

MODEL EXAMINATION

BIOLOGY (044) - CLASS XII

Maximum Marks: 70

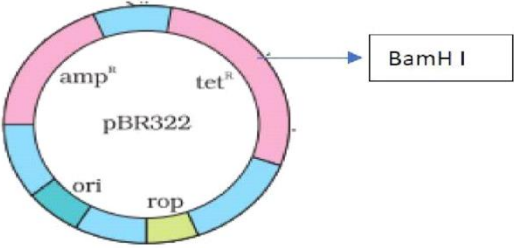
Time: 3 hours

General Instructions:

- All questions are compulsory.
- The question paper has five sections and 33 questions. All questions are compulsory.
- 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;
- Section–E has 3 questions of 5 marks each.
- 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.
- Wherever necessary, neat and properly labeled diagrams should be drawn.

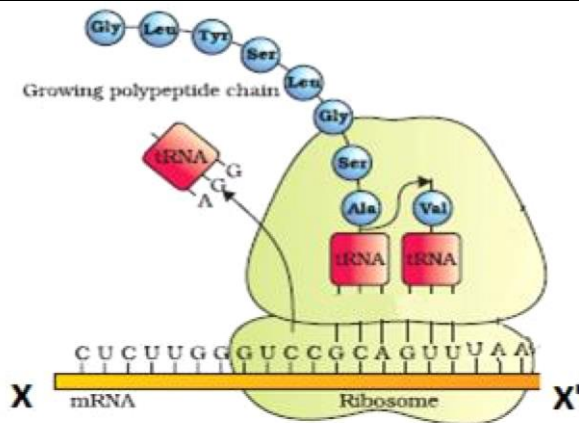
SECTION - A

1. The correct sequence of hormone secretion from beginning of mensuration is
- FSH, progesterone, oestrogen
 - Oestrogen, FSH, progesterone
 - FSH, oestrogen, progesterone
 - Oestrogen, progesterone, FSH
2. Given below are four contraceptive methods and their modes of action. Select the correct match:
- | <i>S. No.</i> | <i>Method</i> | <i>S. No</i> | <i>Mode of action</i> |
|---------------|---------------|--------------|---------------------------------------|
| a) | Condom | (i) | Ovum not able to reach Fallopian tube |
| b) | Vasectomy | (ii) | Prevents ovulation |
| c) | Pill | (iii) | Prevents sperm reaching the cervix |
| d) | Tubectomy | (iv) | Semen contains no sperms |
- a)–(i) b)–(ii) c)– (iii) d)–(iv)
a)–(ii) b)–(iii) c)–(iii) d) – (i)
a)–(iii) b)–(iv) c)–(ii) d)–(i)
a)–(iv) b)–(i) c)– (iii) d)–(ii)
3. A DNA molecule is 160 base pairs long. If it has 20% adenine, how many cytosine bases are present in this molecule?
- 48
 - 48
 - 96
 - 192
4. Which theory arguments that on the earth came from outer space?
- Theory of panspermia.
 - Theory of special creation.
 - Theory catastrophism.
 - All of the above.

5.	<p>Which of the following is correct match?</p> <p>(a) Reserpine -Tranquilise</p> <p>(b) Cocaine -Optic narcotic</p> <p>(c) Morphine –Hallucinogenic</p> <p>(d) Bhang -Analgesic</p>															
6.	<p>An antiviral protein released from infected and dying cell is</p> <p>(a) Antigen</p> <p>(b) Antiserum</p> <p>(c) Antibody</p> <p>(d) interferons</p>															
7.	<p>Which of the following water samples in the table given below, will have a higher concentration of organic matter?</p> <table border="1"> <thead> <tr> <th>Water Sample</th> <th>Level of pollution</th> <th>Value of BOD</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>High</td> <td>High</td> </tr> <tr> <td>(b)</td> <td>Low</td> <td>Low</td> </tr> <tr> <td>(c)</td> <td>Low</td> <td>High</td> </tr> <tr> <td>(d)</td> <td>High</td> <td>Low</td> </tr> </tbody> </table>	Water Sample	Level of pollution	Value of BOD	(a)	High	High	(b)	Low	Low	(c)	Low	High	(d)	High	Low
Water Sample	Level of pollution	Value of BOD														
(a)	High	High														
(b)	Low	Low														
(c)	Low	High														
(d)	High	Low														
8.	<p>The figure below shows the structure of a plasmid.</p>  <p>A foreign DNA was ligated at BamH1. The transformants were then grown in a medium containing antibiotics tetracycline and ampicillin.</p> <p>Choose the correct observation for the growth of bacterial colonies from the given table</p> <table border="1"> <thead> <tr> <th></th> <th>Medium with Tetracycline</th> <th>Medium with Ampicillin</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>Growth</td> <td>No growth</td> </tr> <tr> <td>(b)</td> <td>No growth</td> <td>Growth</td> </tr> <tr> <td>(c)</td> <td>No growth</td> <td>No Growth</td> </tr> <tr> <td>(d)</td> <td>Growth</td> <td>Growth</td> </tr> </tbody> </table>		Medium with Tetracycline	Medium with Ampicillin	(a)	Growth	No growth	(b)	No growth	Growth	(c)	No growth	No Growth	(d)	Growth	Growth
	Medium with Tetracycline	Medium with Ampicillin														
(a)	Growth	No growth														
(b)	No growth	Growth														
(c)	No growth	No Growth														
(d)	Growth	Growth														
9.	<p>Swathi was growing a bacterial colony in a culture flask under ideal laboratory conditions where the resources are replenished. Which of the following equations will represent the growth in this case?</p> <p>(Where population size is N, birth rate is b, death rate is d, unit time period is t, and carrying capacity is K).</p> <p>(a) $dN/dt = KN$</p>															

	<p>(b) $dN/dt = r N$ (c) $dN/dt = r N(K-N/K)$ (d) $dN/dt = r N(K+N/K)$</p>										
10.	<p>Sea Anemone gets attached to the surface of the hermit crab. The kind of population interaction exhibited in this case is</p> <p>(a) amensalism. (b) commensalism. (c) mutualism. (d) parasitism.</p>										
11.	<p>Which of the following food chains is the major conduit for energy flow in terrestrial and aquatic ecosystems respectively?</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left;"><i>Terrestrial Ecosystem</i></th> <th style="text-align: left;"><i>Aquatic Ecosystem</i></th> </tr> </thead> <tbody> <tr> <td>(a) Grazing</td> <td>Grazing</td> </tr> <tr> <td>(b) Detritus</td> <td>Detritus</td> </tr> <tr> <td>(c) Detritus</td> <td>Grazing</td> </tr> <tr> <td>(d) Grazing</td> <td>Detritus</td> </tr> </tbody> </table>	<i>Terrestrial Ecosystem</i>	<i>Aquatic Ecosystem</i>	(a) Grazing	Grazing	(b) Detritus	Detritus	(c) Detritus	Grazing	(d) Grazing	Detritus
<i>Terrestrial Ecosystem</i>	<i>Aquatic Ecosystem</i>										
(a) Grazing	Grazing										
(b) Detritus	Detritus										
(c) Detritus	Grazing										
(d) Grazing	Detritus										
12	<p>Which of the following is an example of ex situ conservation?</p> <p>(a) Sacred Groves (b) National Park (c) Biosphere Reserve (d) Seed Bank</p>										
<p>Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</p> <ul style="list-style-type: none"> • Both A and R are true and R is the correct explanation of A. • Both A and R are true and R is not the correct explanation of A. • A is true but R is false. • Both A and R are false. 											
13.	<p>Assertion: Megaspore mother cell undergoes meiosis to produce four megaspores. Reason: Megaspore mother cell and megaspore both are haploid.</p>										
14.	<p>Assertion: In codominance, the F1-generation resembles both the parents. Reason: An example is different types of red blood cells that determine ABO blood grouping in humans.</p>										
15.	<p>Assertion: Antibody mediated immune response is provided by B-cell. Reason: B-cells work chiefly by secreting substances called antibodies into the body fluids.</p>										
16.	<p>Assertion: Fig species and wasp have a tight relationship. Reason: Angiosperms and insects are co-evolved to perform a plant pollinator interaction.</p>										
SECTION - B											
17.	<p>Given below is an incomplete flow chart showing influence of hormone on gametogenesis in male, observe the flow chart carefully and fill in the</p>										

	<p>blank A, B, C and D.</p> <pre> graph TD Pituitary --> ICSH Pituitary --> FSH ICSH --> Leydig_cell[Leydig cell] Leydig_cell --> A A --> B FSH --> C C --> Factor_Stimulates[Factor Stimulates] Factor_Stimulates --> D </pre> <p>Labels in diagram: - Leydig cell: Name of cell - A: Name of hormone - B: Name of process - C: Name the cell - D: Name the process</p>
18.	A man with blood group AB and his wife with blood group O claim a child with blood group O as their son. Justify with the help of Punnett square whether it is possible or not.
19	Mention one application for each of the following: (i) Passive immunization (ii) Antihistamine (iii) Colostrum (iv) Cytokinin barrier
20	Identify the untranslated region from the following mRNA and mention their location. 5'-ACGUCGAUGGCGUUUUAGGAGGAA-3'
21	<p>Given below is a pyramid of biomass in an ecosystem where each bar represents the standing crop available in the trophic level. With the help of an example explain the conditions where this kind of pyramid is possible in nature?</p> <p>Will the pyramid of energy be also of the same shape in this situation? Give reason for your response.</p> <p style="text-align: center;">OR</p> <p>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? Will the pyramid of energy be also of the same shape in this situation? Give reason for your response.</p>
SECTION - C	
22	(i) Name any two copper releasing IUDs. (ii) Explain how do they act as effective contraceptives in human females.
23	Double fertilization is reported in plants of both, castor and groundnut. However, the mature seeds of groundnut are non-albuminous and castor are albuminous. Explain the post-fertilisation events that are responsible for it.
24	Identify the polarity of x to x' in the diagram below and mention how many more amino acids are expected to be added to this polypeptide chain.



- a) Mention the codon and anticodon for alanine.
 b) Why are some untranslated sequences of bases seen in mRNA coding for a polypeptide? Where exactly are they present on mRNA?

- 25 a) How is Hardy-Weinberg's expression " $(p^2 + 2pq + q^2) = 1$ " derived?
 b) List any two factors that can disturb the genetic equilibrium.

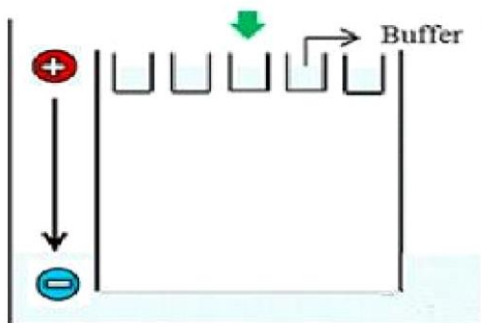
26 Certain attributes of innate immunity are given in the table below. Identify A, B, C, D, E & F respectively in it:

S.No.	Types of barrier	examples of barrier	function
01	A	B	prevented microbial growth
02	C	polymorphonuclear leucocytes	D
03	cytokine	E	F

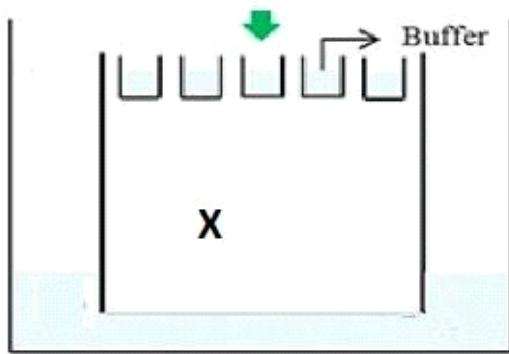
OR

- a) Explain the Life cycle of *Plasmodium* starting from its entry in the body of female *Anopheles* till the completion of its life cycle in humans.
 b) Explain the cause of periodic recurrence of chill and high fever during malarial attack in humans.

27 Carefully observe the given picture. A mixture of DNA with fragments ranging from 200 base pairs to 2500 base pairs was electrophoresed on agarose gel with the following arrangement.



- a) What result will be obtained on staining with ethidium bromide? Explain with reason.
 b) The above set-up was modified and a band with 250 base pairs was obtained at X.



What change(s) were made to the previous design to obtain a band at X? Why did the band appear at the position X?

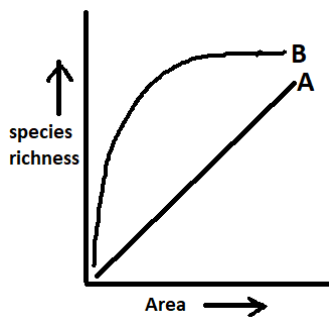
28

The following graph shows the species-area relationship. Answer the following questions as directed:

Name the naturalist who studied the kind of relationship shown in the graph.

Write the observation made by him.

Write the situation as discovered by the ecologist when the value of Z (slope of the line) lies between a) 0.1 and 0.2, b) 0.6 & 1.2. What does Z stand for?

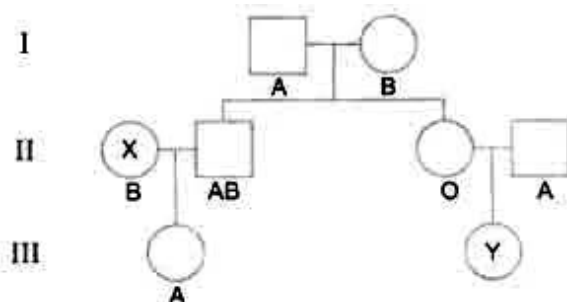


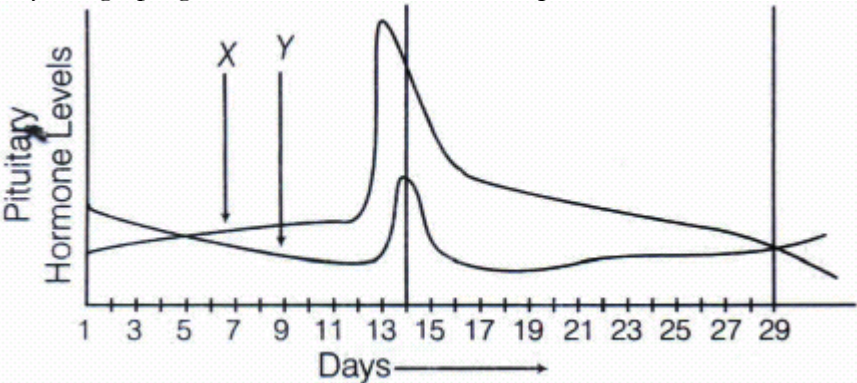
Where should the slope of the line 'B' become steeper?

SECTION - D

Q.no. 29 and 30 are case based questions. Each question has subparts with internal choice subpart.

29 Study the pedigree chart showing the pattern of inheritance of blood group character in a family.



	<p>(a) Give the genotypes of the parents in generation I. (b) State the possible genotypes of the individuals. (i) X in generation II. (ii) Y in generation III. (c) How does the inheritance of this blood group explain codominance?</p> <p>OR</p> <p>(c) In this type of inheritance pattern, out of male and female children which one has less probability of receiving the trait from the parents. Give a reason.</p>
30.	<p>Your classmate complains of cough and headache to the doctor. The doctor confirms that he is suffering from pneumonia and not just common cold.</p> <p>(a) How did the doctor arrive at this conclusion? (b) Write the binomials of the causative organisms of pneumonia. (c) What is common about the transmission of the two diseases, common cold and pneumonia?</p> <p>OR</p> <p>(c) How does cigarette smoking result in lung cancer and emphysema?</p>
SECTION - E	
31	<p>Study the graph given below and answer the questions that follow.</p>  <p>(i) Name the hormones 'X' and 'Y'. (ii) Identify the ovarian phases during menstrual cycle. (a) 5th-12th day of the cycle. (b) 14th day of the cycle. (c) 16th-25th day of the cycle. (iii) Explain the ovarian events (a), (b) and (c) under the influence of hormones 'X' and 'Y'</p> <p>OR</p> <p>Trace the development of a megaspore mother cell to the formation of mature embryo sac in a flowering plant.</p>

32. Observe the segment of mRNA given below.

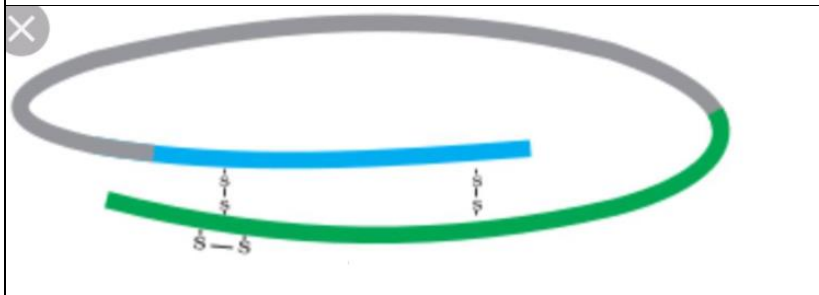


- Explain and illustrate the steps involved to make fully processed hnRNA?
- Gene encoding RNA Polymerase I and III have been affected by mutation in a cell. Explain its impact on the synthesis of polypeptide, stating reasons.

OR

In the medium where *E. coli* was growing, lactose was added, which induced the lac operon. Then, why does lac operon shut down some time after addition of lactose in the medium?

33 Refer to the diagram given below and answer the question that follows



- Identify the structure shown above in the diagram, as proinsulin or insulin
- What is the major difference between insulin and proinsulin?
- What is humulin?

OR

Ryan is suffered from Adenosine Deaminase(ADA) deficiency is a hereditary disease. His parents consulted a doctor. The doctor prescribed a treatment through gene therapy.

- What is gene therapy
- What is the function of Adenosine Deaminase enzyme?
- In which year the first clinical gene therapy was given?
- Which tissue is obtained from ADA patient for gene therapy?
- Name any two diseases in which gene therapy worked.