

SAMPLE QUESTION PAPER
BIOLOGY (044) THEORY
Class – XII (2012-13)

Time: 3 hrs

MM: 70

Type of question	Mark/Question	Total number of Question	Total Marks
VSA	1	8	8
SA I	2	10	20
SA II	3	9	27
LA (V*)	5	3	15
Total		30	70

S. No.	Unit. No.	Unit Name	Weightage of marks
1	I	Reproduction	14
2	II	Genetic and Evolution	18
3	III	Biology in human welfare	14
4	IV	Biotechnology and its application	10
5	V	Ecology and Environment	14
Total			70

The question paper will include value based question (s)
To the extent of 3-5 marks

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Unit No.	Weightage	LA (No. of questions)	SA II (No. of questions)	SA I (No. of questions)	VSA (No. of questions)
I (Reproduction)	14	5 (1)	3 (2)	2 (1)	1 (1)
II (Genetic and Evolution)	18	5 (1)	3 (2)	2 (3)	1 (1)
III (Biology in human welfare)	14	5 (1)*	3 (2)	2 (1)	1 (1)
IV (Biotechnology and its application)	10		3 (1)	2 (2)	1 (3)
V (Ecology and environment)	14		3 (2)	2 (3)	1 (2)
Total	70	5 (3) = 15	3 (9) = 27	2 (10) = 20	1 (8) = 8

*Value based question

NOTE:

- Value Based Question may be asked from any unit / chapter / topic.
- It will consist of 3 – 5 marks.

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General Instructions:-

- (i) All questions are compulsory
- (ii) This question paper consists of Four Sections A, B, C and D. Section-A consists 8 questions of one mark each. Section-B is of 10 questions of two marks each. Section-C is of 9 questions of three marks each and Section-D is of 3 questions of five marks each.
- (iii) There is no overall choice. However an internal choice has been provided in one question of 2 marks. One question of 3 marks and two questions of 5 marks weightage. A student has to attempt only one of the alternative in such questions.
- (iv) Wherever necessary diagram drawn should be neat and properly labeled

SECTION – A

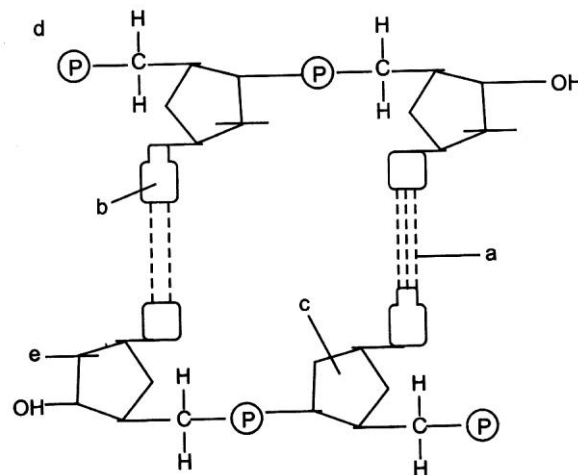
(1 x 8 = 8)

1. The meiocyte of rice has 24 chromosomes how many chromosomes are present in its endosperm?
2. Why do certain genes tend to be inherited together in a cell at the time of cell division?
3. Why do blood pressure and heart rate increase after tobacco consumption?
4. What are sampling ports in a bio-reactor?
5. How do histones acquire positive charge?
6. Provide one sentence information about plasmid with respect to its
 - (a) Chemical nature
 - (b) Its duplication
7. Listed below are a few impurities in urban waste water. Select two colloidal impurities:- ammonia, silt, bacteria, calcium, faecal-matter.
8. Give reasons why measurement of bio-mass in terms of dry weight is more accurate than fresh weight.

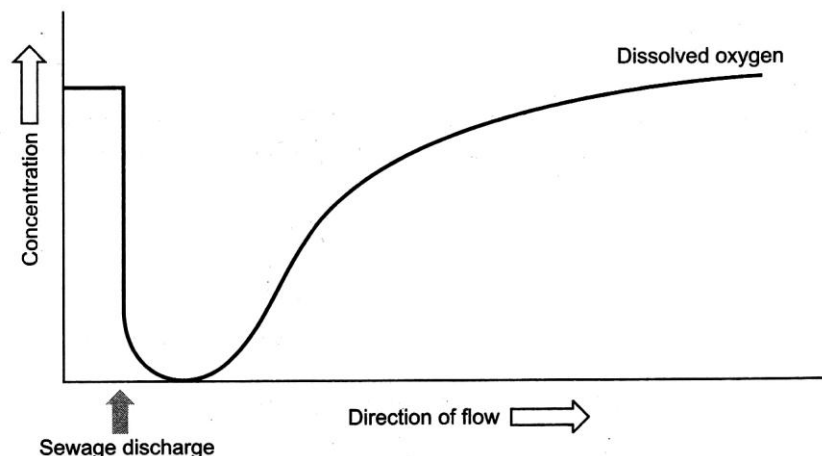
SECTION – B

(2 x 10 = 20)

9. What are the endocrine functions of the placenta?
10. In a cross – between true breeding red flowered snap – dragon and white flowered snap dragon plant, the F₂ phenotypic and genotypic ratio are same. Explain the result with the help of a cross.
11. Discovery of lobe-fins is considered very significant by evolutionary biologists. Explain
12. Study the given portion of double stranded polynucleotide chair carefully. Identify a, b, c and d.



13. Name the three molecular diagnostic techniques that help detect pathogens from suspected patients. Mention one advantage of these techniques over conventional methods.
14. How is a detritivore different from a decomposer? Give one example for each.
15. What is T₁ plasmid? Name the organism where it is found. How does it help in genetic engineering?
16. Study the graph given below. Explain how is oxygen concentration affected in the river when sewage is discharged into it?



17. Name the blank spaced a, b, c and d in the table given below.

Type of microbe	Name	Commercial Provide
Fungus	<u>a</u>	Penicillir
Bacterium	Acetobacter acetic	<u>b</u>
<u>c</u>	Aspergillus riger	Citric acid
Yeast	<u>d</u>	ethanol

18. The species diversity of plants (22%) is much less than that of animals (72%). What could be the explanation to how animals achieved greater diversification?

Or

Among the ecosystem services are control of floods and soil erosion. How is this achieved by the biotic ecoponents of the ecosystem?

SECTION – C

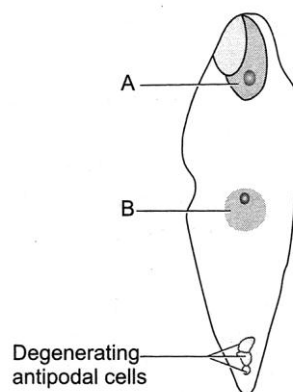
(3 x 9 = 27)

19. What is meant by each of the following:

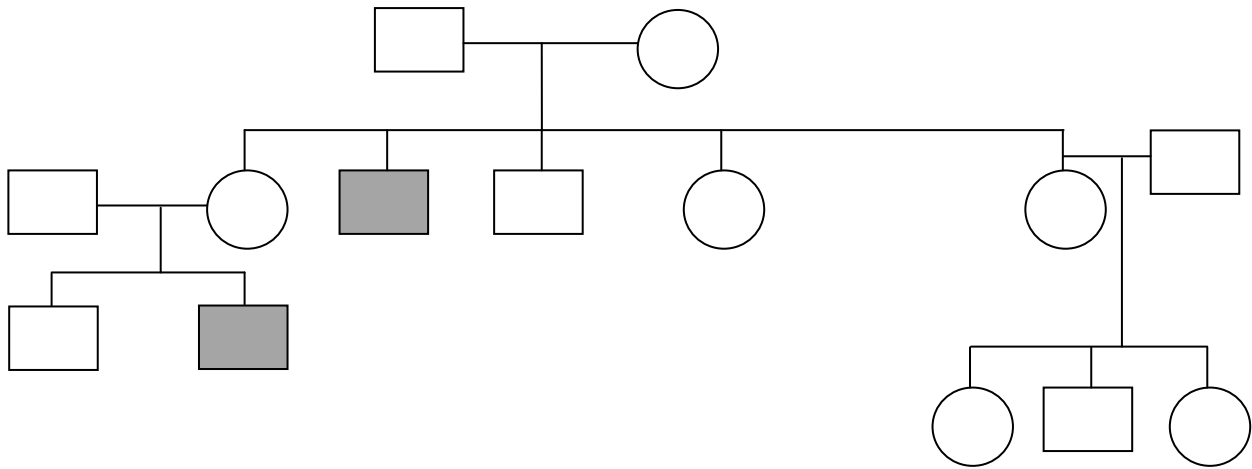
- (i) Primary follicle
- (ii) Secondary follicle
- (iii) Tertiary follicle

Or

- (a) Name the structures which the parts 'A' and B shown in the diagram below respectively develop into
- (b) Explain the process of development which 'B' undergoes in alvuminous and exalbuminous seeds. Give one example of each of these seeds.



20. Haemophilia is a sex-linked inheritance conditions in humans where a simple cut causes non stop bleeding. Study the pedigree chart showing the inheritance of hemophilia in a family. Answer the questions that follow.



Give reasons which explain that hemophilia is

- (i) Sex – linked
 - (ii) Caused by ‘x’ linkadgene
21. (i) Mention the property that enables the explants to regenerate into a new-plant.
(ii) A banana herb is virus – infected, Describe the method that will help in obtaining healthy banana plant from this diseased plant.
22. How do automobiles fitted with catalytic converters reduce air pollution? Suggest the best fuel for such vehicles.
23. An engineered vector for r. DNA technology should have three essential features. What are they? Explain
24. What will happen to an ecosystem if:- (a) all producers are removed; (b) All organisms of herbivore level are eliminated and; (c) All top carnivore population is removed.
25. Describe the technique by which genetic disorder in a developing foetus can be detected? How do people often misuse this technique

Or

- (a) How do plants overcome inbreeding depression?
 - (b) How can seeds be produced without fertilization.
26. (a) List two essential roles of ribosome during translation.
(b) Differentiate between exons and introns.
27. (a) How does our body adapt to low oxygen availability at high attitudes?
(b) Why are small animals rarely found in polar regions?

SECTION – D

28. (a) Give a schematic representation of spermatogenesis in humans.
- (b) Meiotic division during oogenesis is different from that in spermatogenesis. Explain.
- (c) What is spermiogenesis?

Or

- a. Draw a diagram of an enlarged view of T.S. of one microsporangium of an angiosperm and label the following parts.
- (i) Tapetum
 - (ii) Middlelayer
 - (iii) Endothecium
 - (iv) Microspore mother cells
- b. Mention the characteristic features and function of tapetum
- c. Why are pollen grains well preserved as fossils?
- d. People consume pollen tablets?
29. (a) Briefly describe the methodologies in human genome project?
- (b) Which human chromosome was sequenced last?
- (c) Name any 4 non human model organisms whose DNA is sequenced.

Or

Answer the following questions based on Messelson and Stahl's experiment.

- (a) Why did the scientists use $^{15}\text{NH}_4\text{Cl}$ and $^{14}\text{NH}_4\text{Cl}$ as sources of Nitrogen in the culture medium for growing ^{15}N got incorporated into?
 - (b) Name the molecules that ^{15}N got incorporated into?
 - (c) How did they distinguish between ^{15}N labeled molecules from ^{14}N ones?
 - (d) Mention the significance of taking E-coli samples at definite time intervals for observations?
 - (e) Write the conclusion drawn by them at the end of their experiment.
30. Sukesh is an adolescent who accidentally got into a quagmire of drugs. His parents took him to a counsellor. Imagine that you are a counselor, how will you tackle the situation? Why do you think that adolescents easily get into the quagmire of drugs?

ANSWER KEY

Q. No.	Value Points	Marks	Total
SECTION – A (1 x 8 = 8)			
1.	$2n = 24, n = 12$ Endosperm = $3n$ $3 \times 12 = 36$	1	1
2.	These genes are linked genes	1	1
3.	Nicotine stimulates adrenal gland to release adrenaline and non adrenaline into blood circulation	$\frac{1}{2}$ $\frac{1}{2}$	1
4.	To periodically withdraw small volumes of the culture	1	1
5.	Histones are rich in basic amino acid residues eg: lysine which carry positive charge in their side chains	$\frac{1}{2}$ $\frac{1}{2}$	1
6.	Plasmid is a circular DNA molecule capable of undergoing replication independent of DNA in the nucleoid region	$\frac{1}{2}$ $\frac{1}{2}$	1
7.	Faecal matter and Bacteria	$\frac{1}{2} + \frac{1}{2}$	1
8.	Dry weight is total amount of living (or) organic matter in a trophic level / organism after water is removed. Hence it is more accurate	1	1
SECTION – B (2 x 10 = 20)			
9.	Placenta produces hCG, hPL, estrogens and progestogens	$\frac{1}{2} \times 4$	2
10.	Incomplete dominance explanation cross $RR \times rr$ Rr $Rr \times Rr - F_2$ ratio 1:2:1	1 1	 2

11.	Lobe-fins evolved into first amphibians that lived on both land and water. 1938, a fish caught in South Africa was a coelacanth. Which was thought to be extinct these animals are called lobefins	1 1	2			
12.	a. Hydrogen bonds b. Purines c. Pentose sugar d. 5 ¹ - end	$\frac{1}{2} \times 4$	2			
13.	Recombinant DNA technology, Polymerase chain Reaction (PCR) Enzyme Linked immune sorbent Assay (EUSA) Helps in early diagnosis (ie) detects disease even when the concentration of pathogen is very low, even when the symptoms of the disease are not visible	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2			
14.	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> DETRITIVORE Break down Detritus into Smaller particles Called fragmentation Eg: Earthworm </td> <td style="width: 5%; border-left: 1px solid black; border-right: 1px solid black;"></td> <td style="width: 45%; vertical-align: top;"> DECOMPOSER Enzymes degrade detritus into Simple inorganic Substances (Catabolish) Bacteria, Fungi </td> </tr> </table>	DETRITIVORE Break down Detritus into Smaller particles Called fragmentation Eg: Earthworm		DECOMPOSER Enzymes degrade detritus into Simple inorganic Substances (Catabolish) Bacteria, Fungi	$\frac{1}{2} + \frac{1}{2} = 1$ $\frac{1}{2} + \frac{1}{2} = 1$	2
DETRITIVORE Break down Detritus into Smaller particles Called fragmentation Eg: Earthworm		DECOMPOSER Enzymes degrade detritus into Simple inorganic Substances (Catabolish) Bacteria, Fungi				
15.	Tumor Inducing Plasmid of the soil – bacterium Agrobacterium tumefaciens. Modified T ₂ Plasmid – (disarmed) used as cloning vectors to deliver gene of interest into a variety of plants	1 1	2			
16.	O ₂ concentration declines. Sharply – large amount of O ₂ is consumed by aerobic microorganisms in river to decompose organic matter. Organic matter reduces, the amount of DO again increases	1 1 1	3			

17.	a. Penicillium notatum b. Acetic acid c. A fungus d. Saccharmyces cerevisiae	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
18.	Animals – mobile – move away from predators and unfavourable events. Plants are fixed require fewer adaptations – show lesser diversity. Animalst well developed rervous system – receive stimuli and respond plants do not have any such mechanism. Or Plants – roots hold Soil Particles - explain litter and humus – retains water - explain	$1\frac{1}{2}$ $1\frac{1}{2}$ $1\frac{1}{2}$ $1\frac{1}{2}$	3 3
SECTION – C (3 x 9 = 27)			
19.	a. Primary oocyte gets surrounded by a layer of granulosa cells – now called Primary follicle. b. Primary follicle gets surrounded by more layers of granulosa cells and a new theca called secondary follicle. c. Tertiary follicle – fluid filled cavity antrum – inner theca interna and outer theca externa. Or A develops into embryo B develops into endosperm Endosperm = development and example (any one)	1 1 1 1 1 2	3 3
20.	a. Transmission from unaffected carrier female to some of the male progeny. b. Heterozygous (carrier) female transmit the disease to the sons. c. Female becomes haemophilic – if mother (carrier), father (haemophilic)	1 1 1	3
21.	Totipotency - explanation Meristem culture - explanation NCERT: Text page - 177, para 9-.4	$1\frac{1}{2}$ $1\frac{1}{2}$	3

22.	NCERT: Text page – 272. Catalytic comerters – expensive Metals – platinum, palladium, Rhodium – catalyst to reduce emission - Unburnt HC’s converted into CO ₂ , H ₂ O, CO, Nitric oxide N ₂ and CO ₂ Unleaded Petrol lead in Petrol inactivates the catalyst.	2	
		1	3
23.	NCERT – Page 198 – Para: 11.2.2 Cloning Vectors – features – Origin of replication - explanation Selectable marker - explanation Cloning Sites - Explanation	1 1 1	3
24.	a. Reduction in Primary Productivity and biomass of producers. No biomass available for transfer to next higher tropic levels. b. Increase in Primary productivity and biomass of producers. Carnivore population will dwindle. c. Overgrazing leading to desertification	1 1 1	3
25.	Amino centesis – explanation NCERT – Text Page No: 58 To determine sex of the foetus – female foeticide Or a. Out breeding devices. (Page - 31) any 4 methods b. Apomicts (Page - 38)	2 1 $\frac{1}{2} \times 4 = 2$ 1	3 3
26.	Ribosome consists of structured RNAS and 80 different proteins. Site for amino acid birding and acts as an enzyme for the formation of peptide for the formation of peptide bond (Page - 115). Coding sequences – exons. Intervening Sequences found in hn RNA does not applar in processed RNA, removed by splicing	2 1	3

27.	<p>a. Increased RBC production Decreasing binding capacity of haemoglobin Increasing breathing rate</p> <p>b. Heat loss or heat gain is a function of surface area Small animals – large surface area relative to volume Lose body heat fast – have to expend more energy through metabolism</p>	<p>$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$</p>	3
SECTION – D (5 x 3 = 15)			
28.	<p>Figure: 3.8, Page: 49 Primary From one spermatocyte - 4 spermatids - explanation From one Primary oocyte – 1 ova, polarbody formation ... Spermatids are transformed into spermatozoa</p> <p style="text-align: center;">Or</p> <p>a. Figure – 2.3 (b), Page – 22</p> <p>b. Dense cytoplasm, more than one nucleus, nourishes developing pollen – grains Exine – Sporollenin – no enzyme can degrade it Rich in nutrients increase performance of athletes</p>	<p>2 2 1 2 1 1 1</p>	5 5
29.	<p>Page – 118, 119. Expressed Sequence tags sequence annotation (Explanation) Sequence of Chromosome – 1 Was completed by My 2006 Bacteria – Yeast Carenortabditis elegans Drosophila Plants (rice, Arabidopsis) any 4</p>	<p>2 1 $\frac{1}{2} \times 4 = 2$</p>	5

	Or		
	a. Nitrogen got incorporated into newly synthesized DNA.	1	
	b. DNA, Proteins, nucleic acid	1	
	c. Based on centrifugation in cesium chloride.....	1	
	d. To study the cells as they multiplied and extracted DNA that remained as helices	1	
	e. Page – 105, Point (iii) – DNA replication is semiconservative	1	5
30.	Value based. Questions. Refer to Page – 162, Para: 8.5.4 – Prevention and control 5 Points	5	5