Test Booklet No. _____

This booklet consists of 100 questions and 12 printed pages.

RGUPET/____/__

Series NIL

RGUPET 2023
Ph.D. in BOTANY

Full Marks: 100 **Time: 3 Hours**

Roll No. | | | | | | | | |

Day and Date of Examination :

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General Instructions:

PLEASE READ ALL THE INSTRUCTIONS CAREFULLY BEFORE MAKING ANY ENTRY.

1. DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. Candidate must write his/her Roll Number on the space provided.
3. This Test Booklet contains 100 Multiple Choice Questions (MCQs) from the concerned subject. Each question carries 1 mark.
4. Please check the Test Booklet to verify that the total pages and total number of questions contained in the test booklet are the same as those printed on the top of the first page. Also check whether the questions are in sequential order or not.
5. Candidates are not permitted to enter into the examination hall 15 minutes after the commencement of the entrance test or leave the examination hall before 30 minutes of end of examination.
6. Making any identification mark in the OMR Answer Sheet or writing Roll Number anywhere other than the specified places will lead to disqualification of the candidate.
7. Candidates shall maintain silence inside and outside the examination hall. If candidate(s) is/are found violating the instructions mentioned herein or announced in the examination hall, they will be summarily disqualified from the entrance test.
8. In case of any dispute, the decision of the Entrance Test Committee, RGU shall be final and binding.
9. The OMR Answer Sheet consists of two copies, the Original copy and the Student's copy.

1	A list of all works on a subject or by an author that were used or consulted to write a thesis is called -				b	Bibliography
	a) Heading	b) Bibliography	c) Citation	d) References		
2	Level of significance refers to probability of -				c	rejecting null hypothesis
	a) accepting research question	b) rejecting research question	c) rejecting null hypothesis	d accepting null hypothesis		
3	ABCDEF are sitting in a row. E and F are in the centre, A and B are at the ends. C is sitting on the left of A. Who is sitting three places on the right of D?				c	C
	a) E	b) D	c) C	d) B		
4	A synopsis is considered to be good if-				c	A half-way research
	a) A partial research	b) A beginning of research	c) A half-way research	d) A complete research		
5	Which of the following is NOT an essential characteristic of Experimental research in science?				d	Description
	a) Observation	b) Control	c) Replication	d) Description		
6	The significance of an ANOVA test is determined by-				b	Calculating the F-statistic
	a) Calculating the t-statistic	b) Calculating the F-statistic	c) Calculating the P- value	d) Calculating the chi-square statistic		
7	A wider spectrum of ideas and issues may be made possible in which of the following arrangement?				d	Workshop mode
	a) Symposium	b) Conference	c) Lecture mode	d) Workshop mode		
8	How is qualitative research different from quantitative research?				c	Use survey instead of experimentation.
	a) It is cross sectional in nature.	b) It views phenomenon in a holistic manner.	c) Use survey instead of experimentation.	d) It is highly objective.		

9	BLK, DNM, FPO, ____, JTS				c	HRQ
	a) QRH	b) RHQ	c) HRQ	d) HQR		
10	Which of the following is a characteristic of qualitative research?				d	Unique case orientation
	a) Random sampling	b) Standardized tests and measures	c) Generalization to the population	d) Unique case orientation		
11	Complete the given series by finding the missing term: 50, 61, 74, _____,106				d	89
	a) 83	b) 85	c) 87	d) 89		
12	University is for:				c	Students
	a) Lecture	b) Examination	c) Students	d) Convocation		
13	Shodhganga refers as a -				b	reservoir of theses
	a) reservoir of books	b) reservoir of theses	c) reservoir of articles	d)reservoir of knowledge		

14	In biological research, a genetic marker is a					
	a)A gene sequence of unkown locus	b) A DNA sequence with no-repetitive sequences	c)A repetitive sequence of a gene	d)A DNA sequence with known location on a chromosome	d)	A DNA sequence with known location on a chromosome
15	In biological research, the purpose of storage of microbialcultures in BOD incubator is to maintain its optimum requirement of				b)	Temperature
	a) Oxygen	b) Temperature	c)Co_2	d) Moisture		
16	In laboratory, Horizontal Electrophoresis is a technique used for separation of					

	a) DNA	b) RNA and Proteins	c) DNA and Proteins	d) DNA, RNA and Proteins	d)	DNA, RNA and Proteins
17	In plant micropropagation, protoplast culture technique is a process to develop a whole plant from				a)	Cells without cell wall
	a) Cells without cell wall	b) Cells with cell wall	c) Cells of root apex	d) Cells of shoot apex		
18	In gene cloning technique, a vector that is employed for developing transgenic plant is usually a				c)	Ti plasmid
	a) Ri plasmid	b) BACs	c)Ti plasmid	d)YACs		
19	In microbial research laboratory, liquid nitrogen is used for				d)	Preservation of intact samples of cells, spores and cultures
	a) Preservation of cultures	b) Preservation of cells	c) Preservation of spore samples	d)Preservation of intact samples of cells, spores and cultures		
20	In molecular research technique, Tag polymerase is used in the step of				c)	Extension
	a) Denaturation	b) Annealing	c)Extension	d) Ligation		
21	In bacterial laboratory, the cultures maintained by Streak Plate Method for the purpose of obtaining					
	a) CFU	b) Serial Dilution	c) Pure Culture Isolation	d) Both CFU and Pure Culture Isolation	d)	Both CFU and Pure Culture Isolation
22	In Vertical Gel Electrophoresis, the Anode is fitted at which position of the chamber				c)	Bottom
	a) Top	b) Right side	c)Bottom	b) Left side		
23	In Mass Spectrometry technique, the samples are analysed on the basis of its separated				d)	Ratio of mass and charge
	a) Ions	b)Mass	c) Charges	d)Ratios of masses to		

				charges		
24	Chemically, buffers are aqueous solutions composed of				c)	A mixture of a Weak Acid and its Conjugate Base
	a) A Weak Acid	b) A Weak Base	c)A mixture of a Weak Acid and its Conjugate Base	d) A mixture of a Strong Acid and its Conjugate Base		
25	In Cellular Studies, Acetocarmine is used to stain				b)	Chromosome
	a) DNA	b) Chromosome	c) Nucleus	d) Cytoplasm		
26	DuringElectrophoresis techniques, Ethidium Bromide is used asa				c)	DNA intercalating dye
	a) DNA loading dye	b)DNA tracking dye	c)DNA intercalating dye	d)DNA sedimenting dye		

27	Which among the following tests determine whether different recessive mutations are in the same gene?				a	complementation
	a)Complementation	b) test cross	c) back cross	d) hybridisation		
28	To evaluate the expression of many genes at one time, which among the following techniques can be used?				a	DNA Microarray
	a) DNA Microarray	b) Northern Blotting	c) Electrophoresis	d) ELISA		
29	Which among the following techniques is used to measure transpiration rate in plant?				a	Ganong's potometer
	a) Ganong's potometer	b)Photometer	c) Spirometer	d) Thermometer		
30	Which among the following is not a blotting membrane?				d	parafilm
	a) nitrocellulose membrane	b) activated glass fibre membrane	c) nylon membrane	d) parafilm		

31	Which among the following is a model organism belonging to bryophytes?					
	a) *Physcomitrella patens*	b)*Arabidopsis thaliana*	c)*Chlamydomonas renhardtii*	d)*Medicago truncatula*	a	*Physcomitrella patens*
32	AutoDock Vina is a software used in					
	a) molecular docking	b) southern blotting	c) ELISA	d) DNA sequencing	a	Molecular docking
33	Artificial seeds are a bead of gel containing a					
	a) somatic embryo	b) callus	c) endosperm	d) bud	a	Somatic embryo
34	The process of extracting metals from ore using microbes is known as					
	a) bioleaching	b) biomining	c) bioremediation	d)bioaugmentation	a	bioleaching
35	Which method is used to determine the minimum size of a quadrat?					
	a) species-area curve	b) species-number curve	c) species-size curve	d) species-frequency curve	a	Species-area curve
36	Which experiment demonstrated that translocation of photosynthates occurs through phloem?					
	a) Girdling experiment	b) Fick's experiment	c) Emerson effect	d) Sanger's experiment	a	Girdlingexperiment
37	Earth's primitive atmosphere was capable of producing the building blocks of life from inorganic materials was established by					Miller-Uery
	a) Oparin and Haldane's experiment	b) Miller-Urey experiment	c) Charles Darwin	d) Jean-Baptiste de Lamarck	b	
38	A population's genotype frequencies can be predicted from its allele frequencies. This is based on					Hardy-Weinberg principle

	a) Hardy-Weinberg principle	b) Shannon-Weiner index	c) Simpson's index	d) Brandy's principle	a	
39	Haploid plants can be produced from				c	Both anther and ovary culture
	a) anther culture	b) ovary culture	c) both anther and ovary culture	d) endosperm culture		

40	Which of the following is the name of the human genetic disorder resulting from defects in nucleotide excision repair?				b	Xeroderma pigmentosum (XP)
	a) Hereditary nonpolyposis colorectal cancer (HNPCC)	**b)** Xeroderma pigmentosum (XP)	**c)** Lynch syndrome	**d)** Diabetes		
41	At which end are the new DNA bases added?				d	3' OH end
	a) 5' triphosphate end	b) 3' triphosphate end	c) 5' OH end	d) 3' OH end		
42	Which one of the following is not a component of DNA polymerase III holoenzyme?				d	$\omega -$ particle
	a) γ - Complex	b) Core particles	c) Dimerizing unit	d) $\omega -$ particle		
43	In which of the following would you find telomeres?				b	Human chromosomes
	a) Human mitochondrial DNA	b) Human chromosomes	c) Bacterial chromosomes	d) The influenza virus genome		
44	You grow a bacterial culture in a media containing N^{15} and transfer it to a media with N^{14}. After two rounds of replication you perform a CsCl density gradient centrifugation of the					

	DNA. How many bands will you observe what will be their intensity?					
	a) One, very intense	b) Two, equally intense	c) Three with middle one more intense than upper and lower	d) Three equally intense	b	Two, equally intense
45	Which of this subunit is not a part of core DNA polymerase?					
	a) α subunit	b) βsubunit	c) θ subunit	d) ε subunit	b	βsubunit
46	You take a circular ssDNA and to it you attach a small labeled complimentary fragment. You add different reagents and try to get free labeled probe. Which of this reagent will give you your desired result?					
	a) Dna b	b) Dna c	c) Dna G	d) Dna a	a	Dna b
47	Which of the following DNA polymerase is required for mitochondrial DNA replication?					
	a) Pol alpha	b) Pol beta	c) Pol gamma	d) Pol delta	c	Pol gamma
48	What constitutes Primosome?					
	a) Dna a, Dna b, Dna c, Dna G	b) Dna b, Dna G	c) Dna c, Dna b	d) Dna a, Dna c	b	Dna b, Dna G
49	What does global warming potential of a gas denote?					
	a) Amount of heat liberated by the gas equivalent to 1kg of CO_2	b) Amount of heat liberated by the gas equivalent to 1ton of CO_2	c) Amount of heat absorbed by the gas equivalent to 1ton of CO_2	d) Amount of heat absorbed by the gas equivalent to 1kg of CO_2	c	Amount of heat absorbed by the gas equivalent to 1ton of CO_2

50	Which of the following tracheophytes are leafless?				a	*Psilopsida*
	a) *Psilopsida*	b) *Lycopsida*	c) *Sphenopsida*	d) *Pteropsida*		

51	First and original collection by the author for a new taxon is called				c	Holotype
	a)Isotype	b)Syntype	c)Holotype	d)Paratype		
52	The Shenzen Code of ICN was published in the year				b	2017
	a) 2020	b)2017	c)2016	d)2011		
53	Hypanthodium inflorescence could be found in				c	*Moraceae*
	a)Euphorbiaceae	*b)Urticaceae*	*c)Moraceae*	*d)Juglandaceae*		
54	*Malus domestica* is a correct name for				c	
	a)Peach	*b)Plum*	*c)Apple*	*d)Mango*		
55	The tribe of plant is indicated as				d	-eae
	a) -oideae	b) -inae	c) -ceae	d) -eae		

56	**Which one of the following does not have Sulfuric acid groups?**				c	**Hyaluronic acid**
	a) Heparin	b) Chondroitin sulfate	c) **Hyaluronic acid**	d) Kerato sulfate		
57	Identify the simplest lipid from the following:				c	Triacylglycerol
	a) Lecithin	b) Fatty acid	c) Triacylglycerol	d) Steroids		
58	What is the application of absorbance assay?				b	Determination of protein concentration
	a) Isolation of DNA	b) Determination of protein	c) Protein purification	d) Separation of proteins		

		concentration				
59	Which of the following wavelength ranges is not associated with IR spectroscopy?					
	a) 400 cm^{-1} – 1500 cm^{-1}	b) 4000– 400 cm^{-1}	c) 50 – 1000 cm^{-1}	d) 20000 – 16000 cm^{-1}	d	20000 – 16000 cm^{-1}

60	T-DNA of Ti plasmid of Agrobacteria does not have				C	**Ori region**
	a) RB and LB	b) Hormone producing gene	c) **Ori region**	d) Oncogenic gene		
61	Which of the polymerase enzyme have 5′→3′ polymerase, 3′→5′ Exonuclease activity and 5′→3′ exonuclease activity				A	**Pol-I**
	a) Pol-I	b) Pol-II	c) Pol-III	d) Taq polymerase		
62	Fusion products with the nucleus of one parent and extra-nuclear genome/s of the other parent are referred to as cybrid and the process to obtain cells or plants with such genetic combination/s is called:				A	Cybridization
	a) **Cybridization**	b) Hybridization	c) Parthenogenisis	d) Synthetic seeds		

63	Which algal division have chlorophyll a and c as photosynthetic pigments?				d	Chrysophyta
	a) Chlorophyta	b) Cryptophyta	c) Charophyta	d) Chrysophyta		
64	The members of which division of algae have chlorophyll a & b as their photosynthetic pigments.				a	Chlorophyta
	a) Chrysophyta	b) Chlorophyta	c) Cryptophyta	d) Cyanophyta		
65	The Rhodophycean members has the cell wall composed of-				d	Outer layer pectin and inner layer
	a) Cell wall	b) Cellulosic	c) Cellulosic and	d) Outer layer pectin and		

	absent	& calcified	peptic materials	inner layer cellulose		cellulose
66	The most advance form of thallus organization is found in –				d	*Fischerella*
	a) *Microcystic*	b) *Oscillatoria*	c) *Anabaena*	d) *Fischerella*		
67	Sexual dimorphism is found in which genus of green algae?				b	*Spirogyra*
	a) *Chara*	b) *Spirogyra*	c) *Oedogonium*	d) *Ulothrix*		
68	Which algal division have the members of golden-brown, yellow-green and the diatoms?				d	Crysophyta
	a) Pyrrophyta	b) Chlorophyta	c) Phaeophyta	d) Crysophyta		
69	Which algae are considered as the cheap producer in the Ocean?				a	Blue green algae
	a) Blue green algae	b) Red algae	c) Brown algae	d) Green algae		
70	The food reserve in Phaeophyta -				d	Laminarin, Mannitol & sucrose
	a) Cyanophycean granules and starch	b) Starch (Amylose & Amylopectin) & Fats	c) Floridean starch	d) Laminarin, Mannitol & sucrose		
71	The members of this algal division never produce motile flagellated cells.				c	Rhodophyta
	a) Chlorophyta	b) Phaeophyta	c) Rhodophyta	d) Charophyta		
72	Euglenoids lack cell wall, instead they have a protein rich layer as their protective covering called-				d	Pellicle

	a) Lignin	b) Peptidoglycan	c) Pectin	d) Pellicle		
73	Fusion of a mature individual in which the vegetative cell directly act as a gametes is called –				b	Hologamy
	a) Autogamy	b) Hologamy	c) Anisogamy	d) Isogamy		
74	Identify the parasitic algae which caused rust in plantation crops (tea):				d	*Cephaleuros*
	a) *Vaucheria*	b) *Gracilaria*	c) *Batrachospermum*	d) *Cephaleuros*		

75	Which of the following form is predominantly expressed in cells out of the various forms of DNA helices?				a	B- Helix
	a) B- Helix	b) A-Helix	c) E-Helix	d) Z-Helix		
76	Which of the following process does not occur in prokaryotes?				b	Splicing
	a) Replication	b) Splicing	c) Translation	d) Transcription		
77	Which of the following DNA polymerase is required for mitochondrial DNA replication?				d	Pol gamma
	a) Pol alpha	b) Pol beta	c) Pol gamma	d) Pol delta		
78	Which of the following has the ability to introduce negative supercoiling of the DNA?				c	DNA gyrase
	a) DnaA protein	b) DnaB Protein	c) DNA gyrase	d) DNA polymerase		
79	What is the name of the DNA repair system in *E. coli* in which dual incisions are made in the damaged part of the double helix, and a 12-13 base segment is removed and replaced with new DNA?				c	Nucleotide excision repair
	a) Mismatch repair	**b)** Base excision repair	**c)** Nucleotide excision repair	**d)** AP site repair		

80	Which of the following Musa species is a hybrid				d	*M. Paradisiacal*
	a) *M. hirta*	b) *M. balbisiana*	c) *M. acuminata*	d) *M. Paradisiacal*		
81	Which of the following is classified as a "plant alkaloid" having anti-carcinogenic property:				a	Taxol
	a) Taxol	b) Quinone	c) Sorbitol	d) Cellulosic ethanol		
82	_____is the largest producer of tea in the world				a	People's Republic of China
	a) People's Republic of China	b) Assam, India	c) Sri Lanka	d)Nairobi, Kenya		
83	Natural rubber is obtained from the sap or gum of				d	*Hevea brasiliensis*
	a)*Hevea camargoana*	b) *Hevea benthamiana*	c) *Hevea microphylla*	d) *Hevea brasiliensis*		
84	In general, chocolate and cocoa are considered to be a rich source of				d	Antioxidants
	a) Fatty acid	b)Polysaccharides	c) Proteins	d) Antioxidants		

85	Histones are positively charged, due to				B	**an abundance of the arginine and lysine**
	a) an abundance of the arginine and proline	**b) an abundance of the arginine and lysine**	c) an abundance of arginine and methionine	d) an abundance of arginine and proline		
86	M phase is initiated by activation of				A	Cdk1/cyclin B
	a) Cdk1/cyclin B	b) Cdk1/cyclin D	c) Cdk2/cyclin B	d) Cdk2/cyclin A		
87	Mendel's laws of inheritance does not include				D	law of Epistasis
	a) law of dominance	b) law of segregation	c) law of independent assortment	d) **law of Epistasis**		
88	T-DNA region of Ti plasmid does not				B	containOri region
	a) containleft border and right	b) **containOri region**	c) containgene for growth	d) integrate into the plant		

	border		hormone	genome		
89	_____was the first artificial cloning vector used in rDNA technology				D	pBR322
	a) pUC19	b) pBR327	c) pUC18	**d)** pBR322		

90	Three-dimensional images of live cells can be produced with				c	Confocal microscopy
	a) darkfield microscopy	b) transmission electron microscopy	c) confocal microscopy	d) phase-contrast microscopy		
91	A typical biomembrane is assembled from three types of lipids. Which of the following is not present in it?				d	phosphosphingosine
	a) phosphoglycerides	b) sphingolipids	c) steroids	d) phosphosphingosine		
92	There are three types of membrane proteins. Which of the following is not one among them?				c	Glycyl-anchored
	a) Integral	b) Lipid-anchored	c) Glycyl-anchored	d) peripheral		
93	Which among the followings is not a component of cytoskeleton?				d	Peripheral filaments
	a) Microfilaments	b) Microtublues	c) Intermediate filaments	d) Peripheral filaments		

94	Which of the following factors do not affect the rate of		

	migration of DNA in agarose gels?				b	DNA concentration
	a) Gel concentration	b) DNA concentration	c) DNA conformation	d) Voltage		
95	What will be the supernatant after centrifugation of milk?				c	whey
	a) casein	b) fat	c) whey	d) water		
96	Which of the following substances is used to stain the tissue samples (floating the tissue on the drops of the substance) in Transmission Electron Microscope (TEM)?				c	Uranyl acetate & lead citrate
	a) Hydrocarbons	b) Slow-molecular weight stains	c) Uranyl acetate & lead citrate	d) Oil immersion		
97	**What is the ratio of resolving power of an optical microscope for wavelengths λ_1= 3000 Å and λ_2= 12000 Å?**				b	4:1
	a) 1:4	b) 4:1	c) 2:16	d) 16:2		
98	**How thick are the thinnest tissue sections produced by a microtome?**				a	0.1-1 microns
	a) 0.1-1 microns	b) 10-50 microns	c) 1-10 microns	d) 50-100 microns		
99	To which country is the export of flowers from India highest?				a	Netherland
	a) Netherland	b) United Kingdom	c) Canada	d) France		
100	Which country is highest exporter of Banana in the world?				c	Ecuador
	a) Philippines	b) India	c) Ecuador	d) USA		

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