BRAINWARE UNIVERSITY

Term End Examination 2019 - 20

Programme – Bachelor of Science honours in Biotechnology

Course Name – Genetics

Course Code – BBTH010402

(Semester – 3)

Time allotted: 3 Hours | 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) 20 x 1 = 20

1. *Choose the correct alternative from the following* (Answer any Twenty)

(i) RFLP is an;

a. A DNA marker.
b. Protein marker.
c. Both DNA & protein marker.
d. None of these.

(ii) An example of alleles is;

a. AB & Tt
b. TT & Tt
c. T & t
d. X & Y

(iii) Normal human eggs contains;

a. 22 autosomes and an X chromosome.
b. 22 autosomes and a Y chromosome.
c. 23 autosomes.
d. 46 chromosomes.

(iv) Isozyme is a;

a. DNA marker.
b. Morphological marker.
c. Protein marker.
d. None of these.

(v) When a tall plant with round seeds (TTRR) is crossed with a dwarf plant with wrinkled seeds (ttrr) the F1 generation consist of tall plants with rounded seeds. How many types of gametes the F1 plant would produce?

a. One.
b. Three.
c. Four.
d. Eight.

(vi) A tall plant grown in nutrient deficient soil and remained dwarf when it is crossed with dwarf plan then

a. All hybrid are dwarf.
b. All hybrid are tall.
c. 50% tall and 50% dwarf.
d. 75% tall and 25% dwarf.

(vii) Heterozygous purple flower is crossed with recessive white flower. The progeny has the ratio;

a. All purple.
b. All white.
c. 50% purple and 50% white.
d. 75% purple and 25% white.

(viii) A dihybrid test cross yielding a result of 1:1:1:1 ratio is indicative of

a. Four different types of gamates produced by the F1 dihybrids.
b. Homozygous condition of the F1 hybrid.
c. Four different types of F1 generation hybrid.
d. Four different types of gametes produced by the P1-parents.

(ix) What will be possible blood group in children from the parents with B and AB blood groups?

a. A,O.
b. A, B, AB and O.
c. A, B and AB
d. B and O.

(x) In If *Lathyrus odoratus* hybrid blue flowered and long pollen plant is test crossed with homozygous recessive red flower and round pollen plant, then how many parental types are obtained when genes are present in cis stage in parents?

a. 50%.
b. 43.7%.
c. 87.4%.
d. 12.6%.

(xi) How many types of zygotic combination are possible between a cross AaBBCcDd × AAbbCcDD?

a. 32
b. 128
c. 64
d. 16

(xii) If both parents are carriers for thalessemia , which is an autosomal recessive disorder , what are the chances of progeny resulting in an affected child?

a. 50%.
b. 100%.
c. 25%.
d. No chance.

(xiii) Which one of the following ratios in epistatic interection is correct?

a. Agouti (9) : Black(4): Albino(3)
b. Agouti (9) : Black(5): Albino(2)
c. Agouti (9) : White(3): Albino(4)
d. Black(3): Albino(4): Agouti (9)

(xiv) Sickle cell anaemia is an example of

a. Dominance
b. Dominance and incomplete dominance
c. Dominance and incomplete dominance and codominance
d. Dominance and incomplete dominance and codominance and multiple allele

(xv) There are three genes a, b and c. Percentage of crossing over between a and b 20%, b and c is 28% and a and c is 8% . What is the sequence of the genes on chromosomes?

a. b, a and c.
b. a, b and c
c. a, c ,b.
d. None.

(xvi) Which statement is not true wrt Modified allele

a. Modified allele are generally dominat.
b. A non functional enzyme.
c. The normal or less efficient enzyme.
d. No enzyme at all

(xvii) Which of the following statement is true regarding sex determination in bird?

a. Female is homogenetic.
b. Male is homogenic.
c. ZO-ZZ type.
d. Also found in Grass hopper.

(xviii) Cyclin protein is required for cell cycle, which other molecule is essential for completion of cell cycle?

a. CCk.
b. CKc.
c. CKd.
d. CdK.

(xix) Transition type of gene mutation caused due to

a. GC replaced by TA
b. CG replaced by GC
c. AT replaced by CG
d. AT replaced by GC

(xx) Normally the DNA pairing has A-T and GC pairing, however these bases can exit in alternative states owing to rearrangement called as

a. point mutation
b. frameshift mutation
c. analogous mutation
d. tautomerisation

(xxi) Which one of the following trait is inherited by mitochondrial DNA

a. cytoplasmic male sterility
b. tallness
c. colour of flower
d. yield

(xxii) Which one following statement is correct wrt genic balance theory of Drosophila?

a. Y chromosome has no value in sex determination in Drosophila
b. if X/A ratio is >1 then it is female
c. c.if X/A ratio is <.5 then it is male
d. None

(xxiii) Which is a sex linked disease?

a. Sickle cell anaemia.
b. Haemophilia.
c. Phenyl ketonuria.
d. Albinism.

(xxiv) The term meiosis was coined by;

a. Hertwig and Van Bevedin.
b. Sutton and Boveri.
c. Hofmeister and Waldeyer.
d. Farmer and Moore.

(xxv) Allium cepa is having chromosome number of

a. 2n=8
b. 2n=16
c. 2n=32
d. None of these

Group – B

(Short Answer Type Questions) 4 x 5 = 20

Answer any *four* from the following

2. (a) Differentiate between meiotic division I and II. 2
   (b) Mention the significance of meiosis. 3
3. Describe the Mendel's dihybrid cross with diagram. 5
4. (a) Write the different ways by which spontaneous mutation occurs. 2
   (b) Write the different chemical and physical agents for induced mutagenesis. 3

5. Write the concept of DNA marker with examples (any four). 1+4

6. Define satellite DNA, cistron, exon and intron in eukaryotic genome. 5

7. Explain the Lamarck's theory with suitable examples. 5

Group – C

(Long Answer Type Questions) 3 x 10 = 30

Answer any *three* from the following

8. (a) What is Sex Linked Inheritance? 2

(b) A hemophiliac woman has a mother who is phenotypically normal. What are the genotypes of her parents? 8

9. (a) What are chromosomal aberrations? 3

(b) Explain any two types of structural aberrations with reference to their types, mechanism & biological significance. 7

10. (a) What is ploidy? 1

(b) Species 'A' has 2n=16 chromosomes. How many chromosomes will be found per cell in each of the following mutants in the following species? 9

i. Monosomic,
ii. Autotriploid
iii. Autotetraploid
iv. Trisomic
v. Double monosomic
vi. Doublrtrisomic
vii. Nullisomic
viii. Autopentaploid
ix. Tetrasomic

11. (a) What is importance of cell cycle? 3

(b) Briefly describe the main checkpoints and list their salient features. 7

12. llustrate Multiple Alleles with ABO blood group as an example. A woman homozygous for blood type B marries a man who is heterozygous for blood type A. State the possible phenotypic ratio of the offspring. 10
