

Total No. of Printed Pages:02

SUBJECT CODE NO:- B-2163
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y (Sem.-VI) Examination OCT/NOV 2019
Botany Paper- XIX
(Genetics and Biotechnology)

[Time:1:30 Hours]

[Max. Marks:50]

Please check whether you have got the right question paper.

- N.B i) Attempt all questions.
 ii) Draw neat & well labeled diagram wherever necessary.
- Q.1 Discuss interaction of gene. Explain in details supplementary genes or recessive epistasis with suitable example? 20
- OR
- What is sex-linked inheritance? Add a note on colour blindness & haemophilia in man?
- Q.2 Define gene cloning? Explain plasmids & phase vectors? 20
- OR
- Write short notes (any- four)
- Sex determination in birds.
 - G.J. Mendel.
 - Gynandromorphs
 - Restriction endonucleases
 - Alkaptonuria
 - Bt- Brinjal.
- Q.3 Multiple choice Questions 10
- A cross between f_1 & its recessive parent is called
 - Back cross
 - Test cross
 - Dihybrid cross
 - Recessive cross

2) Genic balance theory was proposed by

- A) Calvin Bridges B) Bateson C) Mendel D) Castle

3) In dihybrid cross, the number of gametes are?

- A) 2 B) 4 C) 6 D) 8

4) In incomplete dominance when Red flower (RR) are crossed with white flowers (rr), the f_1 hybrid have ----- coloured flowers.

- A) Red B) White C) Black D) Pink

5) One of the genes present exclusively on the X chromosome in human is concerned with

- A) Baldness B) Haemophilia
C) Night blindness D) none of these

6) In case of Man males are -----

- A) Homogametic B) Heterogametic C) A&B D) None

7) PCR was invented by?

- A) Boyer & Cohen B) Watson & Crick C) Kary Mullis D) None of these.

8) The most commonly used bacterium in plant transformation is?

- a) Rhizobium b) E. coli c) Azotobacter d) Agrobacterium

9) One gene one enzyme hypothesis was proposed by

- a) Beadle b) Morgan c) Mendel d) None of these

10) Sex determination in plants was studied in -----

- a) Cassia b) Melandrium c) Geranium d) None of these.

Time: One Hour

Max. Marks: 50

Instructions

Solve any 25 questions from Q.1 to Q.30

Solve any 25 questions from Q.31 to Q.60

- 1 The Term Genetics was used for the first time by ----- in 1905.
(A)Mendel (B)W. Watson (C)W. Harvey (D)R. de Graff
- 2 Genetics is the science which deals with the study of ----- and variation.
(A)Number (B)Environment (C)Heredity (D)Generation
- 3 Mendelian genetics involves study of both ----- traits and the influence of environment on their expression.
(A)Qualitative and quantitative (B)Only qualitative (C)Only quantitative (D)None of these
- 4 The beginning of the science of genetics was made in ----- by rediscovery of the Mendel's work.
(A)1900 (B)2018 (C)1730 (D)1805
- 5 ----- is appropriately known as father of genetics.
(A)J. Kolreuter (B)Gregor Johann Mendel (C)Knight (D)Gartner
- 6 Mendel presented the data and conclusions derived from his experiments in a paper entitled -----
(A)Experiments in plant growth (B)Experiments in plant hybridization (C)Both of these (D)None of these
- 7 Since garden pea is a self fertilizing, the anthers have to be removed before maturity. This operation of removal of anthers is called --

(A)Ejaculation (B)Inoculation (C)Emasculation (D)None of these
- 8 Mendels success was mainly based on the fact that he considered a ----- character at one time.
(A)Single (B)Multiple (C)Double (D)None of these
- 9 Round seed shape in a pea plant is ----- character
(A)Recessive (B)Dominant (C)Both of these (D)None of these
- 10 In pea plant green cotyledon color is ----- character
(A)Dominant (B)Recessive (C)Dominant and recessive (D)None of these
- 11 The genes which have no effect on the phenotype but influence the viability due to which individual may fail to survive, such genes which cause the death of an individual carrying it are known as -----
(A)Dominant genes (B)Recessive genes (C)Lethal genes (D)None of these
- 12 When a single phenotypic character is influenced by two or more genes and every gene affect the expression of other gene involved, phenomenon is known as -----
(A)Gene interaction (B)Lethal gene (C)Both a & b (D)None of these
- 13 Intragenic gene interaction is an interaction of two or more alleles present on ----- on the two homologous chromosomes of a gene, controlling same phenotype.
(A)On different gene locus (B)The same gene locus (C)Both a & b (D)Codominance
- 14 Lethality is governed by -----
(A)Multiple alleles (B)Lethal allele (C)Dominant gene (D)All of these
- 15 Human blood group is an example of -----
(A)Multiple alleles (B)Lethal alleles (C)Gene interaction (D)all of these
- 16 Epistatic interaction means that one gene ----- the effect of another gene.
(A)Promote (B)Mask (C)Accelerate (D)None of these
- 17 When both the alleles of a gene express themselves in heterozygous condition, the phenomenon is called -----
(A)Incomplete dominance (B)Co-dominance (C)Multiple alleles (D)None of these

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- 18 In dominant epistasis, the dominant alleles hides the effect of other gene e.g. A gene hides the effect of B gene and the F2 phenotypic ratio of dominant epistasis will be -----
- (A) 12:3:1 (B) 9:7 (C) 15:1 (D) 9:3:3:1
- 19 In most eukaryotes, chromosomes are present in pairs. Chromosomes that helps in sex determination are known as ----- and rest of the chromosomes are known as somatic chromosomes.
- (A) Autosomes (B) Sex chromosomes (C) Y- chromosome (D) None of these
- 20 Sex chromosomes were discovered by -----
- (A) Mendel (B) R. Holiday (C) C. E. McClung (D) All of these
- 21 Chromosomal theory of sex determination is proposed by C. E. McClung in -----
- (A) 1906 (B) 1902 (C) 1909 (D) None of these
- 22 Mechanism of sex determination in man is of -----type.
- (A) XX- XO (B) ZZ- ZW (C) XX – XY (D) None of these
- 23 ----- proposed genic balance theory of sex determination in 1922.
- (A) Hildreth (B) C. E. McClung (C) C. B. Bridges (D) Mendel
- 24 The Y chromosome in *Melandrium album* is ----- than X chromosome.
- (A) Smaller (B) Larger (C) Equal sized (D) None of these
- 25 In *Drosophila* the sex is mainly governed by -----
- (A) X chromosome (B) Y chromosome (C) Y/A ratio (D) X/A ratio
- 26 The genes which are situated on non homologous portion of X and Y chromosomes shows a different pattern of inheritance and are called as ----- and this pattern of inheritance is called sex linked inheritance.
- (A) Sex linked genes (B) Autosomes (C) Both a & b (D) None of these
- 27 The genes situated in Y-chromosome are inherited from ----- only, and are not found in females.
- (A) Mother to son (B) Mother to daughter (C) Father to daughter (D) Father to son.
- 28 The reason of X-linked inheritance was first explained by ----- while working on *Drosophila*.
- (A) C. B. Bridges (B) T. H. Morgan (C) Both a and b (D) None of these
- 29 The gene for colorblindness is located on -----
- (A) Y- chromosome (B) X- chromosome (C) On both X & Y chromosomes (D) None of these
- 30 Hemophilia is one of the ancient known human disease in which blood fails to clot, this disease was discovered in man by ----- of Philadelphia in 1803.
- (A) John Cotto (B) T. H. Morgan (C) McClung (D) None of these
- 31 In *Drosophila* -----color is recessive to normal red eye color.
- (A) Blue eye (B) Pink eye (C) White eye (D) Both a and c
- 32 The genes which are exclusively present on the Y – chromosome are called -----
- (A) Dominant genes (B) Holandric genes (C) Both a and b (D) None of these
- 33 The genes which are located in homologous section of X and Y chromosomes are called -----
- (A) XY- linked genes (B) Dominant genes (C) Both a and b (D) None of these.
- 34 In *Drosophila*, occasionally flies are obtained which have female characters in one part of the body and male characters in the remaining parts. Such individuals are known as -----
- (A) Andromorphs (B) Gynomorphs (C) Gynandromorphs (D) All of these
- 35 Availability of gynandromorphs and their cytological examinations suggested that ----- does not play any role in determination of sex in *Drosophila*.
- (A) X- chromosomes (B) Y- chromosomes (C) XY- chromosomes (D) All of these
- 36 Genes located only on Y – chromosome has no alleles on X- chromosomes. These genes are transmitted directly from -----
- (A) Father to son (B) Male to male (C) Never transmitted by females (D) All of these
- 37 The one gene – one enzyme hypothesis is the idea that genes act through the production of -----
- (A) Enzymes (B) Cells (C) Both a and b (D) None of these

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- 38 The concept of one gene – one enzyme was proposed by ----- in an influential 1941 paper on genetic mutations in the mold *Neurospora crassa*.
- (A) Watson (B) George Beadle and Edward Tatum (C) McClung (D) None of these
- 39 The ultimate fine structure of gene is -----
- (A) Linkage map (B) Genome map (C) Restriction map (D) Base sequence
- 40 The fine structure of a gene is based upon the sequence and number of ----- on DNA strand.
- (A) Glutamine (B) Anti – A (C) Nucleotides (D) None of these
- 41 The hereditary disorders -----
- (A) Alkaptonuria (B) Phenylketonuria (C) Albinism (D) All of these
- 42 Alkaptonuria hereditary genetic disease in human is reported by ----- in 1902
- (A) J. D. Watson (B) Bateson (C) Tatum (D) None of these
- 43 The hereditary of developmental defects of the fetus are tested through -----
- (A) Electrolysis (B) Amniocentesis (C) Electrophoresis (D) None of these
- 44 ----- is the process of advising individuals and families affected by genetic disorders to help them and adapt to the medical, psychological and familial implications of genetic contributions to disease.
- (A) Genetic counseling (B) DNA finger printing (C) Gene cloning (D) None of these
- 45 The technique of DNA fingerprinting is developed by ----- and his colleagues at Leicester University in U. K.
- (A) R. Ericson (B) Tatum (C) Both a and b (D) Alec Jeffreys
- 46 A genetic counselor is an expert with a ----- degree in genetic counseling.
- (A) Master of Science (B) Master of Physiology (C) Master of psychology (D) None of these
- 47 The development of ----- hypothesis is often considered the first significant result in molecular biology.
- (A) Multiple alleles (B) cell division (C) Crossing over (D) One gene- one enzyme
- 48 According to National Science Foundation ----- is the controlled use of biological agents, such as microorganisms or cellular components for beneficial use.
- (A) Plant taxonomy (B) Embryology (C) Biotechnology (D) All of these
- 49 The first recombinant DNA molecule was made by the scientist ----- in 1972 by combining DNA from the monkey virus SV40 with the lambda virus.
- (A) Paul Berg (B) Alec Jeffreys (C) Watson (D) George Beadle and Edward Tatum
- 50 Genetic engineering is a process that alters the ----- of an organism by either removing or introducing DNA.
- (A) Color of individual (B) Genetic structure (C) Both a and b (D) None of these
- 51 Using ----- technique we can isolate and clone single copy of a gene or a DNA segment into an indefinite number of copies, all identical.
- (A) Genetic engineering (B) Emasculation (C) Pollination (D) None of these
- 52 ----- are defined as autonomous elements, whose genomes exist in the cell as extra chromosomal units.
- (A) Cosmids (B) Plasmids (C) Hybrids (D) None of these
- 53 Circular plasmid DNA which is used as a vector can be cleaved at one site with the help of a ----- to give a linear DNA molecule.
- (A) Restriction endonuclease (B) mRNA (C) cDNA (D) Both b and c
- 54 pBR322 has genes for resistant against two ----- antibodies.
- (A) penicillin and tetracycline (B) Tetracycline and ampicillin (C) Both a and b (D) None of these
- 55 pBR327, plasmid vector was derived from ----- by deletion of 1427 to 2516 nucleotides.
- (A) pBR326 (B) pBR329 (C) pBR322 (D) None of these
- 56 Restriction endonucleases are used to assist insertion of genes into ----- during gene cloning and protein production experiments.
- (A) Plasmid vectors (B) Cell (C) Both a and b (D) None of these
- 57 The polymerase chain reaction (PCR) technique was developed in 1985, by -----

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- (A)F. Griffith (B)O. T. Avery (C)M. Wilkins (D)Kary Mullis
- 58 Genetic engineering is applicable and useful in -----
- (A)Agriculture (B)Medicine (C)Production of antibiotics (D)All of these
- 59 Gregor Johann Mendel is regarded as father of -----
- (A)Plant breeding (B)Botany (C)Genetics (D)Cytogenetics
- 60 In case of supplementary gene action, F2 generation shows ----- phenotypic ratio.
- (A)9:6:1 (B)12:3:1 (C)9:7 (D)9:3:4

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SUBJECT CODE NO:- B-2056
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. T.Y. (Sem-VI)
Examination November/December- 2022
Botany Paper- XIX
(Genetics and Biotechnology)

[Time: 1:30 Hours]

[Max. Marks:50]

Please check whether you have got the right question paper.

- N.B
- 1) Attempt all questions
 - 2) Draw neat and well-labelled diagrams wherever necessary.
- Q.1 Describe mendelian principles with reference to the law of dominance and law of segregation. 20
- OR
- Describe sex linked inheritance. Explain in detail colour blindness and hemophilia in man. 20
- Q.2 Describe concept of genetic engineering and recombinant DNA technology. 20
- OR
- Write short notes on any four. 20
- a) Sex determination in grasshopper.
 - b) Lethal gene.
 - c) Amniocentesis
 - d) plasmids
 - e) Fine structure of gene
 - f) Blood group inheritance.
- Q.3 Multiple choice questions. 10
1. In a gene interaction the gene that masks the expressiory of another gene is termed as -----
 a) hypostatic b) Epistatic gene c) Both a and b d) None of these.
 2. Genic balance theory of sex determination was given by -----
 a) bridge b) Morgan c) Mendel d) Darwin

3. Visible character in organism are called-----
a) genotype b) phenotype c) both a and b d) none of these
4. Which these is a heterozygous conditions.
a) RR b) Rr c) rr d) None of these
5. Hypertrichosis is expressed in -----only.
a) males b) female c) both a & b d) none of these
6. -----is related with the structure of gene.
a) Mendel b) Darwin c) Seymour Benzes d) all of these
7. Detection of genetic disorders at early stages called-----
a) ECG b) Amnio centesis c) Elisa d) all of these
8. Eco R₁ -----restriction endonucleases.
a) Type I b) Type II c) Type III d) none of these
9. Plasmids replicates -----
a) autonomously b) with DNA c) Dependently d) None of these
10. The enzymes that cuts specifically recognition sites in the DNA is known as -----
a) Ligase b) Endonucleases c) DNA polymerase d) All of these

Total No. of Printed Pages:2

SUBJECT CODE NO:- 2056
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y (Sem-VI)
Examination March/April-2022 (To Be Held In June/July-2022)
Botany Paper- XIX
(Genetics and Biotechnology)

[Time: 1.53 Hours]

[Max. Marks:50]

Please check whether you have got the right question paper.

- N.B
- i) Attempt all questions
 - ii) Draw neat and well – labeled diagrams wherever necessary
- Q.1 What is gene interaction? Explain in details incomplete dominance & co- dominance with suitable examples. 20
- OR
- Define sex- linked inheritance? Explain holandric gene and haemophilia in man 20
- Q.2 What is restriction endonucleases. Explain in detail their properties and uses. 20
- OR
- Short notes (any four) 20
- a) Sex determination in man
 - b) Test cross
 - c) Isolation of gene
 - d) Amniocentesis
 - e) Phenylketonuria
 - f) Bt- cotton
- Q.3 Multiple choice questions 10
- 1) Law of segregation is also called as -----
 - a) Law of Dominance
 - b) Test cross
 - c) Law of purity of gametes
 - d) Back cross
 - 2) Interaction of genes was proposed by
 - a) Morgan
 - b) Bateson & Punnett
 - c) Mendel
 - d) Castle
 - 3) In co- dominance, when red cattle (RR) are crossed with white cattle (rr) the F1 hybrids have -----coloured skin
 - a) Red
 - b) white
 - c) Roan
 - d) Pink
 - 4) Who is the father of genetics

- a) Mendel b) Bateson & Punnett c) castle d) Morgan
- 5) The recessive characters will be expressed in ---- generation
a) F₁ b) F₂ c) Both a & b d) None of these
- 6) Hypertrichosis is expressed in
a) Males only b) Females only c) Both male & female d) None of these
- 7) Father of genetic engineering is.....
a) W. Arber b) A. Jeffery c) Paul Berg d) Smith
- 8) Which of the following is ratio of dominant epistasis
a) 9:7 b) 9:3:4 c) 12:3:1 d) 15:1
- 9) Which of the following is the mechanism of sex determination in Drosophila.
a) XX-XY b) XY-XY c) XX – XO d) ZZ- ZW
- 10) Which of the following genetically modified vegetable crop is ready for commercialization in India –
a) Cucumber b) Chilly c) Brinjal d) None of these

Total No. of Printed Pages: 2

SUBJECT CODE NO: - Y-2056
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y Sem-VI
Examination March / April - 2023
Botany Paper- XIX (Genetics and Biotechnology)

[Time: 1:30 Hours]**[Max. Marks:50]**

Please check whether you have got the right question paper.

N. B

- 1) Attempt all questions
- 2) Draw neat and well labelled diagram wherever necessary

Q1 Describe interaction of genes. Explain in detail dominant epistatic genes or dominant epistasis? 20

OR

Describe in detail sex determination and mechanism of sex determination in man and Drosophila?

Q2 What is genetic engineering? Describe in detail techniques of genetic engineering 20

OR

Write short notes on any four

- a) Test cross
- b) Holandric genes
- c) Law of dominance
- d) Phenylketonuria
- e) Gene cloning
- f) Introduction of G.J.Mendel

Q3 Multiple choice question 10

- 1) Law of segregation is also called as -----
 - a) Law of dominance
 - b) Back cross
 - c) Test cross
 - d) Law of purity of gameles
- 2) Unit of inheritance is called -----
 - a) Genotype
 - b) phenotype
 - c) gene
 - d) chromosome
- 3) A cross between F_1 individuals with either of its parents is called -----
 - a) Recessive
 - b) Back cross
 - c) Dominant
 - d) None of these
- 4) Sex determination in birds is of -----type
 - a) xx-yy
 - b) xx-xo
 - c) zz-zw
 - d) None of these

- 5) Haemophilic male if marries with normal female gives birth to all -----sons.
a) Normal b) Haemophilic c) carrier d) both a and c
- 6) Genetic diseases occurs due to ----genes.
a) Dominant b) recessive c) complementary d) supplementary
- 7) In Drosophila ---eye colour is a mutant character
a) Red b) white c) Blue d) none of these
- 8) ----enzymes are useful to join the cut ends of DNA molecule
a) RNA polymerase b) Ligase c) DNA polymerase d) All of these
- 9) Restriction enzymes were discovered by -----
a) Watson and crick b) Paul Berg c) Beedle and Tatum d) Nathan Arber
- 10) The most common plasmid vector used in genetic engineering is -----
a) P^{BR325} b) P^{BR322} c) P^{BR328} d) None of these

Total No. of Printed Pages : 2

SUBJECT CODE NO: - B-2056
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y (Sem-VI) (Pattern 2013)
Examination November / December 2023
Botany Paper- XIX (Genetics and Biotechnology)

[Time: 1:30 Hours]

[Max. Marks : 50]

Please check whether you have got the right question paper.

- N. B 1) All questions are compulsory.
 2) Draw neat and well labelled diagram whenever necessary.

Q1 Define inheritance. Explain Mendel's law of inheritance with suitable examples. **20**

OR

What is non-Allelic interaction? Describe non allelic non epistatic interaction with suitable example.

Q2 What is sex linked inheritance? Explain in detail inheritance of colorblindness in man. **20**

OR

Write short notes on (any four)

- (a) Plasmids
- (b) complementary genes
- (c) Restriction endonucleases
- (d) Sex determination in Man
- (e) Applications of genetic engineering
- (f) Amniocentesis

Q3 Multiple choice Questions. **10**

- (1) The Alternate form of a gene is -----.
 (a) Alternate type (b) Dominant character
 (c) Recessive character (d) Allele
- (2) 9:7 ratio in the F₂ generation represents
 (a) Incomplete dominance (b) co-dominance
 (c) Epistasis (d) complementary interactions
- (3) The smallest unit of genetic material which produces a phenotypic effect on Mutation is -----.
 (a) Muton (b) gene
 (c) Recon (d) Nucleic acids

- (4) In alkaptonuria disease -----
(a) patients urine contains homogentisic Acid
(b) Urine becomes black
(c) Both a and b
(d) Urine contain phenylalanine
- (5) Phenylketonuria (PKU) is a genetic disorder caused by a deficiency in which enzyme
(a) phenylalanine hydroxylase (b) Tyrosine hydroxylase
(c) Tryptophan hydroxylase (d) Histidine hydroxylase
- (6) Mathew is color-blind. What is the chance his son will inherit color blindness from him -----.
(a) 0% (b) 25%
(c) 50% (d) 100%
- (7) Amniocentesis is performed to determine
(a) The most likely date of Birth
(b) whether the baby will be normal or abnormal
(c) whether the mother has genetic abnormality
(d) Both a and b
- (8) Which is genetically modified crop
(a) Bt. Cotton (b) Bt. Brinjal
(c) Golden rice (d) All of the above
- (9) With respect to Biotechnology what does 'M' stand for in GM crops.
(a) Moderate (b) Modified
(c) Multiple (d) Mix
- (10) A hemophilic Man marries a homozygous woman who is not hemophilic. What are the possibilities that their child may have hemophilic.
(a) 100 (b) 75
(c) 50 (d) Nil