

BTECH—101 (Syllabus—2015)

2 0 1 5

(October)

BIOTECHNOLOGY

(Honours)

(**Cell Biology and Genetics**)

Marks : 56

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Answer Question No. 1 which is compulsory and
any **four** from the rest

1. Differentiate between the following : $2 \times 6 = 12$

- (a) Phenotype and Genotype
- (b) Cis and Trans fate of Golgi complex
- (c) Chromatid and Chromosome
- (d) Diploid and Haploid
- (e) Alleles and Multiple alleles
- (f) Functions related to Polar and Non-polar group of plasma membrane

2. Write short notes on the following :

2+3+2+2+2=11

- (a) Renner complexes
- (b) Lyon hypothesis
- (c) Delimited nucleus
- (d) Chromonemata
- (e) Functions of cristae

3. (a) Enumerate the significance of monosomic, tetrasomic and nullisomic individuals.

6

(b) Describe the characteristic of Barr body with examples.

5

4. With suitable illustration, describe the various phases of cell cycle, with special emphasis on various checkpoints. Also mention the role of cdks and cyclins. 7+4=11

5. (a) What are giant chromosomes? Describe with suitable diagrams.

6

(b) Write briefly on the following : 3+2=5

- (i) One gene-one band hypothesis
- (ii) Somatic pairing

6. (a) A black mouse mates with a brown mouse and all the offsprings are black. State the reason as why no brown offspring are produced. Cite your answer with suitable illustration.

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(b) How will you distinguish cytologically between the following?

3+3=6

- (i) A translocation homozygote and heterozygote
- (ii) A paracentric and a pericentric inversion

7. (a) Describe the role of chloroplast in cytoplasmic inheritance in *Mirabilis jalapa*.

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(b) A colour-blind man has a normal brother and a colour-blind sister. Give the genotypes of the parents. Based on the concept, draw a pedigree chart showing the positions with genotypes of all individuals.

4

(c) What are isochromosomes? Discuss their significances.

3

8. (a) Describe the role of colchicine in induction of polyploidy in cells.

3

(b) Describe in detail the Muller's technique of detection of mutations in X chromosome of *Drosophila*.

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