



BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Master of Science in Biotechnology
Course Name – Genetics & Biostatistics
Course Code - MBT204
(Semester II)

Time allotted : 1 Hrs.15 Min.

Full Marks : 60

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question)

1 x 60=60

Choose the correct alternative from the following :

- (1) Transfer of genes between cells that are in physical contact with one another is known as

a) Conjugation	b) Transduction
c) Transformation	d) Replication
- (2) The transfer of naked DNA from one cell to another is referred to as

a) Transduction	b) Lysogeny
c) Conjugation	d) Transformation
- (3) Which of the following cells of E.coli are referred to as F—

a) Male cells	b) Female cells
c) Both male and female cells	d) Neither male nor female cells
- (4) The F factor DNA is sufficient to specify how many genes?

a) 2	b) 10
c) 40	d) 100
- (5) Which of the following can be used as a measure to construct a linkage map of the Hfr chromosome?

a) frequency of recombination	b) time of entry
c) locus of mutation	d) transfer of F factor
- (6) The Hfr chromosome is transferred to the F— cell in a _____ fashion.

a) circular	b) coiled
c) dimer	d) linear
- (7) How much time is required to inject a copy of the whole Hfr E.coli genome?

a) 24 h	b) 30 min
c) 100 min	d) 48 h
- (8) The first demonstration of recombination in bacteria was achieved by

- a) Lederberg and Tatum
c) Joshua and Lederberg
- b) Luria and Delbruck
d) Luria and Tatum
- (9) The IS elements can be identified by the presence of
- a) Antibiotic resistance gene
c) 50 bp inverted repeat
- b) Endonuclease cleavage site
d) Integrase site
- (10) You are checking the sequence of 3 genes using generalized transduction mapping. The recipient is Leu⁻, Azi^S, Thr⁻ while the donor is Leu⁺, Azi^R, Thr⁺. If you select the Leu⁺ as marker, Azi^R would be 50% while Thr⁺ would be 2%. If you select Thr⁺ as marker Leu⁺ would be 3% and Azi^R would be 0%. What is the sequence?
- a) Thr Leu Azi
c) Azi Leu Thr
- b) Azi Thr Leu
d) Thr Azi Leu
- (11) If the bacterial DNA sequence is Leu Met Att Gal Bio, which of the genes can be transferred via specialized transduction?
- a) Leu and Met
c) Gal and Bio
- b) Met, Att and Gal
d) Met and Gal only
- (12) The recombination study of phages is done using
- a) OD measurement
c) Plating assay
- b) Plaque assay
d) Boyden chamber assay
- (13) Conjugation can't take place between
- a) F⁻ and F⁺
c) HFR and F⁻
- b) F' and F⁻
d) HFR and F⁺
- (14) Which gene in a plasmid is not required for it to participate in conjugation?
- a) Pilli forming gene
c) Sex determining gene
- b) Origin of replication
d) Origin of transfer
- (15) Which of the following is an example of head-and-tail bacteriophage?
- a) M13
c) Pbr322
- b) Lambda phage
d) M16
- (16) Which of the following statements is not true in the context of infection by an M13 phage?
- a) Lytic phage
c) New phage particles are continually synthesized
- b) Lysogenic phage
d) The DNA is not integrated in host genome
- (17) In the purification of a plasmid DNA what will the clear lysate consist of?
- a) Genomic DNA
c) Cell debris
- b) Plasmid DNA
d) Protein
- (18) In which phase bacteria develop competence?
- a) Late log phase
c) Metaphase
- b) Log phase
d) Lag phase
- (19) In which bacteria competence pheromones was first identified?
- a) *S. pneumoniae*
c) *H. influenzae*
- b) *B. subtilis*
d) *N. gonorrhoeae*
- (20) By which of the following methods does the F plasmid integrates into the bacterial genome?
- a) Transformation
c) Recombination
- b) Conjugation
d) Mutation
- (21) ECoR1 is a

- a) DNA ligase enzyme
c) A vector used for insulin synthesis
- b) Restriction endonuclease
d) A plasmid used as a vector
- (22) Methylation dependent restriction system (MDRS) are included in which class of restriction enzymes?
- a) Type I
c) Type III
- b) Type II
d) They are the product of *mcrA*, *mcrB* or *mrr* loci
- (23) In which of the following methylation dependent restriction system is necessary?
- a) *mcrA*
c) Type II
- b) Type I
d) Type III
- (24) Which of the following types of resistance is not provided by the plasmid for its host?
- a) Antibiotic resistance
c) phage infection
- b) Heat resistance
d) Heavy metals
- (25) Which of the following statements about lac operon in e.coli is true?
- a) Promoter is the binding site for the lac repressor
c) β -galactosidase is only produced in large quantities when the lac repressor is bound to the operator
- b) Operon is only switched on in the absence of lactose in the growth medium
d) Lac operon mRNA is a polycistronic mRNA
- (26) You want your bacterial culture to grow well so you made an enriched media with all forms of carbohydrates. Which of this carbohydrate should you restore first if you want the culture to keep growing at the same rate?
- a) Glucose
c) Galactose
- b) Lactose
d) Fructose
- (27) Plasmid incompatibility is
- a) inability of a plasmid to grow in the host
c) both (1) and (2)
- b) inability of two different plasmids to coexist in the same host cell in the absence of selection pressure.
d) none of the above
- (28) In which of the following method, the viral particles are transmitted through lysis of cell?
- a) Lytic cycle
c) Replication
- b) Lysogeny
d) Translation
- (29) It is very important to study lambda biology as lambda phages are used for cloning purposes. Which of the statement is true for lambda phage?
- a) It is an example of temperate phage
c) The lysis fate is that where the phage inserts its genome into the bacterial genome and the replication goes on
- b) The fate of the phage is decided before it infects the cell
d) The lysogenic fate is that where the phage infects the cell and lysis is carried out
- (30) The immediate early transcripts direct synthesis of which genes?
- a) N genes
c) Both N and cro genes
- b) cro genes
d) PR and PL genes
- (31) Choose the correct statement for cII gene and its related function?
- a) The transcription is extended to the region of cII gene and it is termed as late transcription
c) This promoter is responsible to decide whether the life cycle would be lysogenic or lytic
- b) They are responsible for deactivating the promoter for repressor establishment
d) cII gene is responsible for other gene which is gene cIII

- (32) Choose the correct statement for the cI gene
- a) It represses only cII gene
 b) It activates cII gene and represses cIII gene
 c) It represses both cII and cIII gene
 d) It activates both cII and cIII gene
- (33) Replication of plasmid DNA other than initiation is controlled by
- a) transposon
 b) plasmid DNA
 c) bacterial gene
 d) mitochondrial gene
- (34) How many restriction sites are contained by a plasmid?
- a) 1
 b) 2
 c) 3
 d) more than 1
- (35) What branch of biology focusses on the study of patterns of inheritance
- a) genetics
 b) Immunology
 c) Evolution
 d) Ecology
- (36) Who proposed the laws of inheritance in living organisms?
- a) James Watson
 b) Erwin Chargaff
 c) Francis Crick
 d) Gregor Mendel
- (37) Barr bodies are found
- a) In the cytoplasm of female
 b) In the nuclei of female
 c) In the cytoplasm of male
 d) In the nuclei of male
- (38) Which of the following doesn't agree with the chromosomal theory of inheritance?
- a) The genes are located on the chromosome
 b) The genes on the same chromosome are always passed together
 c) The genes are located linearly on the chromosomes
 d) The distance between two genes can be mapped
- (39) You observe a genetic trait which is a common occurrence in the male of a particular pedigree, this is possibly a
- a) X linked
 b) Y linked
 c) X linked recessive
 d) Y linked dominant
- (40) Which of the following could be due to duplication?
- a) Co-dominance
 b) Dominance
 c) Incomplete dominance
 d) Pleiotropy
- (41) Deletion of a region led to over expression of a gene X. What do you conclude from this observation?
- a) Part of gene X is mutated
 b) Promoter of gene X is deleted
 c) Regulator of gene X is deleted
 d) No effect on gene X or its regulators
- (42) Consider this sequence A—O—B—C—D—E—F, be a DNA sequence where O is the centromere. Which of the following will be a pericentric inversion?
- a) A—O—B—D—E—F
 b) B—O—A—D—E—F
 c) D—B—O—A—E—F
 d) A—O—E—D—B—F
- (43) Which of the following is a result of reciprocal translocation?
- a) Burkitt's lymphoma
 b) Trychothiodystrophy
 c) Thalassemia
 d) Cockayne's syndrome
- (44) In mammals which of the following will be a Turner?
- a) AA + XXY
 b) AA+ XYY
 c) AA + XO/ XY
 d) AA+ XO
- (45) Klinefelter syndrome results due to

- a) Non-disjunction in the male gamete
c) Gradual loss of chromosome
- b) Non-disjunction in the female gamete
d) Non-disjunction in any of the gametes
- (46) Which of the following is not a point mutation?
a) Substitution
c) Insertion
- b) Transposition
d) Transversion
- (47) A frame shift mutation will have minimum effect when it leads to
a) Insertion of 2 bases
c) Insertion of 3 bases
- b) Deletion of 1 base
d) Deletion of 2 bases
- (48) A Y linked gene
a) Is expressed only when homozygous
c) Is carried by mother
- b) Is present near the telomere of long arm in human
d) Expressed only in men
- (49) You generate a fluorescent probe against a gene that has been deleted. You expose the DNA to the probe and observe it under fluorescent microscope. What will you see?
a) Fluorescence will correspond to the gene of interest
c) Most parts of the chromosome emits fluorescence
- b) There will be a number of regions that emit fluorescence
d) Nothing is seen under fluorescence microscope
- (50) Which of the following represents the Hardy Weinberg equation?
a) $p^2 + q^2 = 1$
c) $p^2 + q^2 = 0$
- b) $p^2 + 2pq + q^2 = 1$
d) $(p^2 + q^2)^2 = 1$
- (51) Which of the following does not belong to factors affecting the Hardy Weinberg principle?
a) Gene migration
c) Genetic drop
- b) Genetic drift
d) Mutation
- (52) Gene drift occurs when gene migration occurs
a) by chance
c) slowly
- b) spontaneously
d) due to disaster
- (53) What is the unit of linkage map?
a) Morgan
c) Centimeter
- b) Centi-morgan
d) Angstrom
- (54) Name the organism whose first genetic map was made?
a) Rat
c) Fly
- b) Arabidopsis
d) Drosophila
- (55) Name the effect which shows the determination of character by the genotype of a female parent?
a) Cytoplasmic male sterility
c) maternal effect
- b) Probability
d) Random mating
- (56) What is an allele?
a) Characteristics of an organism
c) Homologous chromosomes
- b) Alternate forms of genes
d) Pair of centrioles
- (57) How can Organ transplantation rejection be prevented?
a) Immunosuppressant drugs
c) Interferons
- b) Depressant drugs
d) New T-cells
- (58) Which base is generated by the deamination of guanine?
a) Cytosine
- b) Hypoxanthine

c) Xanthine

d) Thymine

(59) In the following compound which is one of the intercalating agents?

a) 5-bromouracil

b) Ethidium bromide

c) Purine

d) Clastrogen

(60) Which of the following is a subset of population?

a) distribution

b) sample

c) data

d) set