

**NAVODAYA VIDYALAYA SAMITI**

**PRE-BOARD-II (2022-23)**

**CLASS XII**

**BIOLOGY (044)**

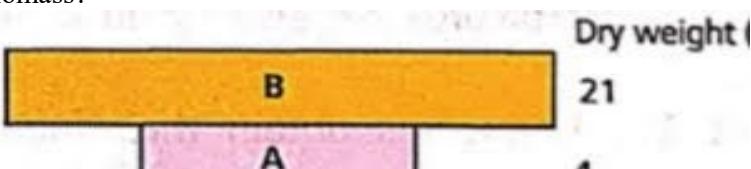
Maximum Marks: 70

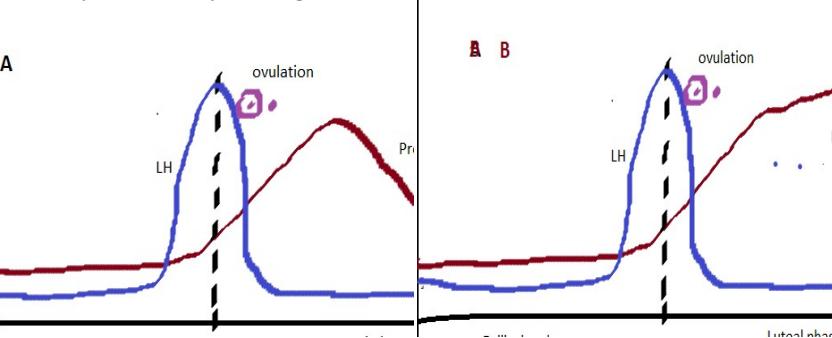
Time: 3 hours

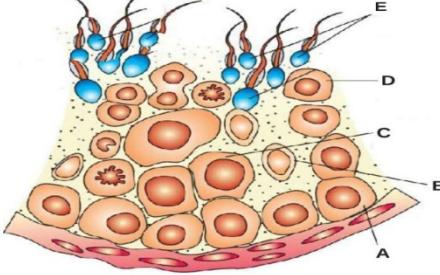
**General Instructions:**

- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
- (iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (v) Wherever necessary, neat and properly labeled diagrams should be drawn.

<b>SECTION-A</b>				<b>MARKS</b>																				
<b>Q. No.</b>	<b>QUESTION</b>																							
1.	The use of Intra Uterine Devices (IUDs) is effective and popular contraceptive method. Which of the following statement is incorrect about IUDs? (a) IUDs increase phagocytosis of sperms within the uterus. (b) The hormone releasing IUDs, make the uterus unsuitable for implantation and the cervix hostile to the sperms. (c) It is not a widely accepted method of contraception in India. (d) IUDs are ideal contraceptives for the females who want to delay pregnancy and/or space children.			1																				
2.	Given below are four assisted reproductive technologies (ART) and their procedure. Select the correct match: <table border="1"><thead><tr><th>S. No.</th><th>ART</th><th>S. No.</th><th>Procedure</th></tr></thead><tbody><tr><td>a)</td><td>ZIFT</td><td>i</td><td>A sperm is directly injected into the ovum.</td></tr><tr><td>b)</td><td>IUT</td><td>ii</td><td>The zygote or early embryos (with upto 8 blastomeres) could then be transferred into the fallopian tube.</td></tr><tr><td>c)</td><td>GIFT</td><td>iii</td><td>The embryos with more than 8 blastomeres, into the uterus.</td></tr><tr><td>d)</td><td>ICSI</td><td>iv</td><td>Transfer of an ovum collected from a donor into the fallopian tube of another female.</td></tr></tbody></table> (a) a)–(i) b)–(ii) c)– (iii) d)–(iv) (b) a)–(ii) b)–(iii) c)–(iv) d) – (i) (c) a)–(iii) b)–(iv) c)–(ii) d)–(i) (d) a)–(iv) b)–(i) c)– (iii) d)–(ii)	S. No.	ART	S. No.	Procedure	a)	ZIFT	i	A sperm is directly injected into the ovum.	b)	IUT	ii	The zygote or early embryos (with upto 8 blastomeres) could then be transferred into the fallopian tube.	c)	GIFT	iii	The embryos with more than 8 blastomeres, into the uterus.	d)	ICSI	iv	Transfer of an ovum collected from a donor into the fallopian tube of another female.			1
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3.	The story of origin of life and evolution of life forms seems fascinating. In the line of evolutionary history the first mammals were- (a) Like shrews and more intelligent in sensing and avoiding danger. (b) Like arboreal and more intelligent in sensing and avoiding danger. (c) Like shrews and not much intelligent in sensing and avoiding danger. (d) Like arboreal and more intelligent in sensing and avoiding danger.	1
4.	Deoxyribonucleoside triphosphates serve dual purposes in the process of DNA replication are- (a) They provide energy and act as substrate for polymerization. (b) They provide primer and energy for polymerization. (c) They provide energy and act as template for polymerization. (d) They provide primer and act as template for polymerization.	1
5.	Which of the following is used to get rid of mosquitoes? (a) Ladybird (b) Dragonflies (c) Trichoderma (d) Clostridium	1
6.	Mr. Rakesh has been suffering with fever and coughs for a week and now his lips and finger nails are appearing gray to bluish in colour. He might be suffering with- (a) Common cold. (b) Typhoid (c) Pneumonia (d) Malaria	1
7.	Penicillin was the first antibiotic to be discovered. Who among following established its full potential as an effective antibiotic? (a) Alexander Fleming (b) Watson and crick (c) Chain and Florey (d) Meselson and stahl	1
8.	Which of the following term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment? (a) Biopiracy (b) Biopatent (c) Biotechnology (d) Biological ethics	1
9.	What is the main reason why very small animals are rarely found in polar regions? (a) Small animals have a larger surface area relative to their volume. (b) Small animals have a smaller surface area relative to their volume. (c) They tend to lose body heat very slow when it is cold outside. (d) They have to expend less energy to generate body heat through metabolism.	1
10.	Sachin was observing pyramids of biomass for different ecosystems. During his observations he found an unusual shape of pyramid of biomass, which is represented in below figure. Which among the following is type of ecosystem has such pyramid for biomass?  (a) Forest	1

	(b) Grassland (c) Pond (d) None of the above	
11.	Which of the following fishes led to the extinction due to introduction of the Nile perch into Lake Victoria? (a) Coelacanth (b) Cardinal fish (c) Capelin (d) Cichlid	1
12.	Which of the following term correctly describe the process of degradation detritus into simpler inorganic substances bacterial and fungal enzymes? (a) Humification (b) Catabolism (c) Fragmentation (d) Leaching	1
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true and R is not the correct explanation of A. C. A is true but R is false. D. A is False but R is true.	
13	Assertion: It has become a fashion in recent years to use pollen tablets as food supplements. Reason: Pollen grains are rich in nutrients	1
14	Assertion: Our body encounters a pathogen for the first time it produces a response called primary response which is of highly intensified. Subsequent encounter with the same pathogen elicits a low intensity secondary response. Reason: Acquired immunity is characterised by memory.	1
15	Assertion: The darkness or lightness of the skin in an individual is determined by the number of each type of alleles in the genotype. Reason: Polygenic inheritance is regulation of multiple phenotypic expressions by single gene.	1
16	Assertion: Commensalism is the interaction in which one species benefits and the other is neither harmed nor benefited. Reason: Predators in nature are ‘prudent’.	1
	SECTION-B	
17	In the figure given below, figure A and B show the level of hormones in two menstrual cycles. Study the figure and answer the questions that follow:  	2

	<p>i) Which among the given pictures reflects pregnancy?      ii) State the impact of the progesterone hormones in pictures A and B on the uterus of the human female.</p>	
18.	The child has a blood group of O. If the father has blood group A and mother has blood group B, work out the genotypes of the parents and the possible genotypes of the other Offspring.	2
19.	A farmer is advised to add a culture of microorganisms in the soil before sowing the paddy crop. Name the microorganisms which can be helpful for farmer. How these microbes useful to the crop?	2
20.	(i) Name the enzyme used for PCR and why? (ii) What is the source of the enzyme used in PCR?	2
21.	<p>(i) Relationship between organisms is expressed in terms of number, biomass or energy by ecological pyramids. Which type of ecological pyramid is always upright?      (ii) What are limitations of ecological pyramids?</p> <p><b>OR</b></p> <p>(i) Draw a pyramid of numbers where a large number of insects are feeding on the leaves of a tree. What is the shape of this pyramid?      (ii) Will the pyramid of energy be also of the same shape in this situation? Give reason for your response.</p>	2
SECTION-C		
22.	<p>(i) Name the structure which represents male gametophytes in plants.      (ii) Describe stages of a microspore maturing into a pollen grain with help of suitable diagrams.</p>	3
23.	<p>(i) Observe the diagrammatic sectional view of a seminiferous tubule given below and identify parts labeled A to E.      (ii) Name the cell where sperm heads become embedded after spermiogenesis.</p> 	3
24.	<p>(i) Mention the various levels where regulation of gene expression can be exerted in eukaryotes.      (ii) What is the predominant site for control of gene expression in prokaryotes?</p>	3
25.	A gene locus has two alleles A and a. If the frequency of dominant allele A is 0.4, then find the number of homozygous dominant, heterozygous and homozygous recessive individuals in the population of 1000 individuals.	3
26.	<p>Name the non-specific type of defence, which is present at the time of birth. This is accomplished by providing different types of barriers to the entry of the foreign agents into our body. What are these barriers? Mention.</p> <p><b>OR</b></p> <p>(i) Differentiate between two different types of tumours? Which one is lethal and why?      (ii) Mention any two common approaches for treatment of cancer.</p>	3

27.	Describe steps in formation of recombinant DNA by action of restriction endonuclease enzyme – EcoRI	3																
28.	(i) India has greater ecosystem diversity than Norway. Do you agree with the statement? Give reasons in support of your answer. (ii) Many plant and animal species are on the verge of their extinction because of loss of forest land by indiscriminate use by the humans. As a biology student what method would you suggest along with its advantages that can protect such threatened species from getting extinct?	3																
<b>SECTION-D</b>																		
	Q.no 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart.																	
29.	<p>In a plant, three dominant independently assorting genes A, B and C are essential for production of purple pigment. If any of the genes or all three genes are present in recessive condition then flower is colourless.</p> <p>Raw material →X→Y→Z pigment</p> <p>(i) On the basis of above paragraph, what will be genotype and colour of flowers in F1 generation when a purple plant with genotype AABBCC crossed with a colourless plant with genotype aabbcc.</p> <p>(ii) On selfing of F1, what will be the proportion of coloured offspring in F2?</p> <p>(iii) How many combinations of gametes will be produced by an organism with AaBBCc genotype?</p> <p>OR</p> <p>Grain colour in wheat is determined by three pairs of polygenes. Following the cross AABBCC (dark colour) x aabbcc (light colour), how many plants will be produced with the genotype AABBCC?</p>	4																
30.	<p>The data given below representing the prevalence of Drug abuse among adolescence.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Drug category</th><th>World</th><th>Asia</th><th>India</th></tr> </thead> <tbody> <tr> <td>Opiods</td><td>0.70%</td><td>0.48%</td><td>1.2%</td></tr> <tr> <td>Cannabis</td><td>3.8%</td><td>2.1%</td><td>1.20%</td></tr> <tr> <td>Cacaine</td><td>0.35%</td><td>0.04%</td><td>0.09%</td></tr> </tbody> </table> <p>(i) With reference to above data name the source of drug which is most prevalent in India. (ii) Which drug abuse is least prevalent in Asia? What could be the effect of excessive dosage of it? (iii) What are common causes, which motivates youngsters towards drug? OR (iii) Mention the measures which would be particularly useful for prevention and control of alcohol and drugs abuse among adolescents.</p>	Drug category	World	Asia	India	Opiods	0.70%	0.48%	1.2%	Cannabis	3.8%	2.1%	1.20%	Cacaine	0.35%	0.04%	0.09%	4
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	<b>SECTION-E</b>																	
31.	What is Oogenesis? Describe the process of Oogenesis in human female. OR Trace the stages in embryo development in dicots.	5																
32.	(i) Describe the structure and function of a tRNA molecule. Why is it referred to as an adapter molecule?	5																

	<p>(ii) Explain the process of splicing of hnRNA in a eukaryotic cell.</p> <p>OR</p> <p>Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follows</p> <table border="1" data-bbox="306 424 1307 466"> <tr> <td>P</td><td>i</td><td>P</td><td>O</td><td>z</td><td>y</td><td>a</td></tr> </table> <p>(i) Identify and name the regulatory gene in this operon. Explain its role in switching off the operon.</p> <p>(ii) Why is lac operon's regulation referred to as negative regulation?</p> <p>(iii) Name the inducer molecule and the products of the genes z and y of the operon. Write the function of these gene products.</p>	P	i	P	O	z	y	a	
P	i	P	O	z	y	a			
33.	<p>(i) Why is the introduction of genetically engineered lymphocytes into an ADA deficiency patient not a permanent cure? Suggest a possible permanent cure.</p> <p>(ii) Why do lepidopterans die when they feed on Bt cotton plant? Explain how it happens</p> <p>(iii) Anmol's father requested to the farmer's in his village to stop using chemical fertilisers in crop fields. Was he correct? Give reason.</p> <p>OR</p> <p>(i) State the role of transposons in silencing of mRNA in eukaryotic cells.</p> <p>(ii) Suggest any two possible treatments that can be given to patient exhibiting adenosine deaminase deficiency.</p> <p>(iii) Name the source organism of the gene cry IAc and its target pest.</p> <p>(iv) Why is molecular diagnosis preferred over conventional methods? Name any two techniques giving one use of each.</p>	5							