

BIOLOGY

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SUBJECT SPECIFIC GUIDELINES FOR CLASS XI BIOLOGY THEORY PAPER

1. The theory paper shall be of 70 marks and of 3 hrs duration.
2. The syllabus shall be in accordance with the core syllabus provided by COBSE.
3. The questions shall be from all the units.
4. The question paper shall have four sections A,B,C,& D. Section A will have 9 questions of one mark each. Section B will have 7 questions of 2 marks each , Section C will have 11 questions of 3 marks each and Section D will have 3 questions out of which two questions will be of 5 marks each and one question of 4 marks. Total number of questions will be 30.
5. All questions will be compulsory.
6. There will be no overall choice. However an internal choice will be provided in one question of section B ,one question of section C and all the three questions of section D. A student has to attempt only one of the alternatives in such questions.
7. The student shall draw correct and neat diagram wherever asked.

BROAD GUIDELINES FOR SUBJECT SPECIFIC PRACTICALS

1. The practical examination shall be of 30 marks and 3hr. duration.
2. The following skill shall be evaluated during practical exam
 - a) procedural skill b) observational skill
 - c) drawing skill d) reporting and interpretative skill
3. Originality of investigatory project shall be given more importance than volume of report.
4. Scheme for evaluation during practical exam:

PART A(10 marks)

S.No	Area	Marks	Criteria	Marks Distribution
1	Practical file and viva on practicals	4+2	Complete and well maintained file	2
			Correct reporting of practical done	2
			Viva on practicals	2
2	Investigatory Project and viva	2+2	Investigatory Project report	2
			Viva Voce on Investigatory Project	2

PART B (20 marks)

3	Description of locally available flowering plant	5	Procedural skill	3
			Observation	0.5
			Drawing	1
			Interpretation	0.5
4	Physiology experiment	5	Procedural skill	3
			Observation	1
			Drawing	-

			Interpretation	1
5	Slide Preparation	3	Procedural skill	1
			Observation	1
			Drawing	1
			Interpretation	-
6	7 spots	7(1 mark each)		-
			Observation (identification)	3.5
			Drawing	-
			Interpretation(comment)	3.5

LIST OF SUBJECT SPECIFIC COMPULSORY EXPERIMENTS

Description of locally available flowering plant

1. Study and describe one locally available common flowering plant from the family Solanaceae , Fabaceae & Liliaceae including dissection and display of floral whorls and anther and ovary to show number of chambers. Types of roots (Tap roots and adventitious root); stem (herbaceous and woody); Leaf (Arrangement, shape, venation, simple and compound).

Physiology Experiment

2. Study of osmosis by potato osmometer.
3. Comparative study of the rates of transpiration in the upper and lower surface of leaf.
4. Test for the presence of sugar, starch, protein and fats in animal/plant material.
5. Separation of plant pigments through paper chromatography.
6. To test the presence of urea in urine.
7. Test the presence of one abnormal constituent out of sugar and albumin in urine.

For slide preparation

8. Study of plasmolysis in epidermal peels (e.g.Rhoeo leave)
9. Study of distribution of stomata in the upper and lower surface of leaves.
10. Preparation and study of T.S of dicot and monocot roots and stems (primary).

For Spotting

11. One lower plant/algae
12. One vertebrate/invertebrate
13. One plant tissue/animal tissue
14. One stage of mitosis.
15. One experimental setup.
16. One inflorescence
17. One modified root/stem/leaf.
18. Bones/joints of human skeleton.
19. External morphology of cockroach.

ASSESSMENT OBJECTIVES & DISTRIBUTION OF FORMS OF QUESTIONS PER UNIT
TASK 4 : BLUEPRINT OF CLASS XI BIOLOGY THEORY QUESTION PAPER

Time allowed : 3 hrs.

Maximum Marks : 70

UNIT	NAME OF UNIT	KNOWLEDGE				UNDERSTANDING				APPLICATION				SKILLS				TOTAL
		LA	SA	VSA	OBJECTIVE	LA	SA	VSA	OBJECTIVE	LA	SA	VSA	OBJECTIVE	LA	SA	VSA	OBJECTIVE	
1	Diversity in Living Organisms		1(3)		1(1)			1(2)										5(10)
2	Structural Organisation in Animals and Plants				1(1)		1(3)		1(1)		1(3)	1(2)						5(10)
3	Cell Structure and Function	1(4)	1(3)		2(2)		1(3)									1(2)		6(14)
4	Plant Physiology		2(6)					1(2)	2(2)					1(5)	1(3)			7(18)
5	Animal Physiology		2(6)		2(2)		1(3)									1(2)		7(18)
Total		13(28)				9(21)				5(14)				3(7)				30(70)

DESIGN OF CLASS XI BIOLOGY THEORY QUESTION PAPER

1. Weightage to assessment objectives

Objectives	%Weightage	MarksOut Of 70
Knowledge	40	28
Understanding	30	21
Applications	20	14
drawing sketches etc	10	7

2. Weightage to Form/Types of Questions

Type Of Questions	%Weightage	No. Of Questions	Marks out of 70
OBJECTIVE TYPE	13	9(4 MCQ +5 VVSA)	9
VSA	20	7	14
SA	47	11	33
LA	20	3	14(4+5+5)

3. Weightage to difficulty level of questions

Level	%Weightage	Marks Out Of 70
Difficult	20	14
Average	50	35
Easy	30	21

SAMPLE QUESTION PAPER
CLASS – XI
SUBJECT BIOLOGY

Time allowed: 3.00 hrs
70

Maximum Marks:

General Instructions:

- (1) All questions are compulsory.
- (2) This question paper consists of four sections A, B, C and D. Section A contains 9 questions of one mark each. Section B has 7 questions of two marks each, Section C has 11 questions of three marks each and section D has 3 questions out of which one question is of 4 marks and two questions are of five marks each.
- (3) There is no overall choice. However, an internal choice has been provided in one question of section B, one question of section C and all the three questions of section D. A student has to attempt only one of the alternatives in such questions.

SECTION A

1. The embryo sac of an angiosperm is made up of
 - (a) 8 cells & 8 nuclei
 - (b) 7 cells & 8 nuclei
 - (c) 8 cells & 7 nuclei
 - (d) 7 cells & 7 nuclei1
2. Vacuole of plant cells is a membrane bound organelle containing
 - (a) water and excretory substances.
 - (b) Sap, excretory substances and other material not useful for plant
 - (c) Storage protein and lipids.
 - (d) Water and storage material1
3. Pick the odd one out
 - (a) Humerus
 - (b) Phalanges

(c) Carpal

(d) Tibia

1

4. Respiratory quotient (RQ) is maximum when the respiratory substrate is

(a) Fat

(b) Glucose

(c) Malic Acid

(d) Protein

1

5. Write the technical term for roots growing vertically upwards in *Rhizophora* plant.

1

6. Name the organelle universally found in bacterial, plant and animal cells.

1

7. Certain columnar epithelial cells in human alimentary canal have microvilli on their free surface. State the functions they will perform.

1

8. Identify 'A' and 'B' in the table given below

1

Hormone	Level of secretion	Disease
-----A-----	Hyper secretion	Acromegaly
Antidiuretic hormone	Hypo secretion	-----B-----

9. Why ABA is known as stress hormone?

1

SECTION B

10. Write any two differences between chondrichthyes and osteichthyes and give one example of each.

2

11. Draw labeled diagrams of animal cells showing mitotic anaphase and anaphase II of meiosis ($2n=6$)

2

12. Why do biologists like to use difficult scientific names for organisms instead of their respective common names? Why do scientific names have two parts?

2

13. An Outline sketch of a plant and an animal cell showing cell membrane, nucleus and cytoplasm were provided to you. Name two common cell organelles and two different cell organelles that you would draw in respective cells.

2

4. Draw a diagram showing axon terminal & synapse and label any 3 parts in it. 2

OR

Draw vertical section of human eye and label the following parts

vitreous chamber, cornea, iris

15. You accidentally find an unlabelled permanent slide. Upon observing it under microscope it appears to be a unicellular organism with well defined nucleus and two flagella, one longitudinal and another transverse. Mention the kingdom and the group this organism can be identified under.

2

16. Plants are known to be adversely affected by too much watering but how does the plant survive under naturally flooded condition and manage excess water.

2

SECTION C

17. Write the three eukaryotic multicellular kingdoms and the nutritional basis on which they were categorized by R.H Whittaker.

3

18. The ovary is superior in some flowers while inferior in others. Write the technical term for the two types of flowers on the basis of position of ovary & classify the flowers of following plants accordingly

Brinjal, Onion, Petunia, Pea ,cucumber

3

19. State three important events of prophase I of meiosis and mention the significance of each event. OR

Describe the structure of the nuclear envelope and state its two function.

3

20. Exchange of gases usually occurs through stomata in plants but trunks of woody trees do it differently. Name the structures through which exchange of gases takes place in tree trunks. Describe how these structures are formed.

3

21. Mention the effects of absence of each of the following organelles on the functioning of a plant cell (i) plastid, (ii) cell wall, (iii) golgi apparatus.

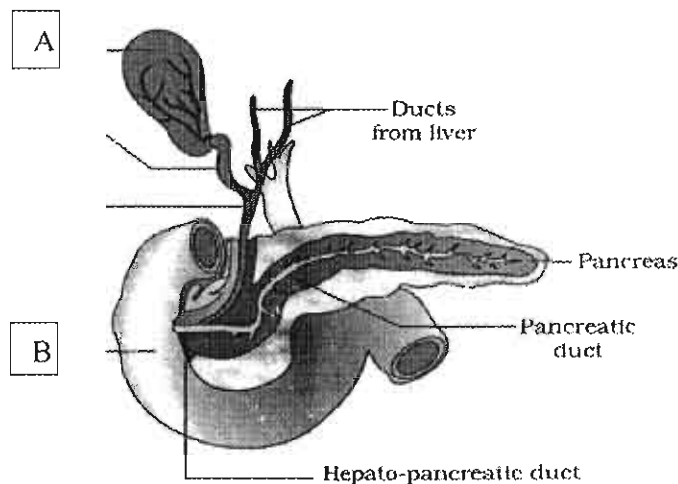
3

22. Name part of human heart referred as the pacemaker? Where is it located & what is its function?

3

23.

Identify the parts labeled A & B in the diagram given below & answer the questions



(a) Write the function of fluid stored in part A?

(b) Name two secretions which flow in to part B.

3

24. On an educational trip to hill station some students observed that many local people had a swelling in their throat. Please help these students to find out the solution to the following questions.

(a) Which probable disease you think are these people suffering from?

(b) How is it caused?

(c) What effect does it have during pregnancy?

3

25. What is energy currency? Explain how it is made available in living system?

3

26. How are root nodules a perfect site for nitrogen fixation? Explain the process of nitrogen fixation.

3

27. Draw a schematic diagram of T.S of root of an angiosperm showing apoplastic and symplastic pathway of water and mineral movement from root hair to xylem.

3

SECTION D

28. (I) What are fatty acids? How saturated fatty acids differ from unsaturated fatty acids?

(II) Make a diagrammatic representation of a portion of glycogen.

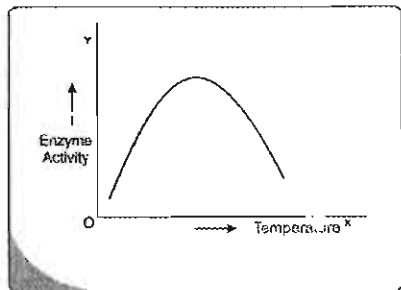
2+2=4

OR

(a) Explain with the help of a graph how increase in the substrate concentration influences the velocity of the enzyme action.

(b) Given below is the graph depicting the effect of change in temperature on enzyme activity? How and why is it different from one drawn by you in the answer of part b above?

2+2=4



29. (a) 'Excretion is purification of blood' - Justify .

(b) How does this purification take place in different parts of the nephron with the help of filtration, reabsorption, and secretion?

(c) List the two ways by which human kidney regulate the water content of body fluids . 1+3+1=5

OR

a) Draw and explain oxygen dissociation curve.

b) list four factors that favour binding of haemoglobin with oxygen in the alveoli .

3+2=5

30. (a) When a freshly collected spirogyra filament is kept in a 10% potassium nitrate solution it is observed that the protoplasm shrink in size.

i) What is this phenomenon called?

ii) What will happen if the filament is replaced in distilled water?

(b) Explain photosynthetic carbon cycle in plants such as maize and sugarcane.

1+4=5

OR

(a) Write the step of glycolysis where

i) two molecules of ATP are produced .

ii) one molecule of ATP is used for phosphorylation

(b) Explain the ways by which following cells handle the end product of glycolysis

i) yeast cell ii) muscle fibre of an athlete in action

2+3=5

MARKING SCHEME
CLASS XI (BIOLOGY)
Section A

- | | | |
|----|---|--------|
| 1. | b | 1 |
| 2. | b | 1 |
| 3. | d | 1 |
| 4. | b | 1 |
| 5. | Pneumatophores | 1 |
| 6. | Ribosomes | 1 |
| 7. | Absorption ,secretion | ½+1/2 |
| 8. | A -growth hormone, B-diabetes insipidus | ½+1/2 |
| 9. | Closes stomata; increases tolerance of the plant for various types of stresses. | ½ +1/2 |

Section B

10.

	Chondrichthyes	Osteichthyes
1	Notochord persistent in adults	Absent in adults
2	cartilaginous endoskeleton	bony endoskeleton
3	no air bladder so they have to swim constantly	Air bladder present which regulates buoyancy
	shark/ray fish/any other correct example	rohu /sea horse/any other correct example

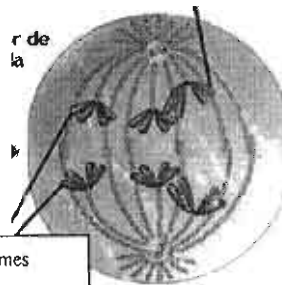
2 x 1(for any two correct differences); ½ +1/2 for e.g.

11



Sister chromatids separate

Mitotic anaphase



Homologous chromosomes separate

Anaphase II of meiosis

1/2

+1/2 for correct diagram; 1/2 +1/2 for correct label

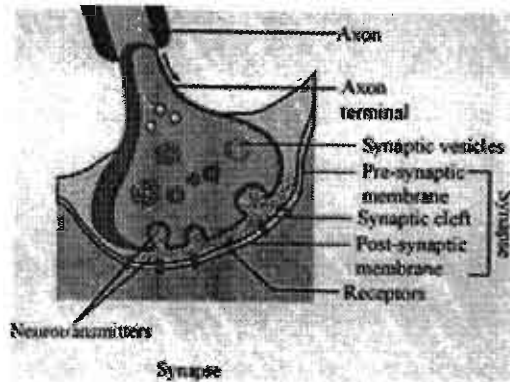
12. An organism is known by different names in different places but has only one scientific /botanical name all over the world;
Such names are universally accepted and description of the organism anywhere in the world would lead to the same scientific name;

'Generic' name shared only by related group of species and the 'specific' name is shared only by individual organisms with fundamental similarities.

$\frac{1}{2} \times 4 = 2$

13. Common -- mitochondria, Golgi complex, ER, ribosome (any two)
 Different --- big vacuole/ plastids in plant cell and centromere/small vacuole in animal cell. $\frac{1}{2} \times 4 = 2$

14.



NOTE: diagram must show axon terminal ,neurotransmitters ,synaptic vesicles and receptors on the post synaptic membrane.

correct diagram=1/2; any three labels=3 x1/2

OR

Diagram on page 323,NCERT TEXT CLASS XI
 (CORRECT DIAGRAM=1/2,CORRECT LABEL=1/2X3)

15. Dinoflagelates ; Kingdom Protista 1+1=2

16 Transpiration and guttation-- --explained 1+1=2

Section -- C

17. Kingdom Fungi-most of them are saprotrophes, others may be parasitic or symbionts; Kingdom Plantae-Autotrophic; Kingdom Animalia -Heterotrophic-holozoic /parasitic/saprotrophic --- 1/2X 6=3

18. Superior ovary-hypogynous flower, eg. Brinjal , Onion, Pea ; ---1/2X4 =2

Inferior ovary-Epigynous flower, eg. Cucumber. ----1/2+1/2=1

19. condensation of chromatin material into compact mitotic chromosomes ; thus become untangled and this helps in their movement.

Homologous chromosomes pair up/synapse to form bivalents ;this helps in crossing over between non sister chromatids leading to exchange of genetic material between the two homologous chromosomes .

Dissolution of synaptonemal complex ; recombined homologous chromosomes separate from each other 1/2x6=3

OR

Consists of two parallel membranes; with perinuclear space; Outer membrane remains continuous with the ER and also bears ribosomes on it; at places the membrane is interrupted by minute pores formed by fusion of its two membranes.

1/2x4=2

Functions- encloses the genetic material within; pores allow bidirectional movement of RNA and proteins between the cytoplasm and the nucleoplasm.

1/2x2=1

20. lenticels, openings on the bark that allow gaseous exchange between the internal tissues of the stem and the outer atmosphere through diffusion. 1/2+1/2=1

formed during secondary growth; when phellogen /cork cambium cuts off parenchymatous cells (instead of cork cells) on its outer side ;these cells soon rupture the epidermis; form openings called lenticels 1/2 x 4 =2

21. Plastids -plant cells would be devoid of any colour and would not photosynthesise 1

Cell wall — no definite shape of the cell, no protection from mechanical damage and infection/ no cell -to cell communication 1

Golgi apparatus --there would be no packaging of secretory vesicles / no formation of glycoproteins and glycolipids 1

22. Sino-atrial node ; located on the right upper corner ; of the right atrium --- 1 1/2
Generates action potential (70-75 per min); is responsible for initiating ; and maintaining rhythmic contractile activity of heart. 1x3=3

23. A – Gall bladder , B - Duodenum 1

(a)Bile juice emulsifies fat and activates lipase enzyme 1

(b)Bile and Pancreatic juice 1

24. a) Goitre -----1

b) deficiency of iodine in diet leads to hypothyroidism -----1

c) Cause defective development and maturation of the new born; leading to stunted growth, mental retardation , deaf- mutism (any two) -----1 =3

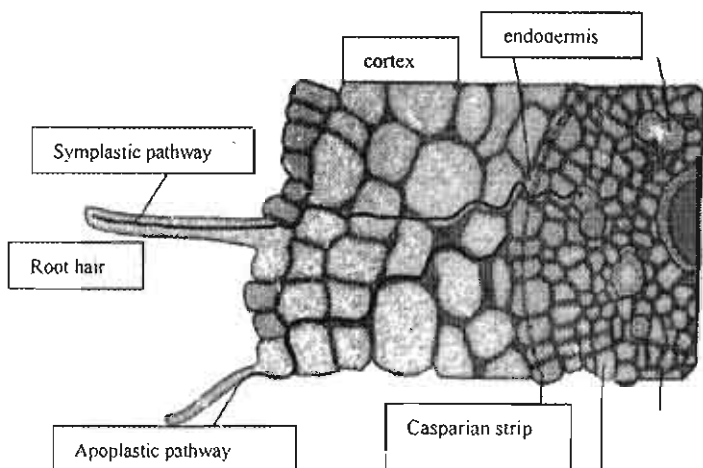
25. Energy currency – readily available form ,of chemical energy for metabolic activities ----- 1

Catabolic pathways lead to release of energy; this energy is stored in the form of chemical bonds ; in certain chemicals such as ATP/GTP ; as and when needed this bond energy can be utilized for performing various life processes. $\frac{1}{2} \times 4 = 2$

26. Nodules-small outgrowths on the roots; they contain bacteria and all the necessary biochemical components for nitrogen fixation; The nodules contain nitrogenase and leg- haemoglobin. ;nitrogenase catalyses the conversion of atmospheric nitrogen into ammonia; it needs anaerobic environment which is provided by leg-haemoglobin-an oxygen scavenger. ----- $\frac{1}{2} \times 6 = 3$

27. Figure--11.7, page185, NCERT TEXTBOOK, correct apoplastic & symplastic pathway -----2

Correct labeling of root hair ,cortex ,endodermis & casparian strip -----1



Section -- D

28. (i) Acids in which carboxyl gp. is attached to R gp having 1-19 carbon atoms 1

unsaturated fatty acids have one or more double bonds between carbon atom/liquid at room temp. ;saturated fatty acids have single bond between carbon atoms/solid at

room temp.

1/2+1/2

ii) NCERT textbook page no.148 figure 9.2 –line structure-----1, molecular structure of either reducing or nonreducing end of poly sachharide chain 1

(OR)

a) NCERT textbook page no.157 figure 9.7(c) ----- 1

With the increase in substrate concentration, the velocity of the enzymatic reaction rises at first ,ultimately reaches a maximum velocity

(V max) which is not exceeded by any further rise in concentration of the substrate because there are no more free enzyme molecules to bind with the additional substrate molecules ----- 1

b) graph is parabola / velocity decreases after attaining maximum value/ velocity is never constant.

1

Each enzyme shows its highest activity at a particular temperature called the optimum temp. ; at low temp. enzyme is inactive ,at high temp. it is denatured-

1/2 +1/2

29.a) filtrate contains all contents of blood plasma except proteins , useful components go back into the blood & nitrogenous wastes are removed 1

b) filtration ---in glomerulus under glomerular blood pressure, filtrate in bowman's capsule 1

reabsorption --in PCT, Henle's loop, DCT & CT ; electrolytes , water & HCO_3^- are reabsorbed

1

secretion---PCT (H^+ , NH_3 , K^+), DCT (H^+ , K^+ , NH_3)

1

C) counter current ; ADH affecting permeability of Henle's loop $\frac{1}{2} + \frac{1}{2}$

(OR)

a) Properly drawn and labelled oxygen dissociation curve 1

sigmoid curve , obtained when percentage saturation of haemoglobin with O_2 is plotted against the pO_2 ., highly useful in studying the effect of different factors on binding of O_2 with haemoglobin.

2

b) high pO_2 , low pCO_2 , lesser H^+ concentration and lower temperature, 2

30.a)

i) plasmolysis/shrinking of protoplasm 1/2

ii) deplasmolysis/protoplasm regains its shape 1

b) flow chart of C₄ cycle / primary CO₂ acceptor is **phosphoenol pyruvate (PEP)**, present in the mesophyll cells, enzyme **PEP carboxylase** catalyses formation of OAA, forms malic acid or aspartic acid, which is transported to the bundle sheath cells, In the bundle sheath cells C₄ acids are broken down to release CO₂, (enters the C₃ or the Calvin pathway), & a 3-carbon molecule (transported back to the mesophyll) where it regenerates PEP

1/2 x 7

= 3 1/2

(OR)

a) i) between triose biphosphate and triose phosphate // phosphoglycerate and phosphoenol pyruvate 1

ii) glucose to glucose 6 phosphate // fructose 6 phosphate to fructose 1,6 biphosphate 1

b) i) by alcoholic fermentation ; producing CO₂, alcohol and NAD⁺ ----- 1/2 x 3

ii) by producing lactic acid by lactate dehydrogenase ; and NAD⁺ ----- 1/2 x 3