2017

MICROBIOLOGY

[Honours]

PAPER – VI

Full-Marks : 90

Time : 4 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

[NEW SYLLABUS]

GROUP – A

Answer any two questions :   15 × 2

1. (a) What is solenoid and supersolenoid ?   2 + 1

   (b) Discuss the role of non-histone proteins in packaging of DNA in eukaryotic chromosome. What is scaffold ?   2 + 1

(c) What are SINE's and LINE's ? 4

(d) What is test cross ratio ? Why is it done ? 2+1

(e) In which case of monohybrid cross phenotypic and genotypic ratio becomes same in F_2. 2

2. (a) Write a short note on wobble hypothesis. 3

(b) What is constitute and facultative hetero-chromatin ? 2

(c) What is (+) and (−) stand of viral RNA ? Mention the steps of rolling circle model. 1+4

(d) What is leader sequence ? Why bending of CAP-c AMP complex is essential in lac operon. 1+4

3. (a) Write a short note on the action of reverse transcriptase. 3

(b) What is phagemid and cosmid ? 2+2

(c) Write a short note in RFLP. 4

(d) Write two applications of genetic engineering in bioremediation and medicine.   4

4.   (a) Compare and contrast Southern blotting with Western blotting.   6

   (b) Write down the type of restriction endo-nuclease with example.   4

   (c) Write down the steps of photoreactivation ? How thymine dimers are repaired ?   4

   (d) What is forbidden base pairing ?   1

GROUP – B

Answer any five questions : 8×5

5.   (a) What is cDNA library ? Mention the steps making cDNA library of yeast.   2+2

   (b) Describe the importance of Ti plasmid in plant genetic engineering.   2

   (c) Mention the characteristic features of mt DNA.   2

6. (a) How it can be proved that DNA does not replicate by conservation or dispersive mode.   4

   (b) What is IS element ?   1

   (c) What is cotransduction frequency ? State its significance in bacterial gene mapping.   1+2

7. (a) Discuss transformation in Gram positive and Gram negative bacteria.   2

   (b) Write a short note the role of DNA polymerase III and sigma factor.   3+3

8. (a) What is deletion loop ? What is paracentric and pericentric inversion ? How dicentric bridges are formed ?   1+ 1+ 3

   (b) How F' is generated ?   2

   (c) Mention the role of promoters in transcription.   1

9. (a) State the role of initiation factors in translation.   4

(b) Mention the steps of PCR. How Taq *polymerase* *differs* from DNA polymerase? 3+1

10. (a) (i) Mention a mechanism by which a foreign DNA is introduced and inserted into the bacterial DNA.

(ii) What are cloning vectors? 4+1

(b) What is transition and transversion? 2

(c) Mention one exception of Mendellism. 1

11. (a) Why are polytene chromosomes termed so? How they are formed? What are chromosomal puffs and balbiani rings? 1+2+2

(b) Mention the role of base analogoues in generating mutation. 3

12. (a) What is interrupted mating experiment? What antibiotic sensitive Hfr is taken in such experiments? 1+2

(b) Briefly describe Sanger's method of protein sequencing. 5

13. (a) Write down the application of exonuclease III. 2

    (b) How BER (Base excession repair) differs from NER (Nucleotide excession repair) ? 3

    (c) What is electroporation ? 2

    (d) What is chromosome walking ? 1

14. (a) Write briefly on application of nif gene. How antirabies vaccine is prepared using biotechnology. 2 + 2

    (b) How frameshift mutation shown by Crick proved that codon is triplet ? 3

    (c) Name an artificial inducer of lac operon. 1

GROUP — C

Answer any **five** questions : 4 × 5

15. (a) Write a short note on $_pBR^{322}$. 4

    (b) What is minimal medium and supplementary medium ? How auxotrophs are screened ? 2 + 2

(c) What is O^c and $_iS$?   2+2

(d) Mention the function of different arms/loop of tRNA related to protein synthesis.   4

(e) What is blue white selection ?   4

(f) What is tautomerism ? How does it induce mutation ?   4

(g) How specialized transduction differs from generalized transduction ?   4

(h) What is satellite DNA ? State its significance.   2+2

(i) What is replicon and primosome ?   2+2

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