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

Time: 3 hrs

<table>
<thead>
<tr>
<th>Type of question</th>
<th>Mark/Question</th>
<th>Total number of Question</th>
<th>Total Marks</th>
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<tr>
<td>VSA</td>
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<td>SA I</td>
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<tr>
<th>S. No.</th>
<th>Unit. No.</th>
<th>Unit Name</th>
<th>Weightage of marks</th>
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<tr>
<td>1</td>
<td>I</td>
<td>Reproduction</td>
<td>14</td>
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<tr>
<td>2</td>
<td>II</td>
<td>Genetic and Evolution</td>
<td>18</td>
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<tr>
<td>3</td>
<td>III</td>
<td>Biology in human welfare</td>
<td>14</td>
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<tr>
<td>4</td>
<td>IV</td>
<td>Biotechnology and its application</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>V</td>
<td>Ecology and Environment</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>70</td>
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The question paper will include value based question (s)
To the extent of 3-5 marks
SAMPLE QUESTION PAPER  
BIOLOGY (044) THEORY  
Class – XII (2012-13)  

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<table>
<thead>
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<th>Unit No.</th>
<th>Weightage</th>
<th>LA (No. of questions)</th>
<th>SA II (No. of questions)</th>
<th>SA I (No. of questions)</th>
<th>VSA (No. of questions)</th>
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<tbody>
<tr>
<td>I (Reproduction)</td>
<td>14</td>
<td>5 (1)</td>
<td>3 (2)</td>
<td>2 (1)</td>
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<tr>
<td>II (Genetic and Evolution)</td>
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<td>5 (1)</td>
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<td>III (Biology in human welfare)</td>
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<tr>
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<td>70</td>
<td>5 (3) = 15</td>
<td>3 (9) = 27</td>
<td>2 (10) = 20</td>
<td>1 (8) = 8</td>
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</table>

*Value based question

NOTE:  
- Value Based Question may be asked from any unit / chapter / topic.  
- It will consist of 3 – 5 marks.
SAMPLE QUESTION PAPER
BIOLOGY (044) THEORY
Class – XII

Time: 3 hrs
MM: 70

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.
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 chain carefully. Identity 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.

<table>
<thead>
<tr>
<th>Type of microbe</th>
<th>Name</th>
<th>Commercial Provide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungus</td>
<td>a</td>
<td>Penicillir</td>
</tr>
<tr>
<td>Bacterium</td>
<td>Acetobacter acetic</td>
<td>b</td>
</tr>
<tr>
<td>Yeast</td>
<td>Aspergillus riger</td>
<td>Citric acid</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>Citric acid</td>
</tr>
</tbody>
</table>

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 condition 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.

![Pedigree Chart]

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 7.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 meselson and stans experiment.

(a) Why did the scientists used $^{15}$NH$_4$Cl and $^{14}$NH$_4$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 $^{15}$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 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?
<table>
<thead>
<tr>
<th>Q. No.</th>
<th>Value Points</th>
<th>Marks</th>
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<tr>
<td><strong>SECTION – A (1 x 8 = 8)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1.</td>
<td>$2n = 24, n = 12$</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Endosperm = $3n$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$3 \times 12 = 36$</td>
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<tr>
<td>2.</td>
<td>These genes are linked genes</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>
| 3.    | Nicotine stimulates adrenal gland to release adrenaline and non adrenaline into blood circulation
|       | $\frac{1}{2}$                                                                |       | 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
|       | $\frac{1}{2}$                                                                |       | 1     |
| 6.    | Plasmid is a circular DNA molecule capable of undergoing replication independent of DNA in the nucleoid region
|       | $\frac{1}{2}$                                                                |       | 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 tropic 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 x rr
|       | $Rr$
|       | $Rr \times Rr – F_2$ ratio 1:2:1                                              | 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 lobe-fins.

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</tbody>
</table>

12. a. Hydrogen bonds  
b. Purines  
c. Pentose sugar  
d. 5' - end

½ x 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

½  2

14. DETRITUVORE | DECOMPOSER
---|---
Break down | Enzymes
Detritus into | degrade
Smaller particles | detritus into
Called fragmentation | Simple inorganic Substances (Catabolish)
Eg: Earthworn | Bacteria, Fungi

½ + ½ = 1  2

15. Tumor Inducing Plasmid of the soil – bacterium Agrobacterium tumefaciens.

Modified T₃ Plasmid – (disarmed) used as cloning vectors to deliver gene of interest into a variety of plants

1  2

16. O₂ concentration declines.

Sharply – large amount of O₂ is consumed by aerobic microorganisms in river to decompose organic matter.

Organic matter reduces, the amount of DO again increases

1  3
17. a. *Penicillium notatum*  
b. *Acetic acid*  
c. A fungus  
d. *Saccharomyces cerevisiae*  

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<th>½</th>
<th>½</th>
<th>½</th>
<th>½</th>
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</table>

18. Animals – mobile – move away from predators and unfavourable events. Plants are fixed require fewer adaptations – show lesser diversity.  
Animalst well developed nervous 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  

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<th>½</th>
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</table>

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 | 2 | 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  

<p>|   | ½ | ½ | 3 | 3 |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Text Page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.</td>
<td></td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td></td>
<td>Ribosome consists of structured RNAs and 80 different proteins. Site for amino acid binding 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 apply in processed RNA, removed by splicing</td>
<td></td>
</tr>
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</table>
### SECTION – D (5 x 3 = 15)

**28.** Figure: 3.8, Page: 49

**Primary**

- From one spermatocyte - 4 spermatids - explanation  
  2
- From one Primary oocyte – 1 ova, polarbody formation …  
  1  5

Spermatids are transformed into spermatozooa

Or

- a. Figure – 2.3 (b), Page – 22  
  2

- b. Dense cytoplasm, more than one nucleus, nourishes developing pollen – grains  
  1

Exine – Sporollenin – no enzyme can degrade it  
  1  5

Rich in nutrients increase performance of athletes  
  1

**29.** Page – 118, 119.

Expressed Sequence tags sequence annotation (Explanation)  
  2

Sequence of Chromosome – 1  
  1

Was completed by My 2006  
  1

Bacteria – Yeast  
Carenortabditis elegans  
Drosophila Plants (rice, Arabidopsis) any 4  
  1/2 x 4 = 2  5
Or

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>a. Nitrogen got incorporated into newly synthesized DNA.</td>
<td>1</td>
</tr>
<tr>
<td>b. DNA, Proteins, nucleic acid</td>
<td>1</td>
</tr>
<tr>
<td>c. Based on centrifugation in cesium chloride…..</td>
<td>1</td>
</tr>
<tr>
<td>d. To study the cells as they multiplied and extracted DNA that remained as helices</td>
<td>1</td>
</tr>
<tr>
<td>e. Page – 105, Point (iii) – DNA replication is seniconservative</td>
<td>1</td>
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Refer to Page – 162, Para: 8.5.4 – Prevention and control
5 Points

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<tr>
<td></td>
<td>5</td>
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5 Points