block .

The defective production of the sinu - atrial impulses and its conduction in the heart is called heart block .

69 . Name the main types of valve replacement .

There are three main types of valve replacement namely

- i) Biological valve replacement : Biological valves are taken from pigs or made from bovine tissue or from the patient's own tissue .
- (ii) Mechanical valve replacement : Mechanical valves are made from metals , plastic or carbon fibre .
- (iii) Homografts : Homografts are human valves that have been removed from dead person .

70. What is Alzheimer's disease ?

Alzheimer's disease is otherwise called Chronic brain syndrome . This disease is associated with the atrophy of cerebral cortex . Neurons undergo degeneration . It is characterized by progressive loss of memory followed by general loss of cognitive functions and death .

71. What is meant by meningitis ?

The term **meningitis** refers to the inflammatory condition of the brain membranes and the sub-arachnoid space . Meningitis may be caused by bacterial or viral or fungal infection .

72. What are the clinical symptoms of meningitis ?

The clinical symptoms of meningitis includes headache , photophobia , irritability , stiffness of the neck , fever and other neurological symptoms .

73. What is Electroencephalography (EEG) ?

Electroencephalography (EEG) is a device to record electrical activity of the brain via electrodes attached to the scalp . It displays a net average of all the neuron's potential .

74. What are the uses of Electroencephalography (EEG) ?

- (i) EEG yields information about the brain function in health and disease .
- (ii) It provides data about brain functions during various activities such as sleeping or waking states .
- (iii) It is also used to diagnose brain disease such as tumour , lesions and epilepsy .

75. What is meant by Lateralization ?

The two cerebral hemispheres have their own specific functions . This division of function or labour between the two hemispheres is called “ **Lateralization** ”

76. What is reflex action ?

Reflex action is the spontaneously involuntary response caused due to stimulation of receptor organ .

e.g. The quick closure of eye lid when some object touches the eyelashes .; the sudden withdrawl of hand when the hand touches hot pan .

77. What is diabetes insipidus ?

The deficiency of **Antidiuretic hormone (ADH)** leads to **Diabetes insipidus**. The symptoms of diabetes insipidus are excretion of large volumes of dilute urine (polyurea) and consumption of large quantities of liquids (polydipsia).

78. Define Basal Metabolic Rate (BMR).

Basal metabolic rate (BMR) is defined as the amount of heat produced in the body in a given time, in complete state of physical and mental rest at 20° C room temperature.

Unit 2. Micro Biology (24 Marks)

1 mark → 1 Question

5 mark → 2 Questions 53, 54

3 mark → 1 Question 38

10 mark → 1 Question 66

Part I

Choose the correct answer.

1. Who first developed vaccine for rabies in man ?

- a) Robert Koch b) Joseph Lister **c) Louis Pasteur** d) Stanley

2. Which one of the following fields paved the way for modern microbiology ?

- a) development of vaccines b) technique of new viral strains
c) discovery of new viral strains **d) development of pure culture technique**

3. Which one of the following statements is incorrect regarding the structure of viruses

- a) Nucleic materials are covered by a protein coat, called capsid.
b) The capsid is made up of capsomeres
c) Some animal viruses have an additional envelope
d) The additional envelope is made up of glycoprotein

4. Virions contain only a single copy of nucleic acid, hence they are called

- a) incomplete viruses **b) haploid viruses** c) ploidy viruses d) complete viruses

5. Tumour inducing viruses are called

- a) Pathogenic viruses **b) oncogenic viruses** c) Para viruses d) variola viruses

6. Which one of the following is a protozoan disease ?

- a) African sleeping sickness** b) Measles c) Cholera d) Taeniasis

7. Sexual reproduction of plasmodium takes place in

- a) liver cells of man b) RBCs of man c) Plasma of man **d) body of mosquito**

8. The pathogenic form of *Entamoeba histolytica* is

- a) encysted spores **b) vegetative trophozoite** c) merozoite d) schizont

9. Which one of the following is a trematode worm ?

- a) Schistosomes** b) Wuchereria c) Taenia d) Ascaris

10. The more promising chemotherapeutic agent for treating viral diseases is

- a) Tetracycline b) Ampicillin **c) Interferon** d) Anthramycin

Part II

1. Define microbiology.

Microbiology deals with the form , structure , reproduction , physiology , metabolism and classification of micro organisms.

2. What is pure culture technique ?

The growth of a mass of cells of the same species in a laboratory vessel / test tube using serial dilutions in the liquid media is called pure culture.

2A. Mention the use of pure culture technique ?

The micro organisms responsible for infections, fermentation, nitrogen fixation in soil, etc. can be grown by pure culture . The pure culture techniques lead to developments in modern microbiology.

3. What is meant by diploid cell strain ?

Diploid cell strains are derived by primary cell cultures from a specific tissues like lung or kidney which is of embryonic origin.

4. Classify different types of malaria.

Four different types of Malaria are

1. Benign Tertian or Vivax malaria, caused by *Plasmodium vivax*.
2. Mild Tertian or Ovale Malaria caused by *Plasmodium ovale*
3. Malignant Tertian or Pernicious Malaria caused by *Plasmodium falciparum*
4. Quartan Malaria caused by *Plasmodium malariae*

Of these four, the malignant type is fatal

5. What is amoebiasis ?

Amoebiasis or **amoebic dysentery** is a protozoan disease due to the infection of *Entamoeba histolytica* in human large intestinal wall . The blood and the ulcer contents pass out as bloody stool . It is more common but, in tropics and sub tropics than in temperate zones.

6. What does the term 'Zooanthroponoses' refer to ?

The term **Zooanthroponoses** refers to infections in which man is not merely an incidental host but an essential link in the life cycle of the parasite (eg., Beef and pork tapeworm).

7. List out notable antibiotics.

- Notable antibiotics are Ampicillin, Streptomycin, Tetracyclin and Erythromycin etc.
- Antifungal antibiotics are Griseofulvin and Imidazole etc.
- Antiviral antibiotics are Interferon , Amantidine and Cycloguanosine etc.
- Antitumour antibiotics are Anthromycin group.

7A . What is meant by antibiotics ?

The word **antibiotic** refers to a metabolic product of one microorganism that in very small amount is inhibitory to other microorganisms .

eg. Penicillin from the fungus, *Pencillium sp.*

7B. What are the types of antibiotics ?

Antibiotics are of two types.

1. **Broad spectrum antibiotics** – can destroy or inhibit many different species of pathogens.
2. **Narrow spectrum antibiotics** – can destroy specifically a few species of pathogens.

8. Enumerate the methods of diagnosis of AIDS.

Methods of diagnosis of AIDS are

1) **ELISA test** (Enzyme Linked Immuno Sorbent Assay) is a sensitive preliminary blood test used to detect HIV antibodies.

2) **Western Blot** is the confirmatory test, which is highly specific and based on specific antibodies to viral core proteins.

9. What is meant by Chemotherapy ?

The control and treatment of infectious diseases with a chemical compound or drug is called **chemotherapy**. The chemical compounds and drugs are called chemotherapeutic agents.

10. Define zoonoses.

Parasitic infections which man acquires from animals are known as zoonotic infections or **zoonoses**. In the zoonoses , human infections are only accidental events .

Unit 3. Immunology (11 Marks)

1 mark → 3 Questions

5 mark → 1 Question 55

3 mark → 1 Question 39

10 mark → Nil

Part I

Choose the correct answer

1. Which of the following can induce immunity

- a) bacteria b) viruses c) parasites **d) all the above**

2. Skin is a/an

- a) anatomical barrier** b) physiological barrier
c) phagocytic barrier d) inflammatory barrier

3. Which among the following is anti-bacterial ?

- a) interferon **b) lysozyme** c) hormone d) protein

4. Which of the following is anti-viral

- a) lysozyme **b) interferon** c) protein d) hormone

5. Identify the phagocytic cells from the following combinations

- a) Macrophage and neutrophil** b) Lymphocyte and eosinophil
c) Macrophage and eosinophil d) Eosinophil and neutrophil

6. Histamine is secreted by

- a) Epithelial cell **b) Mast cells** c) Red blood cells d) white blood cells

7. Humoral immunity consists of

- a) normal cells b) pathological cells
c) cytotoxic cells **d) immunoglobulin molecules**

8. Which type of graft is used in plastic surgery ?

- a) xenograft b) allograft **c) autograft** d) isograft

9. MHC genes in mouse is located in

- a) Chromosome 1 b) Chromosome 2 c) Chromosome 4 **d) Chromosome 6**

10. Which of the following is an auto immune disease ?

- a) AIDS **b) Multiple sclerosis** c) Cancer d) Asthma

11. Which antibody characterizes the allergic reaction

- a) Ig G b) Ig A c) Ig M **d) Ig E**

12. SCID is due to

- a) Adenosine deaminase deficiency** b) Glucose oxidase deficiency
c) Phosphatase deficiency d) Lactate dehydrogenase deficiency

13. Which of the following causes AIDS ?

- a) Bacteria b) Fungus **c) Retro virus** d) TMV

14. Thymus growth occurs up to

- a) 17 years **b) 12 years** c) 5 years d) 30 years

15. Which of the following secretes immunoglobulin

- a) T-lymphocyte b) B-lymphocyte c) Macrophage d) Mast cells

16. The H-chain of immunoglobulin has a molecular weight

- a) equivalent to that of light chain b) Twice that of light chain
c) Triple the amount of light chain d) Twice as that of dark chain

17. Immunoglobulins are chemically

- a) glycogens b) glyco-proteins c) glycolipids d) Lipo-proteins

18. Hyper variability regions are present in

- a) heavy chain only b) light chain only c) heavy and light d) dark chain

19. Organ transplantation from pig to human is an example for

- a) Autograft b) Allo-graft c) Iso-graft d) Xeno-graft

20. Graft between identical twins is called

- a) Xeno-graft b) Allograft c) Auto graft d) Iso graft

Part - II.

1. What is Immunology ?

The system which protects the animal body from various infectious agents and cancer, is called **Immune system**. A study of the immune system is known as **Immunology**

2. What are the four types of infectious agents ?

The four types of infectious agents of animals and human are

- 1) bacteria,
- 2) viruses,
- 3) fungi and
- 4) parasites

3. Define innate immunity.

Innate Immunity (Non-specific immunity) refers to all those natural defense mechanisms with which an organism is protected from infection. This is the **first line of defence** in most animals.

4. What is lysozyme ?

Lysozyme is a chemical substance present in secretions, such as **tears** and **saliva** . It digests the bacterial cell walls and inhibits the growth of bacteria .

5. What is phagocytosis ?

The process of engulfing microbes, viruses and cellular debris by the phagocytes like the **macrophages** and the **neutrophils** is called **phagocytosis** . Phagocytosis is an important mechanism of innate immunity.

6. What is acquired immunity ?

Acquired immunity (adaptive or specific immunity) is the ability of recognizing and selectively eliminating specific microorganisms . Acquired immunity is found only in vertebrates. The specific immunity has two types , viz., (a) **cell-mediated** and (b) **antibody-mediated** or **humoral immunity**

7. Differentiate cell mediated and humoral immunity.

In **Cell - mediated immunity**, the specific target cells like, virus infected cells and cancer cells are destroyed by **cytotoxic T lymphocytes** (CTLs) by a variety of mechanisms. This prevents the completion of life cycle of the pathogen.

In **Antibody mediated** or **humoral immunity**, the specific antigens or pathogens are destroyed the specific immunoglobulins or antibody molecules produced by the **B-lymphocytes**.

8. Differentiate active and passive adapted immunity.

Active immunity is the immune response generated in the individual in question by a **pathogen** or **vaccine**.

Passive immunity is conferred by transfer of immune products, like **antibodies**, etc., from an individual into a non-immune individual .

9. What are the immunoglobulins ?

When an antigen enters into animal body , certain substances called antibodies appeared in the serum and tissue fluids. They react with the specific antigens . The antibodies are also called as **agglutinins** , **precipitins** and **immunoglobulins** . The immunoglobulins (Igs) are glycoprotein molecules.

10. What are the three main functions of antibodies ?

The **antibodies** have three main functions

1. Agglutination of particulate matter, including bacteria and viruses.
2. Opsonisation or coating over bacteria to facilitate recognition and phagocytosis by the phagocytes
3. Neutralization of toxins released by bacteria.

11. State the functions of spleen.

1. The spleen serves as the graveyard for aged red blood cells,
2. It acts as a reserve tank for blood and
3. It filters circulating blood borne foreign particles.

12. What is an immunogen ?

A molecule that provokes an immune response (immunogenicity) in the body is called an immunogen.

13. Define the term 'antigen' ?

A molecule which reacts with the antibody produced or with the activated cellular constituents of cell mediated immunity (antigenicity) is called an antigen.

14. What are haptens ?

Haptens are small chemical groups, such as dinitrophenol (DNP), which are not immunogenic on their own but will react with preformed antibodies. To make a hapten immunogenic, it must be linked to an immunogenic carrier molecule.

15. Distinguish paratope and epitope .

The part of the antibody molecule which makes contact with the antigen is termed the **paratope**. The part of the antigen molecule that makes contact with the paratope is called the **epitope**.

16 . What are immuno suppressant drugs ?

In clinical fields, graft rejection is prevented by giving immunosuppressive drugs to the host. eg . **cyclosporin** and **steroids** etc,

17. Name the five classes of immunoglobins.

The five classes of immunoglobins are

- 1) IgG (Gamma)
- 2) IgA (alpha)
- 3) IgM (mu)
- 4) IgD (delta) and
- 5) IgE (epsilon)

18. Distinguish the variable and constant region in the Ig molecule.

Both H and L chains of Ig molecule contain two regions .

1. The variable (V) region shows a wide variation in amino acid sequences in the N or amino terminal portion of the molecule. These high variability areas of H and L chains are called 'hotspots' or hypervariable regions.

2. The Constant (c) region has unvarying amino acid sequence in the C or COOH terminal portion of the molecule.

19. Distinguish Autograft and Allograft.

Autograft : The tissue of the original donor is grafted back into the same donor. For example, skin graft from thigh to face in case of burnt individuals (plastic surgery).

Allograft : (Homograft). Graft between allogenic individuals (ie.,members of the same species but of different genetic constitution. For example, kidney transplanted from one human to another.

20. How does Xenograft differ from Isograft ?

Xenograft : (Heterograft). Graft between xenogenic individuals (ie.,different genetic lineage). For example organ transplanted from pig to human, baboon to human.

Isograft : Graft between syngeneic individuals (ie., identical genetic constitution). For example, between clones or identical twins.

Unit 4. Modern Genetics (19 Marks)

1 mark → 3 Questions

5 mark → Nil

3 mark → 2 Questions 40, 41

10 mark → 1 Question 67

Part I

Choose the correct answer.

1. In which prokaryote has voluminous genetical works been made ?
 a) TMV virus b) Phage **c) Escherichia coli** d) coliform bacteria
2. Who discovered the double helix DNA model ?
 a) G.H. Khorana b) Mendel c) T.H.Morgan **d) Watson and Crick**
3. About how many hereditary diseases in human beings had been identified ?
a) more than 300 b) less than 300 c) about 400 d) about 100
4. To obtain information about genetic characters in man which of the following helps?
 a) Biochemical test b) Hybridization **c) Pedigree analysis** d) Inbreeding
5. Sickle cell anaemia is due to
a) autosomal gene b) sex chromosomal gene
 c) vitamin deficiency d) hormone imbalance
6. Albinism is due to
a) absence of melanin b) absence of vitamins
 c) presence of melanin d) absence of hormone
7. Name the human disease due autosomal dominant gene
 a) sickle cell anaemia b) thalasemia c) SCID **d) huntington's chorea**
8. Idiogram means
 a) Diagrammatic representation of genes b) Graph showing heart defect
c) Diagrammatic representation of chromosome d) electro cardiogram
9. In human chromosome karyotyping the chromosomes 4 and 5 belong to group
 a) Group A **b) Group B** c) Group C d) Group D
10. What is the name for mobile genetic elements
 a) plasmids b) pili c) barr body **d) transposon**

Part II

1. What is pedigree analysis ?

The scrutiny of established matings to obtain information about the genetic characters / traits in human beings is called **pedigree analysis**.

2. What are the clinical manifestations of thalassemia ?

The clinical manifestations of thalassemia include

- i) decrease in the bone marrow activity,
- ii) peripheral haemolysis and
- iii) splenomegaly (enlarged spleen) and hepatomegaly, (enlarged liver) etc.

The thalassemic children die at the age of seventeen.

3. Mention any two uses of karyotyping .

1. Karyotyping helps to identify the sex of individuals through amniocentesis.
2. Genetic diseases in human beings can be detected. If a disease is detected, medical counselling for termination of pregnancy can be done.
3. The chromosomal abnormalities such as deletion, duplication, translocation, non-disjunctions and aneuploids can be detected.

4. What is foreign DNA in genetic engineering ?

Foreign DNA / Passenger DNA is a fragment of DNA molecule, which is to be enzymatically isolated and cloned.

5. What are cloning vectors ?

The DNA molecules that can carry a inserted foreign DNA fragment is called **Cloning vectors** or **Vehicle DNA** . The generally used vectors are bacterial plasmids and bacteriophages.

6. Name the bacterial species employed in genetic engineering.

Bacterial species employed in genetic engineering are

1. *Escherechia coli*
2. *Bacillus subtilis*,
3. *Strptomyces sp.*,
4. *Saccharomyces cerevisieae* etc.

7. What is called DNA segmenting ?

In genetic engineering , DNA segmenting refers to fragmenting of DNA and sequencing or mapping the DNA in terms of its nucleotide sequences . Chemical and enzymatic methods are available for the above

8. What is called differentiation ?

In the development of multicellular animals , a large number of cells are produced from the fertilized egg cell (the zygote) by mitotic divisions .These cells later become distinct cell types (tissues) differing in form and function. This process is called **differentiation**.

9. What is gene therapy ? Name the two types of gene therapy.

The replacement of corrective genes in place of defective genes in human is called Gene therapy. The two types of gene therapy are

- 1). Somatic cell gene therapy and
- 2). Germ linecell gene therapy.

Both may be employed for treating the inherited diseases.

10. What is a data base in bioinformatics ?

‘Creating’ database means a coherent collection of data with inherent meaning, used for future application. **Database** is a general repository of voluminous information or records to be processed by a programme.

Unit 5. Environmental Science (24 Marks)

1 mark → 1 Questions

5 mark → 2 Questions 56 , 57

3 mark → 1 Question 42

10 mark → 1 Question 68

Part I

Choose the correct answer

1. What is the rate of growth of human population ?

- a) 10 million per year b) 90 million per year
c) 1 million per year d) 80 million per year

2. The present sudden acceleration of population is called as

- a) population explosion b) population bomb c) population trap d) all the above

3. Global warming is caused due to

- a) lack of rainfall b) presence of a hole in ozone layer
c) human activities against nature d) extinction of animals and plants

4. The most abundant green house gas is

- a) NO₂ b) CO₂ c) O₃ d) SO₂

5. Which of the following gas /es destroys ozone layer faster ?

- a) chlorofluorocarbons b) hydrochlorofluoro carbons
c) both (a) and (b) d) sulphur dioxide

6. Which is a better method to dispose large amounts of water carrying relatively small amounts of chemical wastes?

- a) land filling method b) Deep-well injection
c) Surface impoundments d) incineration

7. Which one of the following organisms plays vital role in pollination of trees in tropical forest?

- a) mimic moths b) orchid bees c) Rhinoceros beetles d) Humming birds

8. Which is commonly considered as a biologists paradise?

- a) Gulf of Mannar Biosphere Reserve b) Nilgiri Biosphere Reserve
c) Nanda Devi d) Great Nicobar

9. The amount of energy the earth receives from the sun, per year is

- a) 1000 K calories b) 10×10^{30} K calories
c) 5×10^{20} K calories d) 15×10^{25} K calories

10. Which is considered as a future source of power, that can meet our unlimited demand ?

- a) Hydel power b) Hydrogen c) Thermal power d) Solar power

11. Of the total amount of water, how much is available as fresh water?

- a) 10 % b) 3% c) 15% d) 50%

12. Which of the following countries depend on desalination process for getting fresh water?

- a) Dubai b) Oman c) Bahrain d) all the above

Part II

1. Define ecology.

Environmental science or **ecology** can be defined as the study of organisms in relation to their surrounding . Ecology is one of the most popular areas in biology .

2. How does population growth differ from food production?

Thomas Malthus claimed that population was increasing faster than food production . He proposed that, Population grows geometrically (1, 2, 4, 8) rather than arithmetically (1, 2, 3, 4) , but the agricultural production remain limited .

3. What is known as global warming?

Global warming refers to an increase in the average temperature of earth . The average temperature of earth is about 590F (150C) . At present, it is increasing rapidly due to human activities. This will cause dramatic changes such as rise in sea level, changes in rainfall patterns , wide range of impacts on plants, wildlife and humans.

4. What is meant by ozone depletion?

Ozone is a form of oxygen (O₃) found in the stratosphere (ozonosphere). Ozone blocks out the sun's ultraviolet rays and is a lifesaver. The destruction of stratosphere ozone layer by human activities is called as **Ozone depletion**.

4A. What are the effects of ozone depletion?

If the ozone is depleted, more ultraviolet radiations [especially ultraviolet B (UVB)] will reach the earth's surface.

Effect on plants:- will affect crop yield and forest productivity.

Effect on animals:- will cause damage to fish larvae and other small animals

Effect on human health:- will cause melanoma (skin cancer), acute erythema (sun burn), cataract and affect immune responses.

5. How is the sewage water treated by primary treatment method?

For the treatment of sewage water, the **primary treatment method** consists of mechanical filtration, screening and settling, followed by chlorination. It removes 50 to 65% of the suspended solids.

6. What is bio-diversity?

Biological diversity means the variability among living organisms of terrestrial, marine and other aquatic ecosystems. It is usually considered at three different levels – genetic diversity, species diversity and ecosystem diversity.

7. Write the characteristics of a bioserve.

- It is a land and/or coastal/marine area in which people are an integral component, and which is managed for objectives, ranging from complete protection to intensive yet sustainable production.
- It is a regional centre for monitoring, research, education and training on natural and managed ecosystems.
- It is a place where government decision makers, scientists, managers and local people cooperate in developing a model programme for managing land and water to meet human needs while conserving natural processes and biological resources.
- Finally, each biosphere reserve is a symbol of voluntary cooperation and use resources for the well being of people everywhere.

8. List out the names of biospheres of India.

The other biosphere reserves of India are:

- **Gulf of Mannar Biosphere Reserve** (Tamilnadu) – a marine Biosphere Reserve
- **Nilgiri Biosphere Reserve** (Tamilnadu) – a hill Biosphere Reserve
- **Nokrek** – (Meghalaya),
- **Namdapha** – (Arunachal Pradesh)
- **Nanda Devi** – (Uttar Pradesh), Great
- **Nicobar** – (Andaman & Nicobar islands)
- **Sundarbans** – (West Bengal):

9. What is known as geothermal energy?

Geothermal energy is a significant source of electricity in several island nations of Indian oceans and the Pacific regions . Geothermal plants make use of naturally heated steam drawn to the surface through a series of boreholes .

10. What are the advantages of solar energy?

Advantages of solar energy:

- (a) Solar energy is a kind of universal and non-polluting energy .
- (b) It helps in maintaining the ecological balance through photosynthesis and green house effect.
- (c) It has none of the disadvantages of fossil fuels such as coal, oil or gas.

11. What is known as relative poverty?

A condition of having fewer resources or less income than worldwide averages within a society or country is known as the **relative poverty**.

12. What is meant by seeding of clouds?

Seeding water laden clouds with **dry ice** or **potassium iodide particles** to initiate rain fall is called seeding of clouds .

Unit 6. Applied Biology (41 Marks)

1 mark → 6 Questions

5 mark → 2 Questions 58 , 59

3 mark → 5 Questions 43 - 47

10 mark → 1 Question 69

Part I*Choose the correct answer***1. The breeds of cattle now available in India are**

- a) 29 b) 30
- c) 26**
- d) 20

2. Which one of the following is not a draught breed?

- a) Kangayam b) Malvi
- c) Kankrej**
- d) Hallikar

3. The synonym / other name for the cattle sindhi is

- a) Kongu b) Nellore
- c) Red karachi**
- d) Decan

4. Kangayam breed originated from

- a) Punjab
- b) Coimbatore**
- c) Karnataka d) Kathiawar

5. Which of the following is not an exotic breed?

- a) Jersey
- b) Gir**
- c) Brown swiss d) Ayreshire

6. Which one of the following is a contagious disease of the cattle?

- a) constipation b) milk fever
- c) cow pox**
- d) diabetes

7. Feeding jaggery along with lime water is one of the first aid measure for

- a) Diarrhoea b) constipation
- c) milk-fever**
- d) anthrax

8. Mating of closely related animals is called

- a) out breeding b) artificial insemination
-
- c) cross breeding
- d) Inbreeding**

9. The milk of the following cow is characterised by high carotene content?

- a) Sindhi b) Haryana c) Gir
- d) Jersey**

10. For anthrax one of the following symptom can be seen

- a) swelling of udder
 b) blood discharge from natural openings
 c) loss of appetite
 d) lack of chewing

11. Apis indica is

- a) India bee b) African bee c) European bee d) Rock bee

12. Bee milk is produced by

- a) Drones b) Queen c) Worker d) An adult bee

13. Sterile females are

- a) Queen b) Worker c) Drone d) Both Queen and Worker

14. Stingless bees are

- a) Queen b) Drone c) Worker d) Both Drone and Worker

15. Modern bee hive consists of

- a) 5 Compartments b) 4 Compartments
 c) 6 Compartments d) 7 Compartments

16. Equipment used for spinning the comb is

- a) Bee veil b) Bee brush c) Honey extractor d) Bee gloves

17. The resin is the component of

- a) Bee venom b) Bee bread c) Bee glue d) Bee milk

18. The disease Nosema apis is caused by

- a) Bacteria b) Protozoa c) Fungus d) Virus

19. Bee bread is a mixture of

- a) Nectar and water b) Nectar and pollen
 c) Pollen and royal jelly d) Propolis and royal jelly.

20. One of the bee hive product used for apitherapy

- a) Propolis b) Royal jelly c) Bee venom d) Pollen

Part II

1. What is meant by dairy operations?

Dairy operation consists of proper maintenance of cattle, the collection of milk, processing the milk and its by products . **Dairying** is the production and marketing of milk and its products.

2. How are cattles classified ?

Cattles are classified into three groups based on the purpose they serve to man. They are **Dairy breeds** , **Dual purpose breeds** and **Draught breeds**.

3. How are dual purpose breeds helpful for mankind.

Dual purpose breeds are meant for both milk yield and draught works. The cows are fairly good milkers and the bullocks are useful in draught works like ploughing the field, transport, cart pulling etc. Examples - Haryana and Ongole.

4. Compare the udder of Sindhi with Kangayam.

In Sindhi , the udder is large with medium sized teats .

In Kangayam , the udder is medium sized with small teats .

5. Write down the origin and distribution of the cattle Kangayam.

Kangayam originated from Kangayam divisions of Dharapuram taluk of Coimbatore district in Tamilnadu. This breed is also found in Udumalpet, Palladam, Pollachi and in other parts of South India.

6. How will you identify a healthy cattle?

Cattle in normal health appear bright, alert and active in their movements with a shiny coat. They also enjoy normal appetite and sleep.

Cattle in ill health appear dull, restless and change posture frequently with a drop in milk yield.

7. Mention the bacterial disease of cattle and its symptoms.

Anthrax is a bacterial disease due to \square anthracis which causes sudden death in cattle.

Symptoms : High temperature ($41-41.5^{\circ}\text{c}$), swelling of the neck , thorax and lumbar regions. Blood discharges from natural openings, the affected animal dies in 10 to 36 hrs.

8. What are the control measures of cow pox?

- Segregation of affected animal.
- Giving sloppy food for swallowing and digestion.
- Fomenting udder with warm disinfectant solution.
- Giving saline laxative and diuretics.
- Treating lesions with mild antiseptic ointment and
- Cow shed should be kept clean.

9. What is the first aid given to cattle for constipation?

Precaution and first aid :

- The affected animals can be given wheat bran meal or rice gruel and plenty of drinking water with jiggery or salt,
- Evacuating the rectum by giving warm soap water enema and
- Massaging the abdomen .

10. List out the different types of diseases of cattle.

Cattle are affected by a large number of diseases .

1. Contagious diseases :

- (a) The bacterial diseases – **anthrax , haemorrhagic septicemia, mastitis and tuberculosis.**
- (b) The viral diseases – **cow pox , foot and mouth disease and rinderpest.**

2. Non-contagious diseases :

- (a) Milk fever
- (b) Constipation

3. External parasitic diseases :

- The external parasites are flies, ticks, mites, fleas and lice. They suck the blood from cattle and also transmit bacterial, viral and protozoan diseases.

4. Internal parasitic diseases :

- The internal parasites such as Hook worm , round worm , tape worm and flukes are causing diarrhoea , dysentery and some other complications.

11. Define draught breeds.

Draught breeds are exclusively meant for draught works . The bulls are used for pulling carts, ploughing fields etc.. The cows are poor milkers.

Examples – Amritmahal , Kangayam , Malvi , Hallikar etc.

12. What is artificial insemination?

Artificial insemination is the deposition of male reproductive cells (spermatozoa) in the female reproductive tract by mechanical means rather than by natural mating.

13. What are the advantages of artificial insemination?

The advantages of artificial insemination are

- 1 . No need for maintenance of herd sire .
- 2 . This method permits long distance transport of semen by air.
- 3 . It avoids spreading of genital diseases, and increases the rate of conception.
- 4 . It permits use of semen from injured and old bulls and
- 5 . It helps for detecting any genital abnormalities or pathological infection .

14. Define outbreeding.

Out breeding is mating of less closely related or unrelated animals .The individuals involved in this mating do not have a common ancestor in the preceding 4 – 6 generations.

15. Define cross breeding.

Cross breeding is mating of animals of different breeds. The cross breeds have new desirable characters like increased growth and vigour in the first generation. It is due to blending of desirable dominant genes from two breeds.

16. Compare the bullocks of Sindhi, Ongole and Kangayam.

Sindhi	Ongole	Kangayam
Bullocks are steady workers, suited for road and field work.	Bullocks are powerful and suitable for cart and road work but are not fast.	The bulls are excellent type for hard work.

17. Define breed.

A **breed** is a group of animals of a species which has been bred among themselves for a long period . The members of the breed have closely resembling characters .

18. Define Apiculture.

Cultivation of bees on a commercial scale for the production of honey is called **apiculture** or *bee keeping*

18A . Define Sericulture.

Rearing of silkworm and adoption of different rearing techniques for the production of silk threads of fine quality is known as **Sericulture**.

19. Name the types of silk.

Type of silk	Type of silk insect
1. Mulberry Silk	Bombyx mori
2. Tasar Silk	Antheraea mylitta , A. paphia , A. rayeli , A. pernyi
3. Eri Silk	Attacus ricini
4. Munga Silk	Antheraea assama

20. What is fibroin?

Fibroin, is a kind of liquid fibrous protein . It is secreted by the silk glands . It is insoluble in water and is made up of glycine, alanine and tyrosin . When the liquid secretions of the two silk glands pass through the Spinnert, it transforms them into a single thread.

21. What is sericin

Sericin, is another secretion produced by a pair of accessory glands . It unites the two fibers of fibroin into a single fibre .

22. What are the three stages of sericulture ?

The sericulture practice involves three different stages . They are

- (1) Cultivation of food plants (Plant origin)
- (2) Rearing of larvae (Animal origin) and
- (3) Reeling of thread from cocoon (Technical origin).

23. What is the function of salivary gland of silk worm?

The salivary glands of silk worm are modified into *silk glands* and they secrete silk threads.

24. What is cocoon?

The matured caterpillars begin to secrete sticky secretion around them . When this sticky secretion comes into contact with the air , it is converted into a fine, long and solid thread of silk called Cocoon . The silk cocoon serves as protection for the pupa. Cocoons are white, cream or yellow in colour..

25. What is instar?

The caterpillar larva of Silk Moth is commonly called as *silkworm* . During growth, the larva moults four times. The period between successive moults is called an *instar*

26. What is imago ?

The *pupa* undergoes metamorphic changes inside the cocoon, An adult insect produced after metamorphosis is called *imago* .

27. What is spinneret?

Silk is the secretion of silk glands (modified salivary gland). There are two silk glands lying one on each side of the alimentary canal of the caterpillar. These glands are connected to a narrow tube like structure known as *spinneret*.

Unit 7. Theories of Evolution (10 Marks)

1 mark → 2 Questions

5 mark → 1 Question 60

3 mark → 1 Question 48

10 mark → Nil

Part I

Choose the correct answer

- The book 'Philosophie Zoologique' was published by
 - Charles Darwin
 - August Weismann
 - Mc Dougall
 - Jean Baptiste de Lamarck
- The German scientist who segregated germplasm from somatoplasm for the first time was
 - Lamarck
 - Malthus
 - Weismann
 - Hugo de vries
- Mc Dougall supported neo-lamarckism and proved the concept of
 - Direct action of environment on organism
 - Learning is an acquired character
 - Speed of learning increased from generation to generation
 - All the above
- Darwin supported the following concepts for evolution
 - arrival of the fittest
 - survival of the fittest
 - The differentiation of somatoplasm germplasm
 - genetic recombinations
- The book "Process of organic evolution" to support modern synthetic theory of evolution was provided by
 - Dobzhansky
 - Stebbins
 - Hardy-weinberg
 - Hugo de vries
- The factor that enriches the gene pool with new modified genes
 - mutation
 - somatic variation
 - decrease in chromosomes
 - increase in cytoplasm

Part II

1. State the theory of Lamarck.

The theory of Lamarck is popularly known as the ‘theory of inheritance of acquired characters’. According to this theory modifications or changes acquired during the life time of an organism can automatically be transmitted to succeeding generations.

2. Define the law of use and disuse.

According to this law, constant use of an organ changes its efficiency and makes that organ to increase in size with better development . Similarly if an organ is not used for a long time, it might lead to reduction in efficiency and size of that organ

3. Quote the facts of neo-lamarckism.

The neo-Lamarckism is a modified form of Lamarckism. . Due to changes in the environment , the organism gets adapted to new environment . Thus gradually the organism acquires new structures. The newly obtained character gradually becomes an inheritable trait. These ideas stressed direct action of environment on organisms.

4. Define the germ plasm theory.

The ‘**Germplasm theory**’ states that *‘any change to the somatoplasm will not have an influence over the germplasm’*.

5. State the view of McDougall.

According to **Mc Dougall**

- a) Environment has direct action on organism .
- b) Learning is an acquired character .
- c) Speed of learning increased from generation to generation

6.. What is meant by “survival of the fittest”?

While all living organisms face the struggle for existence, certain organisms possessing adequate modifications and favourable variations are able to escape and survive successfully in life. They survive as fittest organisms in an environment which gets altered frequently.

7. Mention any two objections to Darwinism.

Objections to Darwinism

Some ideas of Darwin are commonly accepted, but there are certain drawbacks in his original theory.

1. Darwin could not explain, the origin and cause for variations while insisting their importance in progressive evolution.

2. He overemphasized the importance of the 'fittest' organisms. During later periods it has been suggested that 'fit' and fitter forms can also exist along with the fittest

3. 'Over-specialization' in Irish deer and its consequent harmful effect had not been accounted for by Darwin.

8. Mention the significance of neo- Darwinism.

A modified form of Darwinism is known as neo-Darwinism.

- The neo-Darwinians proposed the 'germplasm concept'.
- They also believed that characters are controlled by certain factors called **the determinants**.
- The neo-Darwinism concept was incomplete and erroneous.
- It lacked in an understanding of genetics.

9. State the modern synthetic theory.

The modern synthetic theory was provided by Th. Dobzhansky and G.L.Stebbins. They suggest that five basic processes are essential for evolution. They are **gene mutations, chromosomal aberrations, genetic recombinations, natural selection** and **reproductive isolation**. Contributions made by others provided additional factors such as **Hardy-Weinberg equilibrium, Genetic drift** and **Polymorphism**.

10. What is meant by "gene pool" ?

The collection of genes in a population is referred to as the '**gene pool**'. Mutations enrich the gene pool with new modified genes.

11. Name two books that explain the basic concepts of evolution.

The basic concept of evolution is explained in the books titled

1. "Genetics and the Origin of species" (1937) written by Th.Dobzhansky
2. "Process of organic evolution" (1971) written by G.L.Stebbins

12. What is meant by chromosomal aberration?

During the process of meiosis one or more chromosomes may break. Such broken fragments of chromosomes may be subjected to **deletion , translocation , inversion** and **duplication** . All these above mentioned changes are called as chromosomal aberration .

13. State the law of genetic drift.

In a small reproducing population , the frequency of a character that has little adaptive value may increase . Further, continual mating within such populations may cause decrease in the proportion of heterozygotes and increase in the number of homozygotes. Thus the genetic drift may remain a significant factor in the origin of new species on islands and other isolated populations.

14. What is a species?

A **species** may be defined as *“a group of organisms that are reproductively isolated from other such groups”*.

15. Define founder principle.

When a small group of individuals due to genetic drift become founders of a new population, the phenomenon is termed as **‘founder principle’**. The genotype frequencies of new population will be different from the parent population.

16. State the Hardy-Weinberg’s law .

According to Hardy-Weinberg’s law *“ the relative frequencies of various kinds of genes in a large and randomly mating sexual population tend to remain constant from generation to generation in the absence of mutation, selection and gene flow or migration ”*

Unit - 8 Aquaculture (29 Marks)

1 mark → 3 Questions

5 mark → 2 Questions 61 , 62

3 mark → 2 Questions 49, 50

10 mark → 1 Question 70

PART - I

Choose the correct answer

1. The fish cultured in fresh water is

- a. rohu b. mugil c lobster d. milk fish

2. In fresh water aquaculture the salinity of the fresh water should be

- a. >0.50 ‰ b. >0.55 ‰ c. <0.50 ‰ d. <0.55 ‰

3. In metahaline aquaculture the salinity range will be

- a. 36-40 ‰ b. 36-42 ‰ c. 30-40 ‰ d. 35-40 ‰

4. Which one of the following is an exotic fish.

- a. catla b. rohu c. tilapia d. mugil

5. Which one of the following culture practice takes place in cold water.

- a. ornamental fish culture b. race way culture
c. sport fish culture d. larvivorous fish culture

6. The size of fry is

- a. < 2.0cm b. < 2.2cm c. <2.5cm d. <2.7 cm

7. The possible temperature range for survival of different fishes is

- a. 14-15⁰ C b. 10-37⁰ C c. 5-9⁰ C d. 10-15⁰ C

8. The usual size of fish cultured in nursery pond is

- a. less than 2.5 cm. b. more than 1.5 cm.
c. less than 1cm d. more than 4 cm

9. The maximum permissible density of hatchlings is

- a. 10.5 millions /ha b. 10 millions/ha c. 10 billions / ha d. 1million / ha

10. The Indian major carp can survive in a temperature range of
a. 14 – 15⁰ C b. 5 – 9⁰ C c. 13 – 14⁰ C d. 16 – 25⁰ C
11. Ideal pH range for pond water is
a. 6.5 – 9 b. 3.5 – 4.5 c. 4.5 – 5.5 d. 5.5 – 6.5
12. The suitable hardness for pond water is
a. 17 ppm b. 14 ppm c. 13 ppm d. 12 ppm
13. *Macrobrachium rosenbergii* can be identified by the presence of
a. 1-7 horizontal lines on the carapace b. 1-6 horizontal lines on the carapace
c. 1-8 horizontal lines on the carapace d. 1-9 horizontal lines on the carapace
4. In the absence of natural food, which of the following organism become cannibals.
a. *Penaeus indicus* b. *Scylla serrata*
c. *Catla-catla* d. *Macrobrachium rosenbergii*
15. The preparation of pituitary extract is done by
a. Homogeniser b. Distillation c. Hypophysation d. Dehydration
16. The preferable age group for the selection of breeder in hypophystation technique is
a. 4-5 years b. 5-6 years c. 2-4 years d. 1-2 years.
17. The quantity of second dose of pituitary extract lies in the range of
a. 5-8 mg/kg b. 3-4 mg/kg c. 2-3 mg/kg d. 2-5 mg/kg
18. Blindness and haemorrhage are the symptoms for
a. Costiasis b. Dropsy c. Gillrot d. Sapro legniasis
19. The aerator in the aquarium keeps the water
a. Warm b. Oxgenated c. free from turbidity d. free form ammonia
20. The salinity range 3‰ to 29‰ may prevail in the culture of
a. mugil b. mussels c. artemia salina d. milk fish

Part II

1. What is Aquaculture?

Aquaculture is a branch of science that deals with the farming of economically important aquatic organisms and plants, under controlled and in a confined environment.

2. What are the major types of Aquaculture methods?

The Aquaculture can be broadly classified into

- 1 .**Freshwater culture,**
- 2 .**mariculture,**
- 3 .**brackish water culture and**
- 4 .**metahaline culture.**

3. Define mariculture?

The term mariculture refers to culture of marine organism in pollution free marine water. Generally, the mariculture practice is done at the edge of oceans inshore area.

4. Distinguish between fresh water & marine water?

In ‘**Fresh water**’ the salinity is $< 0.5 \text{ ‰}$ (parts per thousand or ppt). Culturing of organisms in this water is known as Fresh water aquaculture

In ‘**Marine water**’ the optimum salinity range is 30 - 35‰.(parts per thousand or ppt). Culturing of organisms in marine water is known as Mariculture .

5. Define integrated fish culture?

Culture of fish along with agricultural crops such as paddy, banana and coconut and livestock such as poultry, duck, cattle and pigs is known as **integrated fish culture** .

6. Name the cultivable organisms of freshwater aquaculture?

Cultivable fresh water fishes :

- | | | |
|--------------------------------|-----------------------------------|-----------------------------|
| (i) <i>Catla catla</i> | (ii) <i>Labeo rohita</i> (Rohu) | (iii) <i>Labeo calbasu</i> |
| (iv) <i>Labeo bata</i> . | (v) <i>Cirrhina mrigala</i> | (vi) <i>Cyprinus carpio</i> |
| (vii) <i>Clarius batrachus</i> | (viii) <i>Tilapia mossambica</i> | (ix) <i>Osphronemus</i> |
| <i>gouramy</i> | (x) <i>Anabas testudineus</i> and | (xi) <i>Channa striatus</i> |

Cultivable fresh water prawns :

- (i) *Macrobrachium rosenbergii* (giant river prawn)
- (ii) *M.Malcolmsonii* (monsoon river prawn) and
- (iii) *M.idae* (river prawn)

7. What are bunds?

Bunds are the protective structure of the pond. Bunds are of three types, namely

- (i) main or peripheral bunds,
- (ii) bunds holding water on one side,
- (iii) bunds dividing two adjacent ponds.

The longevity of any bund depends on quality of soil, slope and crown or crest.

8. What are the components of a typical pond?

A typical earthen pond comprises the following structures such as

- Bunds,
- Harvesting pit and
- Inlet and Outlet .

9. What is the structure of a nursery pond and its nature of utilisation?

Nursery ponds : It is a seasonal pond having the dimension of 12 x 6 x 1 m. It is mainly used to nurse the hatchlings for a period of three weeks until they become fry. The fry is a recently hatched tiny fish less than 2.5 cm in total length. The maximum permissible density of hatchlings is about 10 millions/ha.

10. What are the physical & chemical factors of culturable pond?

The important physical & chemical factors of a culturable pond are

- a) water depth , temperature , turbidity and incident light.
- b) oxygen, pH , carbon-di-oxide and hardness of water.

11. Name 4 species of freshwater cultivable organisms.

- (i) *Catla catla*
- (ii) *Labeo rohita*(Rohu)
- (iii) *Labeo bata*.
- (iv) *Cirrhina mrigala*
- (v) *Channa striatus*
- (vi) *Tilapia mossambica*

12. What is hypophystation?

The **hypophystation** is a technique of stimulating the breeding activity of fish through the injection of pituitary extract. It results timely release of eggs and sperms from the ripe gonads.

13. What is called Hapa?

After the injection of pituitary extract, the male and female breeders are kept together in a rectangular enclosure called '**Hapa**'. The hapa is made of mosquito net cloth to prevent breeders from escaping.

14. What is spawning?

The release of matured eggs and sperms is called **spawning**. It takes place after 3 – 6 hours of hypohystation.

15. What is dropsy?

Dropsy is a fish disease caused by a bacterium. The symptoms are accumulation of water fluid in the body cavity, inflation of intestine and protrusion of scales and eyes.

16. What is costiasis?

Costiasis is a fish disease caused by a protozoan parasite. Bluish mucous coating on the skin, fin and gills are the symptoms of this disease.

17. What is gill-rot?

Gill rot is a fungus disease in fish. Appearance of small red spots on gill filament is the symptom of this disease. This leads to suffocation and ultimate death.

18. What is called spat?

The seeds of the oysters are called '**spat**'. They stick on to the rafts and grow up to its maturity.

19. What are called bouchots?

Pole culture: Wooden poles are placed upright in the inter tidal zone. In this method, ropes with spat attached are wound around large vertical poles called **bouchots**. Mussels and oysters are cultured by this method.

20. Name the cultivable species of edible oyster & pearl oyster.

Edible oyster :	(i) <i>Ostrea edulis</i> ,	(ii) <i>Crossostrea madrasensis</i> .
Pearl oyster :	(i) <i>Pinctada fucata</i> ,	(ii) <i>P.margaritifera</i>

21. Name cultivable species of marine Aquaculture?

- Prawn : (i) *Penaeus indicus*, (ii) *P.monodon*.
 Crab : (i) *Scylla serrata*.
 Fishes : (i) *Chanos chanos*, (ii) *Mugil cephalus*.

22. Name cultivable species of freshwater Aquaculture?

- Fishes : (i) *Catla catla* (ii) *Labeo rohita*(Rohu)
 (iii) *Labeo bata*. (iv) *Channa striatus*
 Prawn : (i) *Macrobrachium rosenbergii* (giant river prawn)
 (ii) *M.Malcolmsonii*

23. What are called pens?

In brackish water areas , milk fish, sea bass, mullet, mugil species and prawns are cultured by installing bamboo or nylon enclosures. These enclosures are called **pens**.

24. Define mata-haline culture

Metahaline culture is practiced in areas where the water having the salinity range of 36-40 ‰. *Artemia salina* , small crustaceans , popularly known as *brine shrimp* are cultured in this culture system.

25. Expand the following acronym.

- (a) CMFRI – Central Marine Fisheries Research Institute
 (b) MPEDA – Marine Product Export Development Authority
 (c) CIBA – Central Institute of Brackish water Aquaculture
 (d) CIFA – Central Institute of Freshwater Aquaculture

