MAK-003-001518 Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

October / November – 2016

Biotechnology : Paper - VI

(BT-502 : Genetics and Molecular Biology)

Faculty Code : 003
Subject Code : 001518

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) Right side figures indicate marks of the question.

1 Answer the following questions in one word or sentence : **1×20=20**

(1) Unit of recombination is called _____ .

(2) Example of RNA dependent DNA Polymerase is _____ .

(3) The first mRNA codon to specify an amino acid is mostly _____ .

(4) Proofreading activity is performed by which subunit of DNA Polymerase III?

(5) *Xeroderma pigmentosa* is due to genetic loss of _____ repair system.

(6) Unwinding of the DNA duplex during replication in prokaryotes is mediated by the enzyme _____ .

(7) Genotype of kleinfelters syndrome is _____ .

(8) Write two exception of Hardy -Weinburg law.

(9) Alternate mode of gene regulation in trp-operon is called _____ .

(10) t-RNA is synthesized by enzyme _____ .

(11) Enzyme which acts as eukaryotic reverse transcriptase is _____ .

(12) The catalytic subunit of Prokaryotic RNA Polymerase is _____ .

(13) The tendency of alleles that are close together on a chromosome to be inherited together during the meiosis phase of sexual reproduction is called _____ .

(14) Insertion size of cosmid vector is _____ .

(15) Write the name of one gene used to create golden rice by genetic engineering.

(16) _____ is called co-repressor in Trptophan operon.

(17) The genetic element called jumping gene _____ .

(18) Which cell organelle carried out maternal inheritance ?

(19) Write the two example of DNA binding protein.

(20) Number of linkage group in male _____ .

2 (a) Answer briefly of any **three** out of six : **3×2=6**

(1) Define cistron, recon and muton.

(2) Write the mechanism of action of Rifampicin antibiotics.

(3) Write name of three major modifications in m-RNA after transcription.

(4) What is C-value and C-value paradox?

(5) Write four features of Z-form of DNA.

(6) Define Operon.

(b) Answer any **three** out of six : **3×3=9**

(1) What is supplementary gene ? Discuss with example.

(2) Differentiate Generalized and Specialized Transduction.

(3) Give the brief account on Ac-Ds Transposable elements.

(4) Describe the structure and function of t-RNA.

(5) Give detailed account of attenuation in regulation of Tryptophan operon.

(6) Enlist the name of three syndromes and its respective chromosome number under Trisomy condition.

(c) Answer any **two** out of five : **2×5=10**

(1) What is Monohybrid Cross Experiment? Differentiate the phenotype and genotype, and explain the Mendel's Law of Dominance and Law of Segregation with example.

(2) Write difference between Autopolyplloidy and Allopolyploidy. Write the role of polyploidy in plant improvement.

(3) Give the detailed account of Excision DNA repair system.

(4) Briefly explain about posttranslational modification?

(5) Define Restriction enzyme. Why type II Restriction enzyme is mostly used in genetic engineering? Give the example of two restriction enzyme along with restriction sequence.

3 (a) Answer any **three** out of six : **3×2=6**

(1) Explain mechanism of Sex determination in Drosophila.

(2) Give the statement of Hardy-Weinberg law of population genetics. Briefly write its significance.

(3) Why DNA is more stable genetic material than RNA?

(4) Give the role of primer in DNA replication.

(5) Write the function of Transcription factor TFIIH in eukaryotes.

(6) What is Expression Vector? Write important component of Expression Vector.

(b) Answer any **three** out of six : **3×3=9**

(1) Define Allelic Gene Interaction. Explain Incomplete dominance and Co dominance with example.

(2) Give the one experimental evidence which proves DNA as a genetic material.

(3) Write the brief account of Transformation in Bacteria.

(4) Write the three difference between DNA-Polymerase and RNA-Polymerase.

(5) Give the mechanism of Group-I and Group-II Intron Splicing.

(6) Describe one method for screening of Transformed cell.

(c) Answer any two out of five : **2×5=10**

(1) Describe Epistasis with suitable example.

(2) Discuss the Extra chromosomal inheritance with two suitable examples.

(3) Elaborate the various steps in prokaryotic transcription.

(4) Write short notes on any two from following vectors -

(a) PBR322

(b) YAC

(c) BAC

(d) Retroviral vector

(5) Briefly write the five applications of Genetic Engineering.