## DIRECTORATE OF GOVERNMENT EXAMINATION, CHENNAI – 6 HSC FIRST YEAR EXAMINATION – MARCH/APRIL 2023 BOTANY KEY ANSWER

## NOTE:

- 1. Answer written only in BLACK or BLUE should be evaluated
- 2. Choose the correct answer and write the option code

**Maximum Marks: 70** 

## Answer all questions. PART- A

15 x 1 = 15

(A Type)				(B Type)			
Q. No	Option	Answer	Q. No	Option	Answer		
1	(a)	Phyllode- Acacia	1	(a)	(1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)		
2	(d)	All of the above	2	(d)	Tyloses		
3	(a)	Arachis hypogea	3	(b)	Prevent the uptake of Fe, Mg but not Ca (or) Prevent the uptake of Fe, Mg and Ca		
4	(b)	Fabaceae	4	(d)	Watson and Crick		
5	(b)	P.Mitchell	5	(c)	Synapsis		
6	(d)	Watson and Crick	6	(a)	Arachis hypogea		
7	(b)	Prevent the uptake of Fe, Mg but not Ca (or) Prevent the uptake of Fe, Mg and Ca	7	(a)	Phyllode- Acacia		
8	(c)	Synapsis	8	(b)	P.Mitchell		
9	(d)	2,4 -D and 2,4,5-T	9	(b)	Ernest Ruska		
10	(c)	Methanobacterium	10	(a)	Cambium for secondary growth		
11	(a)	Cambium for secondary growth	11	(a)	Pinites Succinifera		
12	(a)	(1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)	12	(c)	Methanobacterium		
13	(b)	Ernest Ruska	13	(d)	All of the above		
14	(d)	Tyloses	14	(d)	2,4 -D and 2,4,5-T		
15	(a)	Pinites Succinifera	15	(b)	Fabaceae		

Part II

Note: Answer any six questions. Question no. 24 is compulsory.  $6 \times 2 = 12$ 

16	Bacteria which require CO <sub>2</sub> for t	their growth		2
17	Regions of Root:  Diagram  Any two parts			2
18	Plectostele: Xylem plates alternates with phloem plates Example: Lycopodium clavatum			2
19	Significance of Meiosis:  1.It maintains a definite constant number of chromosomes in organisms.  2. Exchange of genetic material leads to variations among species.  3.These variations are the raw materials to evolution.  4.Genetic variability by partitioning different combinations of genes into gametes through independent assortment.  5. Adaption of organisms to various environmental stress.  (Any two)			2
20	Due to lacking of Protoplast the Tracheids become dead	cells of Sclerenchyma and	2	2
21	Pinus wood	Morus wood		
	Common in gymnosperms  Non porous because it does not contain vessels.  It is also called soft wood  Common in angiosperms  Porous because it contain vessels.  It is also called Hard wood			2
		(Any two)	-	
22	In succulent plants, Carbohydrates are partially oxidised to Malic acid without corresponding release of $CO_2$ but $O_2$ is consumed hence the RQ value will be zero.  (or)  RQ of glucose in Succulents $\frac{zero\ molecule\ of\ CO_2}{3\ molecules\ of\ O_2} = 0(zero)$			2
23	(a) Staminode (b) Epipetalous		1	2
24	Nitrosomonas     Nitrobactor		1	2

25	1. Yes	1	3
	<ol><li>The anthredia produces biflagellate anthrozoids which swims in thin film of water and reach the archegonium</li></ol>	2	3
	and fuse with the egg to form diploid zygote.		
26	Physiological effects of Auxin:  1. They promote cell elongation in stem and coleoptile		
	2. At higher concentration auxins inhibit the elongation of		
	roots but extremely lower concentrations promotes growth of root.		
	3. Suppression of growth in lateral bud by apical bud due to	3×1	3
	auxin produced by apical bud is termed as apical dominance.	JX I	3
	4. Auxin prevents abscission		
	5. It is used to eradicate weeds. Example 2,4-D and 2,4,5-T.		
	<ol><li>Synthetic auxins are used in the formation of seedless fruits. (parthinocarpic fruit).</li></ol>		
	7. It is used to break the dormancy in seeds		
07	(Any three only)	3	
27	In certain plants deficiency symptoms appear first in younger leaves while in others they do so in mature organs, mainly due	3	
	to mobility of minerals. <b>(or)</b>		
	1.Calcium, Sulphur, Iron, Boron and Copper shows deficiency	1 ½	
	symptoms first that appear on young leaves due to the immobile nature of minerals.		3
	2.Nitrogen, Phosphorus, Potassium and Magnesium deficiency symptoms first appear on old and senescent leaves due to	1 ½	
	active movement of minerals to younger leaves.		
28	Structure of plant cell:  Diagram:	2	
	_	1	3
29	Any 4 parts Class : Dicotyledonae	1	
	Sub class: Polypetalae	1	3
	Series : Calyciflorae	1	

30						
		Sympodial branching (Determinate)	Monopodial branching (Indeterminate)	2		
		The terminal bud cease to grow after a period of growth and the further growth is taken care by successive or several lateral meristem or buds.	The terminal bud grows uninterrupted and produce several lateral branches	1	3	
		Example: Cycas	Example: Polyalthia, Swietenia (any one)			
31	Differences between DNA and RNA					
		DNA	RNA			
		1.lt is a double stranded	1.It is a single stranded			
		2.lt has deoxyribose sugar	2.It has ribose sugar			
		3.lt contains nitrogen bases	3.lt contains nitrogen bases	3×1	3	
	such as adenine, guanine, such as adenine, guanine,		such as adenine,guanine,			
W		thymine and cytosine. 4. The nitrogen base is covalently bonded to the	cytosine and uracil.  4.The nitrogen base is covalently bonded to the		e	1
		sugar deoxyribose.	sugar ribose.			
		5.It is stable molecule.	5.lt is unstable molecule.			
32	Si	gnificances of Transmissior	Electron microscope:			
	It is used for studying detailed structure of viruses, Mycoplasma, Cellular Organelles etc.				3	
33	Solution: Water will move from low DPD to high DPI (Hypodermis 2 atm to Cortex 5 atm).				3	

<u>Part-IV</u>

Note: Answer the following questions

 $5 \times 5 = 25$ 

34		ences between Gram				
a)	S.No	Characters	Gram positive bacteria	Gram negative bacteria.		
	1	Cell wall	Thick Layered	Thin layered		
	2	Rigidity of the cellwall	Rigid	Elastic		
	3	Chemical composition	Teichoic acid Present	Teichoic acid absent		
	4	Outer membrane	Absent	Present	5×1	5
	5	Periplasmic space	Absent	Present		
	6	susceptibility to penicillin	highly susceptible	low susceptible		
	7	Nutritional requirement	Relatively complex	Relatively simple		
	8	Flagella	Contain 2 basal	Contain 4 basal		
			body rings	rings		
	9	Libid and lipoproteins	Low	High		
	10	Lipopolysaccharides	Absent	Present		
		V.Pa	Ua5	(Any Five Only)		
			(OR)			
34	Datur	<i>a metal</i> – Botanical des	scription: -			
b)	1). (i).	Habit	]			
(ii) (iii)		Root . Stem . Leaf		(any two)	1	
	2.(i). Inflorescence (ii). Flower (iii). Calyx (iv). Corolla (v). Androecium (vi).Gynoecium			(any four)	2	5
	(vii 3. (i)	). Fruit i). Seed . Floral formula . Floral diagram	J		1 1	

35	Types of Pro	otostele with Explanation	<u>n</u>			
a)	(i). Haplostel	е		1		
	(ii). Actinoste	ele		1		
	(iii). Plectoste	ele		1	5	
	(iv). Mixed pr			1		
	. ,	s of plectostele ( $\frac{1}{2}$ ) and ac	etinostele (1/2)	1		
35	Differences	between plant cell and a	OR) animal cell			
b)	Diliciciioco	between plant oen and t				
,	s.no	Plant cell	Animal cell			
		ey are larger in size	They are smaller in size			
		smodesmata present	Absent			
		loroplast present	Absent			
		cuole large and rmanent	Vacuole small and temporary	5×1	5	
	5 cel	l wall present	cell wall absent			
		noplast present around	Tonoplast absent			
	7 Ce	ntriole Absent	Centrioles present			
		cleus present along	Nucleus present at the cenre			
		Periphery of the cell	of the cell			
		sosomes are rare	Lysosomes are present			
$\Delta M$	10 storage material is starch storage material is glycogen					
- 4			(Any Five only)			
36	Types of Ae	stivations: -	, ,			
a)	(i) M-	h		_		
	( )	ılvate visted		1		
	` '	uincuncial		I	_	
	` '	bricate		1	5	
	(v) Ve	exillary		1		
	(Exp	planation ½, Diagram or	example ½ to each type)	•		
	(OR)					
36	Prophase					
b)	Metaphase					
	Anaphase			1		
	Telophase	J				
					5	
		Expla	nation to each Heading	4		
		l	1			

	ps involved in Dark reaction .Detail		
(a) 1.C	arboxylation.[fixation]	1	
	eduction.[glycolytic reversal]		
3.R	egeneration		
pha	se I-Carboxylation[Fixation]: - Explanation	1	
pha	se II- Reduction (Glycolytic Reversal) - Explanation	2	5
pha	se -III- Regenaration: - Explanation	-	
	(OR)	1	
	Flow Chart		
	(Mention of enzymes & carbon symbol are not necessary)	5	
	(OR)		
	rnative way of Glucose breakdown: -		
(b) (i) P	rentose Phosphate pathway <b>or</b>		
Pho	spho gluconate pathway <b>or</b>	1	
	P shunt <b>or</b> (any one)		
War	burg-Dickens-Lipmann pathway		
(ii) l	low chart -		
	ntion of stages& carbon symbol are not necessary)	4	
(Me	(OR)		
i) P	entose Phosphate pathway <b>or</b>		5
Pho	spho gluconate pathway <b>or</b>	1	
	P shunt <b>or</b> (any one) ct Oxidative Pathway <b>or</b>		
War	burg-Dickens-Lipmann pathway		
ii) E	Explanation	4	
38 <b>Typ</b>	es of Sclereids		
a) (	i) Brachysclereids	1	
	ii) Macrosclereids	1	
	iii) Osteosclereids	1	5
l '	(iv) Astrosclereids (v) trichosclereids	1	
	(Explanation – ½, Example or Diagram – ½ for each type)	•	
	(OR)	1	

38	Measurement of Growth by arc auxanometer			
b)	<ol> <li>The increase in the length of the stem tip can easily be measured by an arc auxanometer</li> </ol>			
	It consists of a small pulley to the axis of which is attached a long pointer sliding over a graduated arc			
	<ol> <li>A thread one end of which is tied to the stem tip and another end to a weight pass over the pulley tightly.</li> </ol>	3	5	
	4. The stem tip increases in length, the pully moves and the pointer slide over the graduated arc.			
	5. The actual increase in the length of the stem is then calculated by knowing the length of the pointer and the radius of the pulley.			
	Formula:			
	Actual growth in length = Distance travelled by the pointer X Radius of the pulley	1		
	Length of the pointer			
<b>\</b>	Diagram with parts	1		