BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Bachelor of Science (Honours) in Biotechnology

Course Name – Recombinant DNA Technology

Course Code - BBT502

Semester / Year - Semester V

Time allotted : 85 Minutes | Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 70=70

1. *(Answer any Seventy)*

(i) Who developed the chemical techniques to synthesize polynucleotides?

a) Crick b) Watson

c) Mc.Clintok d) Khorana

(ii) EcoRI exhibits a two-fold rotational symmetry.

a) True b) False

c) True & False d) None

(iii) Recombinant plasmids are added to a bacterial culture that has been pre-treated with _____ions.

a) Ferrous b) Iodine

c) Magnesium d) Calcium

(iv) Polymerase chain reaction (PCR) was invented by

a) Watson b) Mullis

c) Crick d) Franklin

(v) The temperature cycles in a polymerase chain reaction are in the order

a) 94, Tm, 72 b) Tm, 72, 94

c) 94, 72, Tm d) Tm, 94, 72

(vi) Molecular beacons are short

a) Polynucleotides
b) Oligonucleotides
c) Monosaccharide
d) Polysaccharide

(vii) DNA libraries are collection of

a) RNA
b) Cloned DNA
c) Virus particles
d) Bacteriophages

(viii) Bacterial artificial chromosomes are the _____of bacterial cells.

a) Episomes
b) F factors
c) Plasmids
d) Nucleosome

(ix) If a plasmid has 4 restriction sites, how many fragments will be generated after digestion?

a) 1
b) 2
c) 3
d) 4

(x) Maximum size of foreign DNA that can be inserted into a replacement vector is

a) 18-20 kb
b) 20-25 kb
c) 25-30 kb
d) 30-35 kb

(xi) Plasmid incompatibility is

a) Iinability of a plasmid to grow in the host
b) Inability of two different plasmids to coexist in the same host cell in the absence of selection pressure.
c) Both
d) None

(xii) Select the wrong statement about plasmids?

a) It is extrachromosomal
b) It is double stranded
c) Its replication depends upon host cell
d) It is closed and circular DNA

(xiii) Phagemid consist of

a) Plasmid vector carrying ? phage's cos site

b) Plasmid vector carrying ? attachment (? att) site

c) Plasmid vector carrying origin of replication of ? phage only

d) Plasmid vector carrying origin of replication of plasmid only

(xiv) The restriction endonuclease is having a defence mechanism in the bacterial system against foreign DNA such as viruses. But how it is able to protect its own DNA?

a) By methylation of bacterial DNA by restriction enzyme

b) By methylation of foreign DNA by restriction enzyme

c) By phosphorylation of bacterial DNA by restriction enzyme

d) By phosphorylation of foreign DNA by restriction enzyme

(xv) Type II cuts the sequence in the following way

a) Within the recognition sequence

b) At 100-1000 nucleotides away from the recognition sequence

c) At 27-30 nucleotides away from the recognition sequence

d) It cuts randomly

(xvi) After cleaving the sequence, the nature of the ends created by the type II endonuclease is

a) The ends created are always single stranded

b) The ends created are always double stranded

c) Either the ends are single stranded or they are double stranded

d) One end is single stranded and one end is double stranded

(xvii) Blunt ends created by the restriction endonuclease can be joined.

a) True

b) False

c) True & False

d) None

(xviii) If all the nucleotides are present with equal frequencies and at random,

what are the chances of having a particular four nucleotide long motif?

a) 1/256
b) 23377
c) 43846
d) 43838

(xix) Genomic library construction is concerned with

a) Gene isolation
b) Protein production
c) Antibiotics
d) Regeneration

(xx) Which DNA is restricted to making a genomic library?

a) Genomic
b) Plasmid
c) Phage
d) Plants

(xxi) Which kind of packing is done for the fragmented genes?

a) In vivo
b) Population
c) Group
d) In vitro

(xxii) HaeIII and AluI have _____ recognition sites.

a) Same
b) Different
c) Short
d) Long

(xxiii) Linkers are required when using enzymes HaeIII and AluI.

a) True
b) False
c) True & False
d) None

(xxiv) Choose the incorrect statement for cDNA libraries.

a) They constitute of DNA copies produced from the RNA sequences and usually mRNA
b) They represent expressed sequences
c) Introns are not represented
d) Comparison of cDNA sequences with genomic sequences leads to the determination of polyadenylation sites

(xxv) Which of the following methods can be used to select for plasmid?transformed clones?

a) Culturing cells in the presence of a DNA replication inhibitor
b) Culturing cells in the presence of an RNA synthesis inhibitor
c) Culturing cells in the presence of ampicillin
d) All of these

(xxvi) How many types of DNA libraries are possible?

a) 1
b) 2
c) 3
d) 4

(xxvii) Which enzyme is involved in the synthesis of the DNA over an RNA template?

a) DNA polymerase
b) Reverse transcriptase
c) Klenow fragment
d) RNA polymerase

(xxviii) For the construction of DNA library what is the range of genomic DNA that has to be cloned into the vector?

a) Less than 100 bases
b) 100 to 1000 bases
c) Less than 100 to mega bases
d) Less than 10 bases

(xxix) Which of the following enzymes is responsible for the digestion of the RNA strand in the RNA-DNA hybrid?

a) RNase A
b) RNase H
c) DNase
d) Exonuclease

(xxx) cDNA is synthesized from

a) Protein chain
b) RNA
c) DNA
d) tRNA

(xxxi) What is the characteristic of the DNA that is used for the construction of library?

a) Naked DNA
b) Plasmid
c) Plasmid and naked DNA
d) Plasmid is preferred over naked DNA

(xxxii) Partial digestion is preferred for the fragmentation of DNA.

a) True
b) False
c) True & False
d) None

(xxxiii) The first crop plant genome sequenced

a) Rice
b) Maize
c) Brinjal
d) Cotton

(xxxiv) If the embryo is at one-cell stage then it is found in

a) Ovary
b) Oviduct
c) Uterus
d) Either ovary or uterus

(xxxv) Embryonic stem cells (ES) are isolated and are injected again into the blastocoel of a developing embryo. The embryo which develops is entirely made up of these cells only.

a) True
b) False
c) True & False
d) None

(xxxvi) If a gene is inactivated by gene targeting then it is called as

a) Knocked in gene
b) Knocked down gene
c) Knocked out gene
d) All of these

(xxxvii) Some types of variation are due to changes in the genetic material. What is this type of change called?

a) Mutation
b) Deletion
c) Sterilization
d) Fertilization

(xxxviii) DNA microinjection into the egg has been used to produce which of

the following transgenic animals?

a) Pig
b) Mice
c) Chicken
d) All

(xxxix) Superovulation is an

a) Decreased ovulatory response by internal hormonal therapy
b) Increased ovulatory response by internal hormonal therapy
c) Increased ovulatory response by external hormonal therapy
d) Decreased ovulatory response by external hormonal therapy

(xl) What is the dinucleotide sequence of microsatellites?

a) CA
b) CC
c) CG
d) CT

(xli) By which process miss-incorporated base can change into a permanent mutation?

a) Replication
b) Transcription
c) Translation
d) Transposition

(xlii) Which of the following is NOT a type of reverse mutation?

a) Back mutation
b) Intergenic suppressor mutation
c) Intragenic suppressor mutation
d) Missense mutation

(xliii) What is the detection technique of auxotrophs?

a) Spread plating
b) Replica plating
c) Streaking
d) Pouring

(xliv) Addition or deletion of bases causes which kind of mutation?

a) Transversion
b) Frameshift mutation
c) Transition
d) Transcription

(xlv) Which of the following chemical mutagen affects only replicating DNA?

a) Acridine dye
b) Alkylating agent
c) Deaminating agent
d) Base analog

(xlvi) When was the first method of site-directed mutagenesis developed?

a) 1940s
b) 1970s
c) 1980s
d) 2000s

(xlvii) The synthetic oligonucleotide _____ the DNA synthesis.

a) Primes
b) Shortens
c) Lengthens
d) Degrades

(xlviii) Clones can be screened using a

a) PCR
b) Suppressor
c) Probe
d) Promoter

(xlix) The repair system of E.coli is

a) Lacking
b) Cysteine-directed
c) Methyl-directed
d) Mutated

(l) Which of the following mutations are not used to overcome problems associated with the mismatch repair system?

a) MutL
b) MutS
c) MutH
d) MutE

(li) Which kind of DNA are easier to prepare for PCR mutagenesis?

a) Linear
b) Circular
c) Single-stranded
d) Double-stranded

(lii) Tm calculation is based on the formula

a) 2AT+4GC
b) 3AT-5GC

c) 4AT+GC
d) 4AT+2GC

(liii) Which phage is used in oligonucleotide directed mutagenesis?

a) M13
b) Cosmid
c) Phasemid
d) Lambda-phage

(liv) Write down the name of scientist who has discovered the method of site directed mutagenesis?

a) Bostein Shortle
b) Craik
c) Grait
d) Joller Smith

(lv) Homologous recombination in germ cells occur in the _____ phase.

a) Leptotene
b) Zygotene
c) Pachytene
d) Diplotene

(lvi) Homologous recombination does not provide

a) Genetic variation
b) Sequence retrieval
c) Restart of stalled replication
d) Random base incorporation

(lvii) PCR using the mutagenic primer and one of the flanking primers is used to carry out amplification and generates a product corresponding to the part of the gene. It is called as megaprimer.

a) True
b) False
c) True & False
d) None

(lviii) If PCR is used to introduce random mutations rather than specific mutations, it is called as

a) Mutagenic PCR
b) Error-prone PCR
c) Random PCR
d) General PCR

(lix) Plant viruses are _____ vectors.

a) Integrative
b) Replacement
c) Episomal
d) Artificial

(lx) Callus tissue is derived from

a) Leaf
b) Seed
c) Root
d) All of these

(lxi) Need of tissue culture is minimized or eliminated if _____ is used.

a) Seed
b) Whole plant
c) Leaf
d) Trunk

(lxii) Transgenic plants can be _____ from transformed plant cells.

a) Inactivated
b) Regenerated
c) Degenerated
d) Excised

(lxiii) Co-integrating transformation vectors must include a region of homology in

a) The vector plasmid
b) Ti-plasmid
c) Between vector plasmid and Ti-plasmid
d) None of these

(lxiv) In the liposome mediated gene transfer in plants, nucleic acids are

a) Protected from nuclease digestion
b) Stable in liposome
c) Protected from nuclease digestion & Stable in liposome
d) None

(lxv) Advantage of microprojectile method over microinjection method for gene transfer in plants include

a) Intact cells are used
b) Method is universal in its application irrespective of all shape, size, type and presence or absence of cell wall

c) Gene can be transferred to many cells simultaneously
d) All

(lxvi) On Ti-plasmid T-region or T-DNA is flanked by a direct repeat of

a) 25 bp
b) 30 bp
c) 20 bp
d) 15 bp

(lxvii) Microprojectile method of gene transfer in plants involves delivery of DNA

a) With the help of micromanipulator
b) With the help of bolistics
c) With the help of needles
d) All of these

(lxviii) Which of the following genes are constitutively expressed and control the plant induced activation of other vir genes?

a) vir A and vir G
b) vir C and vir D
c) vir B and vir E
d) vir D1 and vir D2

(lxix) Which of the following plant signal molecules regulate the expression of vir B, C, D and E in case of tobacco?

a) Acetosyringone
b) ?-hydroxy acetosyringone
c) Acetosyringone & ?-hydroxy acetosyringone
d) None

(lxx) Which of the following is not true for microinjection technique that involves transfer of DNA into protoplast?

a) It is carried out with the help of micromanipulator
b) The recipient cells are immobilized on artificial support or artificially bound to substarate
c) It employs needle with diameter greater than cell diameter
d) All of these