



BIOLOGY

# THE BIOLOGY C.E.T. PAPER

**QUESTIONS WOULD BE FROM BOTH  
FIRST AND SECOND YEAR SYLLABUS**

**II PU SYLLABUS = 40 questions  
(about 66%)**

**I PU SYLLABUS = 15 questions  
(about 25%)**

**COMBINED SYLLABUS = 5 questions  
(about 9%)**

**QUESTIONS WOULD BE OF  
DIFFERENT LEVELS**

**ABOUT 18 QUESTIONS (30%)  
WOULD BE EASY**

**ANOTHER 18 QUESTIONS (30%)  
WOULD BE MIDDLE LEVEL**

**18 MORE QUESTIONS WOULD  
BE QUITE DIFFICULT**

**6 QUESTIONS WOULD BE OF THE  
H.O.T.S. CATEGORY**



**ALL CHAPTERS IN YOUR  
SYLLABUS WOULD BE  
PROPORTIONATELY  
REPRESENTED IN THE  
C.E.T. PAPER**



BIOLOGY

# BIOTECHNOLOGY



# BIOTECHNOLOGY

TOTAL TEACHING TIME  
ALLOTTED IN THE SYLLABUS =  
8 HOURS

APPROXIMATE WEIGHTAGE  
OF MARKS IN THE CET PAPER  
= 5

**BIOTECHNOLOGY**

**MAJOR TOPICS  
IN THIS  
CHAPTER**

# **GENETIC ENGINEERING**

## **Tools used in GE**

- **Restriction enzymes**
  - **Ligases**
- **Plasmid vectors**
  - **Host cells**
  - **Bioreactors**



# **GENETIC ENGINEERING**

- **Benefits from GE experiments**
- **Insulin biosynthesis through GE**
- **Transgenic plants and animals**
  - **Hazards of GE Experiments**
- **Safeguards against misuse of GE**

# **OTHER ASPECTS OF BIOTECHNOLOGY**

- **DNA fingerprinting**
  - **Tissue culture**
  - **Gene therapy**
- **Human Genome Project**
  - **Hybridoma Technique**
- **Improvement of plants and animals**
  - **Stem cells & their culturing**

# BIOTECHNOLOGY

**What is not true about Restriction Enzymes?**

- 1) They are available in the cytoplasm of bacteria**
- 2) They recognize palindromic nucleotide sequences on DNA**
- 3) They can cut any DNA at any place**
- 4) They are popularly known as molecular scissors**

# **BIOTECHNOLOGY**

**Study the two statements given here and choose the correct option that describes them:**

**SEE NEXT SLIDE**

# BIOTECHNOLOGY

*A – Restriction enzymes are regularly used for making recombinant DNA.*

*B – Restriction enzymes can actually insert alien DNA into the plasmid DNA to produce a combination of both samples of DNA.*

- 1) Both statements are correct and A is the reason for B
- 2) Both statements are correct and B is the reason for A
- 3) A is right and B is wrong
- 4) A is wrong and B is right

**BIOTECHNOLOGY**

Given below are four sequences of nucleotides along a strand of DNA. Which of them could be a recognition site for a Restriction Enzyme?

- 1) 5'ACCCCA 3'
- 2) 5'GTGGTG 3'
- 3) 5'CTGGTC 3'
- 4) 5'AGCGCT 3'

1

**5'ACCCCA 3'**

2

**5'GTGGTG 3'**

3

**5'CTGGTC 3'**

4

**5'AGCGCT 3'**

1 5'ACCCCA 3'  
'3 TGGGT 5'

2 5'GTGGTG 3'  
'3 CACCAC 5'

3 5'CTGGTC 3'  
'3 GACCA 5'

4 5'AGCGCT 3'  
'3 AGCGCT 5'



# **BIOTECHNOLOGY**

**This enzyme is also known by the name Reverse Transcriptase:**

- 1) DNA directed RNA polymerase**
- 2) DNA directed DNA polymerase**
- 3) RNA directed RNA polymerase**
- 4) RNA directed DNA polymerase**

**BIOTECHNOLOGY**

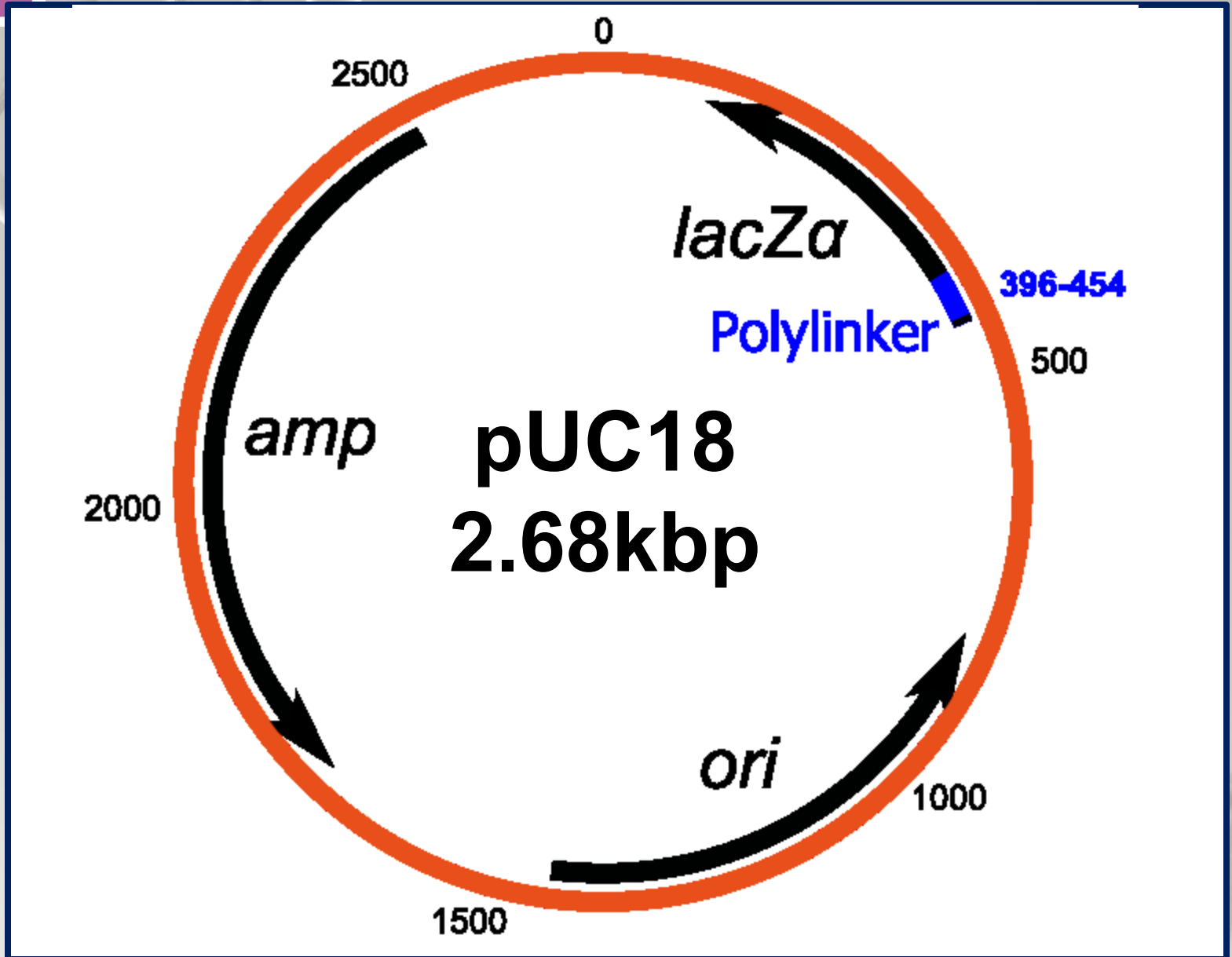
What is the template for the reverse transcriptase enzyme?

- 1) mRNA
- 2) tRNA
- 3) Double stranded RNA
- 4) Double stranded DNA

**BIOTECHNOLOGY**

Which of the following regions of pUC18 plasmid, can be said to be a marker gene?

- 1) Orisite
- 2) Restriction site
- 3) Multiple cloning site
- 4) Amp gene



**BIOTECHNOLOGY**

Which among the various regions of the plasmid pUC18 is the region usually selected for inserting alien gene to produce recombinant DNA?

- 1) Orisite
- 2) Restriction site
- 3) Multiple cloning site
- 4) Amp gene

# BIOTECHNOLOGY

In the well-known procedure adopted for producing human insulin through genetic engineering in *E. coli*, the proinsulin gene is inserted adjacent to this region of the plasmid vector:

- 1) Gene for beta-galactosidase enzyme
- 2) Ampicillin resistant gene
- 3) Tetracycline resistant gene
- 4) Orisite

# BIOTECHNOLOGY

This organism was not used in the experiments that lead to the development of Golden Rice:

- 1) *Escherichia coli*
- 2) *Agrobacterium tumefaciens*
- 3) *Erwinia uredovora*
- 4) Daffodil

# BIOTECHNOLOGY

Golden rice is a genetically modified crop wherein the incorporated genes are meant for the biosynthesis of ----- in the grains.

- 1) Beta carotene
- 2) Vitamin-B
- 3) Vitamin –A
- 4) Vitamin –C





# BIOTECHNOLOGY

Which of the following enzymes is absolutely necessary for making a cDNA library?

- 1) RNA polymerase
- 2) Reverse Transcriptase
- 3) Kornberg polymerase
- 4) Replicase

**BIOTECHNOLOGY**

**This is not an example of a GMO:**

- 1) Pomato**
- 2) Tracy**
- 3) Bt brinjal**
- 4) Super cow**

# **BIOTECHNOLOGY**

**DNA fingerprinting cannot be used for distinguishing between**

- 1) Monozygotic twins**
- 2) Siblings**
- 3) Father and son**
- 4) Mother and child**

**BIOTECHNOLOGY**

Identify the odd name among the following:

- 1) Northern blotting
- 2) Southern blotting
- 3) Eastern blotting
- 4) Western blotting

# BIOTECHNOLOGY

The problem of enzyme stability at high temperature in the PCR (Polymerase Chain Reaction) process was solved by the discovery and use of this enzyme:

- 1) Kornberg polymerase
- 2) Taq polymerase
- 3) Reverse transcriptase
- 4) Topoisomerase

# **BIOTECHNOLOGY**

**The following are important stages in a typical tissue culture experiment:  
Arrange them in the correct sequence of operations:**

**SEE NEXT SLIDE**

**BIOTECHNOLOGY**

**M- Autoclaving**

**N- Preparation of culture medium**

**O- Inoculation**

**P - Surface sterilization of explants**

**Q - Hardening**

**R - Maintenance of culture**

**S - Modification of responses during culturing.**

**1) NOPSQRM**

**2) PRSMQON**

**3) PNMORSQ**

**4) PSQSORM**

**BIOTECHNOLOGY**

**In standard tissue culture experiment, it is the custom to autoclave all materials used in the experiment except this:**

- 1) Culture vessels**
- 2) Nutrient medium**
- 3) Explant**
- 4) Instruments used in the experiment**



**BIOTECHNOLOGY**

**Why is sucrose the usual carbon source used in tissue culture media?**

- 1) No specific reason**
- 2) It is the cheapest sugar**
- 3) It is very sweet**
- 4) It is the principal translocatory substance in the phloem of plants**

# BIOTECHNOLOGY

This enzyme is regularly used for isolating naked protoplasts from living plant cells by dissolving the cell wall:

- 1) Helicase
- 2) Cellulose
- 3) Cellulase
- 4) Amylase

# **BIOTECHNOLOGY**

**This type of tissue culture is often used for studying recessive genes in crop plants:**

- 1) Mericulture**
- 2) Anther culture**
- 3) Pollen culture**
- 4) Endosperm culture**

# **BIOTECHNOLOGY**

**This substance is often used as a fusogen in somatic hybridization experiments:**

- 1) Cyanogen bromide**
- 2) Polyurethane**
- 3) Polyethylene Glycol**
- 4) Polyacrylamide**

**BIOTECHNOLOGY**

**What is the advantage in using meristems as explants in tissue culture experiments?**

- 1) It eliminates the necessity of using growth regulators**
- 2) It helps to raise virus-free plantlets**
- 3) It quickens the process of organogeny**
- 4) It helps in developing haploid plants**

# **BIOTECHNOLOGY**

The nutrient culture medium used in tissue culture experiments can be converted into a solid medium by adding and dissolving this substance in the culture medium:

- 1) Pectin
- 2) Coconut milk
- 3) Agar-agar
- 4) Polyvinyl pyrrolidone

**BIOTECHNOLOGY**

**Monoclonal antibodies were first obtained in this animal.**

- 1) Mouse**
- 2) Sheep**
- 3) Fruit flies**
- 4) Human beings**

# BIOTECHNOLOGY

Gene therapy for the disease SCID is done by introducing a normal gene for this enzyme in the lymphocytes of the patient.

- 1) Trypsin
- 2) Alpha-antitrypsin
- 3) Adenine deaminase
- 4) Phenyl alanine hydroxylase



**BIOTECHNOLOGY**

**Haemopoietic stem cells in the bone marrow are**

- 1) unipotent**
- 2) multipotent**
- 3) totipotent**
- 4) pluripotent**

**BIOTECHNOLOGY**

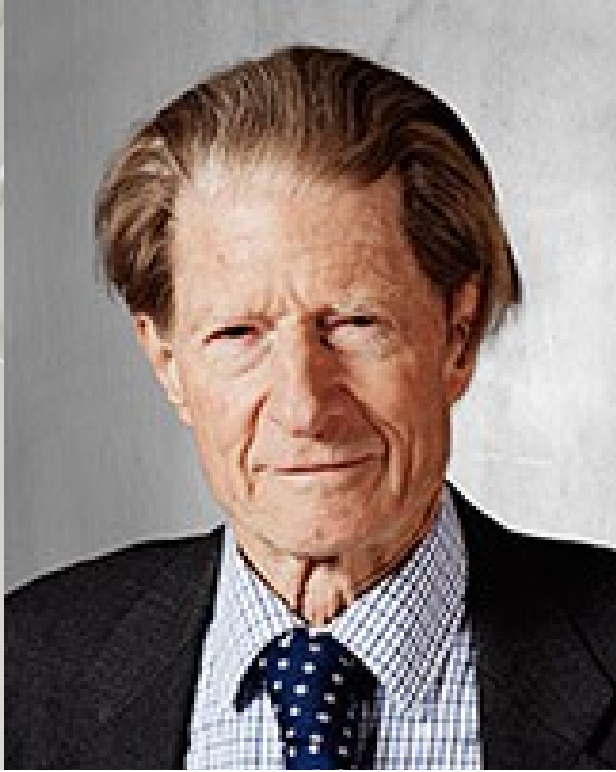
Which of the following is not true for stem cells?

- 1) They are culturable
- 2) They are highly specialized
- 3) They are undifferentiated
- 4) They are capable of repeated cell divisions

# BIOTECHNOLOGY

The two cells produced by the first division of human zygote could be described as ---  
----- stem cells.

- 1) Unipotent
- 2) Multipotent
- 3) Pluripotent
- 4) Totipotent



**SIR JOHN B. GURDON**

**SHINYA YAMANAKA**

**Last year's Nobel Prize winners in medicine for "successful reprogramming of mature cells into pluripotent stem cells (now known as IPS cells)"**

# **BIOTECHNOLOGY**

Nowadays DNA fingerprint analysis is done on the basis of STR (short tandem repeats of about 2-6 base pairs) instead of the conventional VNTR.

The results are obtained very quickly and they are much more accurate and reliable.

# **BIOTECHNOLOGY**

**The original concept of 'junk DNA' in our body is no longer valid.**

**Today it has been discovered that several regions of the so called junk DNA actually contain elements that have regulatory control over functioning of many genes.**

**These have been discovered and listed in ENCODE (Encyclopaedia of DNA Elements)**

# **BIOTECHNOLOGY**

**BIOINFORMATICS IS ADVANCING BY  
LEAPS AND BOUNDS**

**TODAY INFORMATION CREATED BY  
MAN CAN BE STORED EFFICIENTLY  
AND SAFELY IN DNA**

**NICK GOLDMAN (UK) & HIS TEAM HAVE  
MANAGED TO STORE 154 SONNETS  
OF SHAKESPEARE AND WATSON &  
CRICK'S PAPER  
IN DNA !!**



BIOLOGY

***THANK YOU***  
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