

DIRECTORATE OF GOVERNMENT EXAMINATIONS, CHENNAI-06
HIGHER SECONDARY SECOND YEAR PUBLIC EXAMINATIONS - MARCH 2018
BOTANY KEY ANSWER

Max Marks:150

Note :

1. Answers written only in BLACK or BLUE should be evaluated.
2. Choose the correct answer and write the option code with corresponding answer.
3. If one of them (option or answer) is wrong, then award zero mark only.

SECTION-A				30x1=30	
Q. No	Option	TYPE-A	Q. No	Option	TYPE-B
1		mere attempt	1	a	Solanum xanthocarpum
2	b	Artificial system	2	a	crude oil slick
3	b	Stellate parenchyma	3	d	Arabidaopsis thaliana
4	a	400 nm - 700 nm	4	b	Echinops
5	d	Cola nitida	5	b	polyethylene glycol
6	a	nucleus	6	b	2, 4D
7	a	lateral meristem	7	a	endodermis
8	b	Echinops	8	b	38 ATP
9	b	38 ATP	9	b	Mg
10	b	Artificial synthetic seeds	10	c	loculicidal capsule
11	b	2, 4D	11	d	Serin
12	a	Solanum xanthocarpum	12	a	Translation
13	d	Euphorbiaceae	13	a	400 nm - 700 nm
14	d	Pyricularia Oryzae	14	d	Tobacco
15	b	polyethylene glycol	15	b	Stellate parenchyma
16	c	Pericycle	16		mere attempt
17	d	Strelizia reginae	17	d	Crotalaria verrucosa
18	d	Tobacco	18	d	Euphorbiaceae
19	d	Crotalaria verrucosa	19	b	artificial synthetic seeds
20	a	endodermis	20	d	Strelizia reginae
21	a	Translation	21	d	Cola nitida
22	a	3 - 5%	22	c	Two
23	a	crude oil slick	23	a	lateral meristem
24	c	loculicidal capsule	24	d	Pyricularia Oryzae
25	c	Two	25	a	nucleus
26	d	Arabidaopsis thaliana	26	b	Artificial system
27	d	Waldeyer	27	c	Ethylene
28	c	Ethylene	28	c	Pericycle
29	b	Mg	29	d	Waldeyer
30	d	Serin	30	a	3 - 5%

SECTION B		15X3=45	
Answer any 15 questions			
31	Binomial Nomenclature: Naming a plant with two words The first word indicates genus The second word indicates species Eg. <i>Mangifera indica</i> (or) any binomial name	2 1	3
32	Epicalyx: Bracteoles forming a whorl outer to calyx Eg. <i>Hibiscus rosa-sinensis</i> <i>Pavonia odorata</i> / <i>Malva sylvestris</i> (any one)	2 1	3
33	Syngenesious: 1. Anthers are fused into a tube around the style - 2. Filaments are free	1½ 1½	3
34	Polygamous: Staminate flowers, pistillate flowers and bisexual flowers are present in same plant. Example – <i>Musa</i> or <i>Banana</i>	2 1	3
35	Companion cells: The thin walled, elongated, specialized parenchyma cells which are associated with sieve elements are called companion cells.		3
36	Types of chromosome: Four morphogenic types of chromosomes (Based on position of centromere) 4-diagram Label the parts	$4 \times \frac{1}{2} = 2$ 1	3
37	Crossing Over: The process, which produces recombination of genes by interchanging the corresponding segments between non-sister chromatids of homologous chromosomes.		3
38	Genetic Code: At the time of protein synthesis, Three successive nucleotide bases in the mRNA, which codes are specific aminoacids in a polypeptide is called genetic code.		3
39	Splicing: Using the enzyme DNA ligase, the DNA fragments of donor and vector are joined together. This process is called splicing.		3

40	Uses of SCP: (4)	4x¾	3
41	Difference between photorespiration and dark respiration:	1+1+1	3
42	Overall equation of photosynthesis: $\text{CO}_2 + 2\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{Solar energy}} (\text{CH}_2\text{O})_n + \text{H}_2\text{O} + \text{O}_2$		3
43	Dimorphic chloroplast: In C ₄ plants chloroplast in mesophyll tissue are granel (grana present or with grana) Chloroplast in Bundle Sheath cells are agranal (grana absent or without grana)	1 1 1	3
44	Advantages of vernalization: 1. Crops can be produced earlier. 2. They can be cultivated in places where they naturally do not grow. 3. Vernalization helps to accelerate the plant breeding.	1 1 1	3
45	Respiratory quotient for anaerobic respiration: In anaerobic respiration, carbondioxide is evolved but oxygen is not consumed. or $\text{C}_6\text{H}_{12}\text{O}_6 \xrightarrow{\text{zymase}} 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2 + \text{Energy}$ or Respiratory quotient of Glucose in anaerobic respiration = $\frac{2 \text{ moles of CO}_2}{\text{zero moles of O}_2} = \infty$ infinity		3
46	Fermentation : The anaerobic breakdown of glucose to carbondioxide and ethanol is a form of respiration referred to fermentation. (or) A chemical change accompanied by effervescence.		3
47	Sigmoid Curve: The growth in size or increase in number of cells if plotted against time the graph shows 'S' shaped curve known as sigmoid curve.		3

48	Richmond Lang effect: Application of cytokinin delays the process of ageing in plants		3
49	Pure line selection: Collection of plants obtained as a result of repeated self-pollination from a single homozygous individual.		3
50	Biopiracy: The clandestine exploitation and utilization of bioresources from a country by several organizations and multinational companies without proper authorization is known as Biopiracy.		3

SECTION – C
Answer any 7 questions Q.no 54 is compulsory 7x5=35

51	<u>Phylogenetic system of classification:</u>		
	i. Based on evolutionary sequence as well as genetic relationships among different groups of plants. It employs as many taxonomic characters as possible	1	
	ii. Charles Darwin's – Origin of species had given enough stimulus for the creation of phylo-genetic system	1	
	iii. Adolf Engler and Karl Prantl (Germany) published a phylogenetic system in their monograph on "Die natürlichen pflanzen familien"	1	
	iv. Primitive characters	½	5
	a. -single whorl of perianth or no perianth		
	b. -unisexual flowers		
	v. Advanced characters	½	
	perianth with two whorls		
	bisexual flowers		
	pollinated by insects		
	vi. Asteraceae of dicotyledons and orchidaceae of monocotyledons were highly advanced	1	

52	Differences between Musa and Ravenala:		
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S.no	Musa	Ravenala																				
i.	Perennial Herb	Tree	1/2	5																		
ii.	Real stem under ground Rhizome	Aerial and woody	1																			
iii	Inflorescence Branched Spadix	Compound Cyme	1																			
iv	Phyllotaxy spiral	Distichous	1																			
v	5 Stamens are fertile	6 Stamens are fertile	1																			
vi	Fruit - Elongated berry	Capsule	1/2																			
53	Three types of Meristems based on their position: (i). Apical meristem – Explanation (ii). Intercalary meristem – Exaplantion (iii). Lateral meristem – Explanation Diagram and All parts		1/2 1 1 1 1 1/2	5																		
54	Compulsory question <u>Transverse section of dicot root</u> 1. Section enlarged or ground plan 2. Each parts carry 1/4 marks		2 1/4 2 3/4	5																		
55	Differentiate between sapwood and heart wood. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Sapwood</th> <th>Heart wood</th> </tr> </thead> <tbody> <tr> <td>i.</td> <td>The outer part of the wood pale in colour</td> <td>The center part of the wood dark in colour</td> </tr> <tr> <td>ii.</td> <td>Called as alburnum</td> <td>Called as duramen</td> </tr> <tr> <td>iii.</td> <td>It conducts of water</td> <td>Water is not conducted</td> </tr> <tr> <td>iv</td> <td>Economically less useful</td> <td>Economically more useful</td> </tr> <tr> <td>v.</td> <td>Less durable and less resistant to microorganisms and insects.</td> <td>More durable and more resistant to microorganisms and insects.</td> </tr> </tbody> </table>			Sapwood	Heart wood	i.	The outer part of the wood pale in colour	The center part of the wood dark in colour	ii.	Called as alburnum	Called as duramen	iii.	It conducts of water	Water is not conducted	iv	Economically less useful	Economically more useful	v.	Less durable and less resistant to microorganisms and insects.	More durable and more resistant to microorganisms and insects.		5
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56	<u>Structure of chromosome:</u> 1. Diagram 6 Parts	6x½ =	2 3	5
57	Point or Gene mutation Definition Deletion Addition Sustitution - Transition - Transversion		1 1 1 1 ½ ½	5
58	Enzymatic method of isolation of protoplast. Correct Explanation			5
59	Significance of pentose phosphate pathway 5 points			5
60	Differentiate between C3 and C4 plants 1 to 5 points			5
61	<u>Ganong's respiroscope experiment:</u> 1. Explanation 2. Diagram 3. Parts		3 1 1	5
62	Microbes in medicines			
	Microbes	Medicines	Uses	
	i. Penicillium notatum	Penicillin	To treat/cure pneumonia.	½
	ii. Streptomyces griseus	Streptomycin	To cure urinary infection, tuberculosis, meningitis and pneumonia	1
	iii. Streptomyces aureofaciens	Aureomycin	Used to cure osteomyelitis, whooping cough and eye infection.	1
	iv. Streptomyces venezuelae	Chloromycetin	To cure typhoid	1
	v. Bacillus licheniformis	Bacitracin	To treat syphilis and diabetes.	1
	vi. E. coli	Humulin	To treat diabetes.	½
				5

SECTION - D

4x10=40

Answer any 4 question

63	<p>Bentham and Hooker's Classification of plants</p> <p>Explanation</p> <p>Dicotyledonae</p> <p>Gymnospermae</p> <p>Monocotyledonae</p>	<p>6</p> <p>2</p> <p>2</p>	<p>10</p>
64	<p>Clitoria ternatea - Botanical term</p> <p>Habit -1/2</p> <p>Root -1/2</p> <p>Stem -1/2</p> <p>Leaf 1</p> <p>Inflorescence -1/2</p> <p>Flower -1/2</p> <p>Calyx -1/2</p> <p>Corolla -1/2</p> <p>Androecium 1</p> <p>Gynoecium -1/2</p> <p>Fruit -1/2</p> <p>Seed -1/2</p> <p style="text-align: center;">} 7</p> <p>Floral diagram</p> <p>Floral formula</p>	<p>7</p> <p>2</p> <p>1</p>	<p>10</p>
65	<p>Internal structure of dicot leaf:</p> <p>i. Epidermis Explanation</p> <p>ii. Mesophyll Explanation</p> <p>iii. Vascular tissues</p> <p>iv. Diagram</p> <p>v. Twelve parts (each 1/4 mark)</p>	<p>1</p> <p>2</p> <p>2</p> <p>2</p> <p>3</p>	<p>10</p>
66	<p>Structure of DNA</p> <p>Explanation</p> <p>Diagram with parts</p>	<p>7</p> <p>3</p>	<p>10</p>

