SECTION – D

Answer **any five**. (Short answer questions. **Each** question carries a weightage of **2**) :

21. Explain XX-XO type of sex determination.

22. Draw the diagram of a repressible operon you have studied.

23. From the blood types of children, determine the blood types of parents in the following families. Family 1 : All children are of group A. Family 2 : Children are of groups AB and A.

24. Cross between a red flowered 4 O'clock plant with a white flowered one gave an all pink F_1 progeny and a 1red:2pink: 1white F_2 progeny. Explain the inheritance pattern. Diagram the cross.

25. What are plasmagenes ? Enumerate their characteristics.

26. What is meant by dimerization ? Give the diagram of a thymine dimer.

27. Write a note on excision repair. **(5×2=10)**

SECTION – E

Answer **any one**. (Essay type question. **Each** question carries a weightage of **4**) :

28. Explain polygene concept. Bring out the characteristics of polygenes citing the inheritance of ear size in Corn as an example.

29. Give the details of transcription in eukaryotes. Add a note on post transcriptional modification of mRNA.

30. What do you understand by semi conservative replication ? Who first suggested it ? How did Meselson and Stahl prove that DNA replication is semiconservative ? **(1×4=4)**

M 7106

Reg. No. : .....

Name : .....

V Semester B.Sc. Degree (CCSS – Reg./Supple./Imp.) Examination, November 2014
CORE COURSE IN BOTANY/PLANT SCIENCE
5B06 BOT/PLS : Genetics and Molecular Biology
(2011 and Earlier Admissions)

Time : 3 Hours Max. Weightage : 30

Instruction : ***Draw*** *diagrams* ***wherever*** *necessary.*

SECTION – A

Answer **all** (questions in bunches of **four**. **Each** bunch carries a weightage of **1**) :

1. Choose the correct answer :
   i) Choose the incorrect statement about DNA.
      a) It contains C, H, O, N, P and S
      b) It can act as a template for synthesis of RNA
      c) It replicates in a semi discontinuous manner
      d) It can be formed from RNA
   ii) In Meiosis, bivalents are formed during
      a) Leptotene b) Zygotene c) Diplotene d) Early metaphase
   iii) Complementary genes modify the dihybrid F_2 phenotypic ratio to
      a) 12:3:1 b) 9:3:4 c) 9:7 d) 9:6:1
   iv) Mobile genetic elements were first observed by
      a) Bateson and Punnett b) Barbara McClintock
      c) Sutton and Boveri d) Rosalind Franklin

2. i) If an organism has 3 pairs of genes, how many types of gametes can it produce ?
      a) 3 b) 6 c) 8 d) 9
   ii) Zygotene is characterized by
      a) Synapsis b) Bivalents
      c) Tetrad d) Synapsis and bivalents

iii) When a phenotypically tall pea plant is crossed to a dwarf one, what will be the ratio of tall and dwarf phenotypes in the progeny ?
a) 3:1 b) All tall c) 1:1 d) All dwarf

iv) The number of base pairs per turn in Z DNA is
a) 10 b) 11 c) 12 d) 34

3. State **true** or **false** :
i) DNA polymerase III is also called Kornberg enzyme.
ii) In meiosis, halving of chromosome number occurs during phase 1.
iii) The term gene was used for the first time by William Bateson.
iv) A primer is a short stretch of RNA attached to the 3' end of template DNA.

4. Answer in **one** word or **one** sentence :
i) Who proposed wobble hypothesis ?
ii) What is emasculation ?
iii) Give the F_2 phenotypic ratio when inhibitory genes operate.
iv) Name the chemical bond between the monomeric units in DNA.

5. Rearrange column B and C to match column A.

	A	B	C
i	One gene one enzyme hypothesis	Nirenberg and Matthei Beadle and Tatum	1900
ii	Operon concept	Sutton and Boveri Jacob and Monod	1906
iii	Coupling and repulsion	Bateson and Punnett T.H. Morgan	1960
iv	ABO blood group system	Arthur Kornberg Carl Landsteiner	1941

(5×1=5)

SECTION – B

Distinguish between **any four** of the following (**Each** question carries a weightage of **1**) :

6. hnRNA and mRNA.
7. Eukaryotic and prokaryotic ribosomes.
8. Antigen and antibody.
9. XX-XO and ZZ-ZW types of sex determination.
10. F_2 phenotypes in incomplete dominance and complete dominance.
11. Penetrance and expressivity. **(4×1=4)**

SECTION – C

Answer **any seven**. (Short answer questions. **Each** question carries a weightage of **1**) :

12. How can you relate crossing over and distances between genes ?
13. If the base sequence in one strand of a DNA segment is 5' TCATACATATTGACGCAG 3', What will be the base sequence of the complementary strand and the mRNA transcribed from it ?
14. Define a universal donor. Which group of persons are called so ?
15. State the law of dominance.
16. What are synonymous codons ?
17. Draw the structure of a dinucleotide.
18. Define a diallele.
19. What do you mean by sex ratio ?
20. What is terminalization ? **(7×1=7)**