T(5th Sm.)-Botany-H/CC-11/CBCS

2020

BOTANY — HONOURS

Paper : CC-11

(Cell and Molecular Biology)

Full Marks : 50

The figures in the margin indicate full marks.

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

- 1. Answer any five questions from the following :
 - (a) State the central dogma of living organisms.
 - (b) Comment on the importance of nuclear lamina.
 - (c) Why does DNA replication go from 5' to 3'?
 - (d) What are riboswitches? Give one example.
 - (e) What happens when a cell reaches G_0 stage?
 - (f) Name one thermostable enzyme used for DNA amplification. Mention its source.
 - (g) Is there a difference between oncogene and tumor suppressor gene?
 - (h) Name the histone proteins associated with nucleosome.
- 2. Answer any two questions from the following :
 - (a) Write a brief essay about application of PCR technology in biotechnology. 5
 - (b) Discuss the role of telomerase in eukaryotic DNA replication and mention its importance. 4+1
 - (c) Enumerate the properties of genetic code mentioning the exceptions, if any. 5
 - (d) How does the initiation of translation occur in prokaryotes?
- 3. Answer any three questions from the following :
 - (a) State the events occur during the $G_1 S$ and $G_2 M$ checkpoints in yeast cell cycle. Describe the role of MPF during cell-cycle progression. 6+4
 - (b) What is an operon? Describe the structure of lac-operon. Discuss with diagrams the negative control of lac-operon. 2+3+5
 - (c) Describe briefly about the events that led to transition from RNA to DNA world. What is endosymbiosis? How endosymbiotic theory helps to explain the origin of eukaryotic cell? 4+1+5

Please Turn Over

2×5

5

- (d) What are the structural differences between hnRNA and mRNA? What is spliceosome? Describe the prerequisite condition for DNA replication in prokaryotes. 2+2+6
- (e) What is cancer? Mention the different stages of cancer. What are the probable causes of cancer? Mention the role of 'Ras' gene in cancer.
 2+2+4+2

T(5th Sm.)-Botany-H/CC-12/CBCS

2020

BOTANY — **HONOURS**

Paper : CC-12

(Biochemistry)

Full Marks : 50

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

- 1. Answer briefly the following (any five) :
 - (a) What is Handerson-Hasselbach equation?
 - (b) "All co-enzymes are co-factors but all co-factors are not co-enzymes"— Explain with example.
 - (c) Differentiate between symport and antiport.
 - (d) Give an example each of saturated and unsaturated fatty acids.
 - (e) What is the maximum number of amino acids in an α -helix? Name one non-essential amino acid.
 - (f) What is 'Z-DNA'? What is its main difference with normal 'B-DNA'?
 - (g) What is redox-potential? What is its significance in biological system?

2. Answer *any two* of the following :

- (a) Distinguish between :
 - (i) Enantiomer and Epimer
 - (ii) Phospholipid and Glycolipid.

(b)	Give a br	ief account o	of competitive a	and non-comp	petitive inhi	ibition of enz	yme activity.	5
			1	1			5 5	

- (c) Write a short note on the significance of H bond in biology.
- (d) Give a short account on the mechanism of active and passive ion uptake in plants. 5
- 3. Answer *any three* of the following :
 - (a) Write down the chemical structure of a Purine and a Pyrimidine nitrogenous base. Distinguish between ribonucleotide and deoxyribonucleotide. How nucleotides are joined together to form polynucleotide? Schematically represent an oligonucleotide chain. 3+2+3+2
 - (b) Distinguish between oxidative and photophosphorylation. In the light of chemiosmotic model describe the mechanism of ATP synthesis in chloroplasts. 5+5
 - (c) What is meant by steady state of enzyme action? How can K_m value be determined with the help of an equation of straight line? 2+8

Please Turn Over

 2×5

21/2×2

5

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(2)

- (d) Explain with illustration how primary, secondary, tertiary and quaternary structure of proteins are formed. How two amino acids are joined to form a polypeptide? 8+2
- (e) (i) Discuss stereoisomerism in Carbohydrates.
 - (ii) Explain numerical system of enzyme classification with examples. 5+5

T(5th Sm.)-Botany-H/DSE-A-1/CBCS

2020

BOTANY — HONOURS

Paper : DSE-A-1

(Biostatistics)

Full Marks : 50

The figures in the margin indicate full marks.

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

1.	Answer	any five of the following:	
	(a) Wh	nat is frequency distribution?	2
	(b) Wri	ite two limitations of statistics.	1+1
	(c) Wh	nat do you mean by discrete variables?	2
	(d) Def	fine primary data with example.	1+1
	(e) Def	fine null hypothesis with example.	2
	(f) Def	fine statistical error. How it is different from mistake?	1+1
	(g) Wh	nat do you mean by 'Population' and 'Sample'?	1+1
	(h) Def	fine cumulative frequency distribution and mention one of its use.	1+1
2.	Answer	any two of the following:	
	(a) Wh	nat are the advantages of 'Arithmatic mean' and 'mode value'?	5
	(b) How Wh	w does the standard deviation help for analysing the data in case of normal d nat is bimodal distribution?	istribution? 4+1

(c) Five persons A, B, C, D, E occupy seats in a row at random. What is the probability that A and B sit next to each other? 5

3. Answer any three of the following :

(a) Explain why the standard deviation is regarded as superior to other measures of dispersion. What is its chief defect? The grain length of a variety in rice is given below :

Grain length in mm	9-11	12-14	15-17	18-20
No. of grains	3	5	9	3

Calculate the mean and standard error of grain length of the variety.

3+2+2+3

Please Turn Over

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(b) What do you mean by Hardy-Weinberg Equilibrium? Mention the factors affecting the equilibrium. In a study of a tribe from central Asia 26 Albino individuals are found in a total population of 6000. Albinism is recessive to normal skin colour. Calculate the expected allele frequencies and genotype frequencies if the population is in Hardy-Weinberg Equilibrium. How many of tribal individuals are estimated to be carriers of the recessive albino allele? 2+3+3+2

(2)

(c) Define coefficient of variation. What are the special uses of this measure? Find the coefficient of variation from the following and comment on that.
2+3+5

weight (gm)	110-119	120-129	130-139	140-149	150-159	160-169	170-179	180-189
Frequency	5	7	12	20	16	10	7	3

- (d) Selfing of a hybrid plant, produced a population with 120 pink flowers and 88 white flowers. Explain the data with χ^2 analysis. Find out the segregation ratio and test the goodness of fit. Comment on the nature of segregation. [χ^2 table value is 3.84 for 1 degree of freedom at 0.05 probability level]. 3+4+3
- (e) (i) Four cards are drawn consecutively four times from a pack of 52 cards. Find the chances of drawing an ace, a king, a queen and a jack. The cards are not replaced after each withdrawal.
 - (ii) What is the probability of getting a king or a club from a pack of 52 cards?
 - (iii) Define conditional probability.

4+4+2

T(5th Sm.)-Botany-H/DSE-B-1/CBCS

2020

BOTANY — **HONOURS**

Paper : DSE-B-1

(Plant Biotechnology)

Full Marks : 50

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

1. Answer any five questions :

- (a) Name two chemicals used for surface sterilization of explants for in vitro culture.
- (b) What is cytodifferentiation?
- (c) What do you mean by 'Super bug'?
- (d) What is edible vaccine?
- (e) Define cellular totipotency.
- (f) What is T-DNA?
- (g) Define fusogen with an example.
- (h) State two names of transgenic plants.

2. Answer any two questions :

(a) Briefly discuss the method of isolation of protoplast.	5
(b) Briefly discuss the Ti Plasmid.	5
(c) Write a short note on <i>Bt</i> cotton.	5
(d) What is callus culture? State its application.	3+2

3. Answer any three questions :

- (a) With a suitable flow chart enumerate anther culture method. Explain its application. 7+3
- (b) Write short notes :
 - (i) Reporter gene (ii) Artificial seed (iii) De-differentiation (iv) Suspension culture. 2¹/₂×4
- (c) Briefly discuss the steps of T-DNA transfer process from *Agrobacterium tumifaciens* cell to plant cell.
- (d) Starting from an explant give an outline of different steps involved to raise a plant *in vitro*. State the essential components of any plant tissue culture medium. 5+5
- (e) Distinguish between direct and indirect organogenesis. Define rhizogenesis. What is somatic embryo?

6+2+2

 2×5