Padasalai's Telegram Groups!

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- 6th to 8th Standard - Group
https://t.me/Padasalai_6to8

- 1st to 5th Standard - Group
https://t.me/Padasalai_1to5

- TET - Group
https://t.me/Padasalai_TET

- PGTRB - Group
https://t.me/Padasalai_PGTRB

- TNPSC - Group
https://t.me/Padasalai_TNPSC

"Discretion shall preserve you, Understanding shall keep you"-Pro2:11

1.ASEXUAL AND SEXUAL REPRODUCTION IN PLANTS [4bits]

2MARKS: Clones**[2]**; Few examples of Asexual reproduction in Lower group organisms **[2]**; Diaspores**[2]**; Root as Vegetative propagules **[2]**; Terror/sorrow of Bengal **[2]**; Vegatativeprogules of Stem **[3]**; Epiphyllous bud **[3]**; Advantages & Disadvantages of Natural vegetative propagation **[3]**; Stock and scion**[4]**;Disadvantages of conventional methods**[6]**; Totipotent**[6]**;Micropropagation**[6]**; 3 stages of sexual reproduction in plants**[7]**;Sporogeneoustissue**[7]**;Layers of Anther wall**[7]**;Microsporogenesis**[7]**; Microspore tetrad**[8]**; Pollinium**[8]**; Corpusculum**[8]**; Retinaculum **[8]**; Layers of mature anther wall**[8]**; Stomium**[9]**; T.S of mature anther**[9]**; Ubisch bodies**[9]**; Rejection reaction**[9]**; Epidermis**[8]**;Middle layer**[9]**;Mellitopalynology**[10]**; Bee pollen uses **[10]**; Pollen calendar**[10]**; Parthenium/carrot grass/congress grass**[10]**; Palynology**[10]**; Sporopollenin**[10]**; Germ pore**[10]**;Shapes of pollen**[10]**;Pollen bank**[10]**; Pollen kit**[11]**;Carpel/pistil parts**[11]**; Ovules based on number**[11]**;Integuments & Its types **[11]**; 2 types of ovule based on position of sporogeneous cell**[12]**; Hypostase and Epistase**[12]**; Archesporium **[13]**; Role of filliform apparatus **[14]**; Homogamy**[15]**; Incomplete Dichogamy**[15]**; List out abiotic agents in pollination **[16]**; Tassel and Cob of maize **[17]**; Structural adaptation of vallisneria in Hydrophily **[17,18]**; Characteristics of Ornithophilous flowers **[18]**; Zoophily and Its Eg.**[18]**; Signification of Pollination **[20]**; Pollen –pistil interaction **[21]**; Recognition and rejection protein reaction **[21]**; Cap block **[21]**; Obturator**[22]**; Caruncle **[23]**; Perisperm **[23]**; Sphaerosomes **[24]**; Functions of Endosperm**[25]**; Endosperm of Coconut [25]; Draw the developmental stages of Endosperm **[25]**; Seed **[26]**; Draw the diagram of Dicot and Monocot Seed**[26]**; Testa and tegmen**[26]**; Epicotyl and Hypocotyl **[26]**; Coleoptile and Coleorhiza**[26,27]**; Apomixis **[27]**; Saprophytic budding**[27]**; Polyembryony**[27]**; Practical application of polyembryony**[28]**; Parthenocarpy **[28]**; Significance of Parthenocarpy **[28]**.

3MARKS: Various types of cutting**[5]**; Advantages of Conventional methods**[6]**; Advantages of modern methods**[6]**;Disadvantages of Modern methods**[6]**; Translator**[8]**;Secretory and invasive tapetum **[9]**; Endothecium**[8]**;Anther cavity and Connective tissue**[9]**; Structure of microspore**[9,10]**;Basic types of embryo sac development**[13]**; 7 and 8 celled embryo sac with labelled diagram**[14]**; Various mechanisms of out breeding in plants**[15]**; Dichogamy **[15]**; Herkogamy**[16]**; Heterostyly **[16]**; Self- incompatability **[16]**; Anemophily and Eg.**[17]**; Morphological Adaptations of Anemophilous plants **[17]**; Hydrophily and its types **[17]**; Biotic agencies in pollination with Eg.**[19]**;Lever mechanism in Salvia **[19]**; Pollination in Yucca plant, Amorphophallous and Ophyrus **[20]**; Advantages and Disadvantages of Self pollination **[20]**; Advantages and Disadvantages of Cross pollination **[20]**;3 types of Style **[21]**; 3 modes of Pollen tube entry into ovule **[22]**; Syngamy and Triple fusion **[22]**; Post fertilization changes in Apple, Brinjal, Jack fruit,Ricinus **[23]**;Chart the Post fertilization changes in Flower **[24]**; Recurrent and Non-recurrent apomixes **[27]**; Diplospory and Apospory **[27]**; 3 Types of Parthenocarpy **[28]**.

5MARKS: Types of Grafting**[5]**; Layering and its types **[5]**; Development of anther**[7]**;Tapetum and its function**[9]**; Development of male gametophyte**[11]**; Structure of megasporangium**[11]**; 6 types of ovules based on the position of chalaza, micropyle and Funicle**[12]**; Development of monosporic embryo sac**[13]**; Chart out the pollination types **[14,15]**; Endosperm and its types**[24]**; 4 categories of Polyembryony**[27]**.

2.CLASSICAL GENETICS [5-6bits]

2MARKS: Genetics**[33]**;Transmission genetics**[33]**; Molecular genetics **[33]**;Population genetics **[33]**;Quantitative genetics**[33]**;Genes**[33]**;Re-discoverers of Mendel's Experiment**[37]**; Alleles**[37]**; Hybrids **[37]**;TT&tt**[37]**;Phenotype & Genotype**[37]**; Polygenic ratio **[47]**.

3MARKS: Heredity and variation **[34]**; Continous variation with eg.**[34]**;Discontinous variation with Eg.**[34]**;Importance of variation **[34]**; Why Mendel chosen Pea plant?**[35]**; Emasculation & Bagging **[35]**;Anthocyanin pigment**[36]**;Law of dominance **[37]**; Law of segregation **[37]**; Reciprocal cross**[38]**; Test cross **[38]**; GA1 **[39]**; Back cross**[39]**; Law of independent assortment **[40]**; SBE I **[41]**; Trihybrid ratio **[42]**; Gene interaction chart **[42]**; Explain incomplete dominance at molecular level**[44]**; Cytoplasmic inheritance**[48]**;Atavism **[49].**

5MARKS: Birth of 'Experiments on plant hybrids' **[34,35]**;Reasons for Mendel success**[35]**; Bring out allelomorphs,gene locus and Dominant & Recessive gene in single chart**[36]**;Dihybrid cross chart **[41]**; Incomplete dominace**[43]**;COdominance**[44]**; Lethal genes **[44]**; Pleotrophic genes **[45]**; Dominant epistatis**[45]**; Allelic and non-allelic interaction chart and ratio **[46]**; Polygenic inheritance **[46,47]**; Chloroplast inheritance **[48]**;Mitochondrial inheritance **[48]**.

3.CHROMOSOMAL BASIS OF INHERITANCE [4bits]

2MARKS: Chromosome **[53]**; Sutton and Boveri**[53]**; Compare Gene & Chromosome **[55]**; T.H.Morgan**[55]**;Fossil genes**[55]**;Linked genes **[56]**; Synteny**[56]**;Linkage groups in organism**[58]**;Tetrad stage **[59]**; Chiasmata**[59]**;Synaptonemal complex**[59]**; Terminalisation**[60]**;Recombination **[60]**; Calculate RF**[61]**; Linkage map**[61]**;Uses of genetic mapping **[64]**;Multiple alleles **[64]**; Mutation **[66]**; Mutation theory**[66]**;Mutagens **[66]**;Mutagenesis **[66]**;Point mutation **[68]**;Sharbatisonara**[69]**; Castor Aruna**[69]**; Comutagens**[69]**; Mustard gas **[69]**;Chromosomal aberration **[69]**; Numerical ploidy**[70]**.

3MARKS: Salient features of chromosomal theory of inheritance **[54]**; Chromosomal behavior during meiosis **[55]**;Number of chromosomes in organisms**[55]**; Cis-Trans linkage **[56]**;Linkage and Crossing over**[58]**;Meiotic & Mitotic Crossing over**[59]**;Syndesis**[59]**; Pairing phenomenon**[59]**; Importance of Crossing over**[60]**; Map distance **[62]**; Three recessive alleles in Maize**[62]**;Characteristics of Multiple Alleles **[64]**; Sex determination in Silenelatifolia**[65]**; Monomorphic & Dimorphic plants **[65]**; Chemical mutagens **[69]**;Types of ploidy chart **[70]**; Aneuploidy **[70]**; Autotriploids**[71]**;Autotetraploids**[72]**; Raphanobrassica**[72]**;Significance of ploidy**[73]**.

5MARKS: Sex linkage in Drosophila **[54]**; Coupling and repulsion chart **[57]**;Types of Crossing over **[60]**;Holiday's Hybrid DNA Model **[61]**;Self sterility in Nicotiana**[64]**;Sex determination in papaya**[65]**; Sex determination in Sphaerocarpos**[66]**; Sex determination chart of Maize **[66]**;Major types of mutations **[67]**; Types of point mutation **[68]**;Physical mutagens **[69]**;Hyperploidy**[70]**;Hypoploidy**[71]**; Hexaploid Triticale **[72]**; Deletion chromosomal aberration **[73]**; Duplication chromosomal aberration **[73,74]**; Tandem duplication **[74]**; Inversion **[74]**; Translocation **[74,75]**.

4.PRINCIPLES AND PROCESSES OF BIOTECHNOLOGY [2-3bits]

2MARKS: Biotechnology**[78]**;Bioreactor**[81]**;Microbial enzymes **[82]**;Microorganism in SCP**[82]**; Applications of SCP**[82]**;Methanophilusmethylotrophus**[82]**;Insert **[83]**;Gene manipulation **[83]**; PCR **[84]**; Three main classes of Restriction endonuclease **[84]**;HINDIII**[84]**; ECORI **[84.85]**;DNA ligase **[85]**; Alkaline phosphatase **[85]**;ORI site **[86]**; Selectable marker **[86]**; Cloning sites **[86]**; Plasmid **[87]**; Walking genes **[87]**; Cosmid**[88]**;Phagemid**[88]**;Shuttle vector **[88]**; Transfection by Heatshock method**[89]**;Lac Z **[91]**;Principle of GEL electrophoresis **[92]**; Filter papers in northern and southernblotting**[93]**; Transfection **[94]**;C-Value **[94]**;Genome sequencing **[94]**;Dicer and Drosha**[95]**;EPSPS **[96]**; Molecular pharming**[99]**.

3MARKS: Traditional and modern biotechnology **[78,79]**;Downstream process**[81]**;Primary & secondary metabolites **[82]**;Palindrome sequence **[85]**;Blunt and flush end **[85]**; Cloning vector & its types **[86]**; pBR 322 **[87]**;Ti Plasmid**[87]**;Transposons **[87]**; YAC and BAC **[88]**; Antibiotic resistant markers **[91]**; Replica plating method **[91]**;Differences among blotting techniques**[94]**;CRISPR-cas9**[94]**; Advantages of Herbicide tolerant **[96]**;Herbicide tolerant -Basta**[96]**;Bt-Brinjal**[97]**;DMH **[97]**;FlavrSavr tomato**[97]**; PHB **[98]**;GM foods benefits & risks**[98]**;PLA **[98]**;GFP protocol **[99]**; Name the organism used in biofuels **[100]**;Biopiracy and examples alone **[101]**.

5MARKS: Fermentation **[81]**;SCP **[82]**; Steps involved in rDNA technology**[83]**;Restriction endonuclease **[84]**; Properties of vector**[86]**;Vector less gene transfer method**[89,90]**; Agrobacterium mediated gene transfer **[90]**;Insertional inactivation method **[91]**;Agarose gel electrophoresis **[92]**; Types of blotting techniques **[92]**;Steps involved in Southern blotting **[93]**;RNAi in nematode resistance **[95]**;Herbicide tolerant – Glyphosate **[96]**;Bt-Cotton **[96]**;Biofortified Golden rice **[98]**; Bioremediation technologies **[99,100]**;Applications of biotechnology **[101,102]**.

5.PLANT TISSUE CULTURE [2 bits]

2MARKS: Tissue culture**[107]**; Contributions of Haberlandt**[107]**; Knop's solution **[108]**;Totipotency**[109]**; Differentiation **[109]**; Redifferentiation**[109]**; Dedifferentiation **[109]**; Explant **[109]**;HEPA **[109]**; Agar **[110]**; Embryogenesis **[111]**; Hardening **[112]**;Embryoids**[114]**; Synthetic seeds **[114]**; Somaclonal&Gamoclonal variations **[115]**;Facets of IPR in India **[117]**;ELSI **[118]**; GEAC **[118]**.

3MARKS:3 fundamental principles of PTC **[109]**; Lab facilities for PTC **[109]**; Media for PTC **[110]**; Induction of callus **[111]**; Organ culture **[112]**; Meristem culture **[112]**; Secondary metabolites in plant **[112]**; Somatic embryogenesis & applications **[114]**; Organogenesis **[114]**;Micropropagation protocol for banana **[115]**; Protocol for virus free meristem culture **[116]**; Germplasm conservation **[116]**; Cryopreservation **[116]**; Three parts of patent **[117]**; General steps in patenting **[118]**.

5MARKS: Sterilization **[110]**; Protoplasmic culture **[112,113]**;Applications of PTC **[115]**; Artificial synthetic seeds & Advantages **[115,116]**.

6.PRINCIPLES OF ECOLOGY [3bits]

2MARKS: Ecology **[122]**; Ecological hierarchy **[123]**;Biotope **[123]**; Ecotope**[123]**; Applied ecology **[123]**; Ecological equivalents **[123,124]**;Heliophytes&Sciophytes**[125]**;Paleoclimatology **[125]**; 3 Limits of temperature on organism **[125]**; Timber line **[125]**; Anemometre**[125]**;Indicator of fire **[128]**; Rhytidome**[128]**; Pedology**[128]**; Pedogenesis& Based on it soil types **[128]**;Loamy soil **[129]**;Hollard,Chresard&Echard**[130]**; Topography **[130]**;Ecotone**[130]**;Edge effect **[130]**; Velamen **[132]**; Hygrophytes **[136]**; Heterophylly**[136]**; Trichophyllous plants **[137]**; Phylloclade,Cladode, phyllode**[137]**;Pnematophores**[139]**; Aphyllous**[139]**.

3MARKS: Autecology & Synecology **[123]**;Habitat & Niche **[123]**; Biotic & Abiotic factors **[124]**; Role light**[124]**; Eurythermal& Stenothermal **[125]**; Thermal stratification **[125]**; Thermal zonation **[125]**; Effects of temperature on plants **[126]**;Evergreen &Sclerophyllous forests **[126]**; Euryhaline&Stenohaline**[126]**;Tolerance of environmental factor **[126]**; Examples of tolerance to toxicity **[127]**; Albedo effect **[127]**; 3types of fire **[127]**; Plants based on distribution of vegetation **[129]**; Myrmecophily**[134]**; Seed ball **[142]**; Epiphemerals **[137]**.

5MARKS: Effects of wind & Fire **[127]**;Soil formation **[128]**; Soil horizon **[129]**; Mutualism **[130]**;Commensalism **[130,131]**; Predation**[132]**; Competition **[133]**;Amensalism**[134]**; Mimicry **[134]**;Coevolution **[133]**;Classification of hydrophytes **[135]**; Morphological adaptation of hydrophytes **[136]**; Anatomical & Physiological adaptation of hydrophytes **[136]**, Xerophytes classifications **[137]**; Morphological adaptations **[137]**; Anatomical and physiological adaptation of xerophytes **[138]**; Mesophytes**[138]**; Epiphytes **[138,139]**; Halophytes **[139]**; Adaptations of seed dispersal **[140]**; Adaptations of hydrochory**[141]**; Adaptations of zoochory**[141]**; Adaptations to autochory**[141]**;Advantages of seed dispersal **[142]**.

7.ECOSYSTEM [2bits]

2MARKS: Ecosystem **[148]**; Parallel terms for ecosystem **[148]**;Standing crop **[149]**; Biomass **[149]**;PAR **[149]**; Eltonian pyramids **[153]**;Limnology **[158]**; Oceanography **[158]**;Flagship species **[161]**; Significance of plant succession **[165]**;Guano **[168]**.

3MARKS: Micro and macroconsumer**[149]**; NPP and GPP **[150]**; NSP & GSP **[150]**;Primary and secondary carnivores**[151]**; First law of thermodynamics **[151]**;Second law of thermodynamics **[152]**; 10 percent law **[152]**;GFC and DFC **[152]**; Shapes in pyramid of numbers**[154]**; Gaseous and sedimentary cycle **[156]**; Classification chart on ecosystem **[157]**;Producers in pond ecosystem **[158]**; Consumers in Pond ecosystem **[158]**;Stratification of pond based on light penetration **[158]**;Ecosystem services chart **[158]**;Plant succession **[162]**;Difference between Primary & secondary succession **[162]**;Chart out types of succession **[163]**; Classify the plant succession **[163]**.

5MARKS: Productivity of an ecosystem **[150]**;Food web and its significance**[153]**; Pyramid of number **[153]**; Pyramids of biomass and energy **[154]**; Decomposition and its mechanism **[155,156]**; Carbon and Phosphorus cycle **[156]**;How human activities disturb ecosystem? Mention the protection practice to save it.**[160]**;Hydrosere succession in flowchart form **[164,165]**.

8.ENVIRONMENTAL ISSUES [4 bits]

2MARKS: Importance of Ecogroup**[170]**; Global warming **[170]**;Effect in plants due to global warming **[171]**; Strategies to deal with global warming **[171]**; Ozone shield **[171]**; Dobson unit **[171/172]**; Ozone hole **[172]**;Importance of stratosphere **[172]**;Silvopasture**[173]**;Protien bank **[173]**; Forestry extension activities **[174]**;Forest man of India **[175]**;Carbon sink **[179]**;Benefits of EIA society **[181]**;ways to assess bio-diversity impacts **[181]**;Importance of GIS **[181,182]**;Uses of remote sensing **[12]**.

3MARKS: Human activities in green house gases emission**[170]**;List out green house gases **[170]**;Good and bad ozone **[171]**;Montreal Kyoto protocol **[172]**; Phytoindicators**[172]**;Causes for Deforestation **[174]**;Flowchart on biodiversity conservation **[176]**;Chipko and appiko movement **[177]**;In-situ conservation **[177]**;Sacred grooves **[177]**; Ex-Situ conservation **[177]**; Endemic plants and centres**[178]**; Carbon sequestration **[178]**; Carbon footprint **[178]**;Biochar**[179]**;Benefits of lake **[180]**;Applications of satellites **[182]**.

5MARKS: Evil effects and sources of green house gases **[171]**;Effects of ozone depletion and ODS**[172,173]**;Agroforestery**[173]**;Effects of deforestation **[174]**;Afforestation motives and achievements **[175]**;Alien species invasion **[176]**;Rainwater harvesting **[180]**.

9.PLANT BREEDING [2 bits]

2MARKS: Bioinoculants**[187]**;Biofertilizer& example **[189]**;Acclimatization **[191]**;Quarantine **[191]**;Heterosis**[193]**;Triticale **[194]**;Raphanobrassica**[194]**;NORIN 10 **[195]**;Contributions of Norman E Borlaug **[195]**;Dr.M.S.Swaminathan**[190]**;Agronomy &Anthesis**[199]**;Germplasm collection **[199]**.

3MARKS: Rhizobium **[188]**;Azolla in paddy field**[188]**;Arbuscularmycorrhizae**[188]**; Seaweed liquid fertilizer **[189]**;Trichoderma**[189]**;Beauveria**[189]**;Green manuring and few eg.**[189]**;Objectives of plant breeding **[190]**;Steps involved in Plant breeding **[191]**; Difference between Mass and pureline selection **[192]**; Disease resistant varieties **[195]**;Biofortification and Eg.**[196]**;Saccharumbareri&S.offinarum**[6196]**; Pest resistant varieties **[196]**.

5MARKS: Classification of Biofertilizer**[188]**,Primary and secondary introduction **[191]**; Selection and its types **[191]**; Hybridization and steps involved in it **[192]** Types of hybridization **[193]**;Heterosis and its classification **[193,194]**.

10.ECONOMICALLY USEFUL PLANTS AND ENTREPRENEURIAL BIOLOGY[1bit]

2MARKS:*Binomial name,Family and its origin of followings:* Rice**[201]**;Wheat,**[201]**;Pseudo cereal**[201]**;Ragi**[202]**;**[202]**;sorghum**[202]**;foxtail millet**[202]** Kodo millet**[202]**;Black gram**[202]**; Red gram**[203]**;Green gram**[203]**; Lady's finger**[203]**;Mango**[204]**;Cashew nuts**[204]**;Sugarcane**[204]**;of Palmyra**[205]**;Peanut**[205]**;Sesame**[205]**;coffee**[205,206]**;Cardamom**[206]**; Black pepper**[206]**;turmeric**[207]**;Red pepper**[207]**;Tamarind**[207]**;Cotton **[208]**;jute **[208]**;teak**[208]**;Rubber**[209]**;Henna**[210]**;Aloe**[210]**;Madurai malli**[211]**; Jasmine**[211]**;Keezhanelli**[212]**;Nilavembu**[212]**;Opium poppy**[213]**;Marijuana**[213]**;

3MARKS: Wood pulp**[209]**;**Uses** of the followings: Rice **[201]**;Wheat, **[201]**;Pseudo cereal**[201]**; Ragi**[202]**;**[202]**;sorghum **[202]**;foxtail millet **[202]**;Kodo millet **[202]**;Black gram **[202]**; Red gram **[203]**;Green gram **[203]**; Lady's finger **[203]**;Mango **[204]**;Cashew nuts **[204]**;Sugarcane **[204]**;of Palmyra **[205]**;Peanut **[205]**;Sesame **[205]**;coffee **[205,206]**;Cardamom **[206]**; Black pepper **[206]**;turmeric **[207]**;Red pepper **[207]**;Tamarind **[207]**;Cotton **[208]**;jute **[208]**;teak **[208]**;Rubber **[209]**;Henna **[210]**;Aloe **[210]**;Madurai malli**[211]**; Jasmine **[211]**;Keezhanelli**[212]**; Nilavembu**[212]**;Opium poppy **[213]**;Marijuana **[213]**;Capsaicin **[207]**; Rubber vulcanization**[209]**.

5MARKS: Common medicinal plants**[213]**;Organic farming **[214]**.

"Scan and Skim your Textbook which is the only Bible of the year! Incinerate all guides and materials" - Mithun

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"The Lord gives wisdom, out of his mouth comes knowledge and understanding"-Pro 2:6

1.REPRODUCTION IN ORGANISMS[2 bits]

2MARKS: Difference b/n Sexual and Asexual reproduction [**1**]; Multiple fission in Plasmodium[**3**]; Strobilation [**3**]; Plasmotomy [**4**]; Sporulation [**4**]; Gemmules [**5**]; Fragmentation [**5**]; Apolysis[**6**]; Power of regeneration [**6**]; Autogamy [**7**]; Exogamy [**7**]; Hologamy [**7**]; Paedogamy [**7**]; Merogamy [**7**]; Isogamy and Anisogamy [**7**]; Conjugation [**7**]; Seasonal and continuous breeder [**7**]; Senescent phase [**7**]; Ovaviviparous [**9**].

3MARKS: Fission in Paramecium & Euglena [**2,3**];Fission in Vorticella [**3**]; Endogenous and Exogenous budding [**5**]; Epimorphosis and Morphallaxis [**6**]; External and Internal fertilization [**7**]; 3 Phases of Fertilization [**7**]; Oviparous and Viviparous [**8,9**].

5MARKS: Fission and its types[**2**]; Parthenogenesis and Its types [**7,8**].

2.HUMAN REPRODUCTION [3bits]

2MARKS: Major reproductive events in human [**13**]; Scrotum as Thermoregulator [**14**]; Sertoli cells [**14**]; Leydig cells [**14**]; Vesiculase [**16**]; Composition of Seminal plasma [**15**]; Role of semen [**16**]; 2 region of Oviduct[**17**]; Draw and Label Female reproductive system[**17**]; Fundus [**17**]; Cervix[**17**]; Bartholin's Gland [**17**]; Skene's Gland [**17**]; Whether Hymen is indicator of Virginity?[**17**]; Draw and Label Mammary gland [**18**]; Spermiation and Spermiogenesis [**19**]; Nebenkern [**19**]; Graffian follicles [**20**]; Structure of Ovum [**21**]; 4 phases of ovarian cycle [**21**]; LH surge [**21**]; Ovulation [**21**]; Corpus luteum& Corpus albicans [**21,22**]; Methods to manage Mensus[**23**]; Disposal of Pad w.r.t Arunachalammuruganandham[**23,29**]; Menopause [**23**]; Capacitation[**23**]; Acrosomal reaction [**23**]; How polyspermy can be prevented?[**23**]; Morula[**23**]; Blastocyst[**23**]; Trophoblast[**23**]; ICM [**23**] Ectopic pregnancy [**24**]; Extra embryonic layers[**25**]; Chorionic villi [**25**]; Placenta [**25**]; Hormones during pregnancy [**25**]; Draw the Diagram of Human Foetus within uterus[**25**];Parturition[**26**]; Braxter-Hick's contraction[**26**]; Foetal ejection reflex or Ferguson reflex[**26**]; Let down reflex [**26**]; Lactogenesis [**26**]; Colustrum [**26**]; C section[**28**]; Mother's Milk as Natural passive immunization [**28**]; Azospermia and Orchidectomy[**29**]; Menarche and Spermache [**21,29**]

3MARKS: Gastrulation and organogenesis [**14**]; Cryptorchism[**15**]; Journey of Sperm [**15**]; Accessory glands [**15**]; Role of Penis in Insemination[**16**]; Ovarian stroma[**16**]; Tunica albuginea [**16**]: Mesovarium [**16**]; Infundibulum and Fimbrae [**16**]; Layers of Uterus [**17**]; External Vulva [**17**]; Journey of Milk expulsion from its origin [**17**]; Chart of Gamatogenesis [**18**]; Role of Hormone in Spermatogenesis[**19**]; PCOS[**22**]; What are the types of Twins?[**24**]; Gestation period [**25**]; WBW[**28**].

5MARKS: Spermatogenesis [**18,19**]; Structure of Sperm [**19**];Oogenesis [**20**]; Structure of ovum [**20,21**]; Various Stages of Menstrual cycle with suitable diagram [**21,22**]; 5 Stages of fertilization events[**24**].

3.REPRODUCTIVE HEALTH [3 BITS]

2MARKS: Major tasks of RCH prog.[**34**]; POCSO & PCPNDT act [**35**];Periodic abstinence[**36**]; Continuous abstinence [**36**]; coitus interruptus[**36**]; chemical barrier [**36**]; TNHSP[**38**]; ART [**41**]; IUI[**41**]; IUT [**42**]; Surrogacy[**42**]; CVS [**43**].

3MARKS: Amniocentesis & Statutory ban[**35**]; Female foeticide& infanticide[**35**]; Lactationalamenorrhoea[**36**];Mechanical barrier [**37**]; Saheli [**37**]; Diff b/n Vasectomy &tubectomy [**37**]; MTP[**37,38**]; List out various STDs and its prevention [**38**]; How cervical cancer can be detected? [**40**]; ZIFT & GIFT [**41,42**]; ICSI[**42**]; TESE [**42**];Amniocentesis [**42,43**]; Foetoscope [**43**].

5MARKS: IUDs types & its mode of action [**37**]; List out STDs, causative agents and 2 symptoms each [**39,40**]; Reasons for infertility [**40,41**]; IVF [**41**].

4.PRINCIPLES OF INHERITANCE AND VARIATION [7BITS]

2MARKS: Wiener hypothesis[**49**]; SRYgene[**52**]; Holandric genes [**53**]; PAH[**56**]; DOPA [**56**]; Trisomy-21[**57**]; Trisomy-13 [**57**]; XXY males [**57**]; XO females [**57**].

3MARKS:Multiple allelism [**47**]; Null allele [**48**]; Chart of Genetic basis of human ABO blood groups [**49**]; Bernstein studies [**48**]; Prevention of Erythroblastosisfoetalis [**50**]; Barr Body [**52**]; Kin selection [**53**]; Haemophilia [**53**]; Colour blindness [**53**]; Y linked inheritance [**54**]; Preparation of karyotype [**55**]; Applications of karyotyping [**55**]; List Mendelian disorders [**56**]; Alpha and Beta thalassemia [**56**]; Albunism [**56**]; Huntington's chorea [**56,57**].

5MARKS: Rh factor [**49**]; Fisher and Race hypothesis [**49**];Haemolytic disease of new born HDN[**50**]; Heterogametic males [**50-51**]; Heterogametic females [**51**]; Various cross between color blindness [**54**]; Various types symbols used in pedigree chart [**55**]; Autosomal aneuploidy in human beings [**57**]; Allosomal abnormalities in human beings [**57**].

5.MOLECULAR GENETICS [8BITS]

2MARKS: Central dogma **[64];** Gene **[64];** Locus & Alleles **[64];** Chromosomes **[64];**Nuclein**[64];**Unineme**[70];** Nucleoid **[70];**Genophore**[70];** Nucleosomes**[70];** Histone octomer**[70];** Kornberg enzyme role **[72];**Ori region **[72];**Okazaki fragment **[72];** DNA polymerase **[73];** DNA ligase **[73];**Replication fork **[73];** Replication fork Diagram **[72];** TATA &Pribnow box **[74];** Coding & Template strand **[74];**Monocistronic&Polycistronic**[74];** Structure of a transcription unit **[74];** Transcription bubble **[74];** Exons & Introns **[75];** Splicing **[75];** Capping an dtailing**[75];** HGT **[76];**

3MARKS: One gene –One enzyme hypothesis **[64];**Ribose sugar **[67];** Nitrogenous bases **[67];** Phosphate functional group **[67];** Nucleotide and Nucleoside **[67];**Erwin chargaff's rule **[68];** Ribozyme **[68];**Compare the stability of DNA & RNA **[69];** Compare the Information storage & mutation of RNA & DNA **[69];**How do you calculate the length of DNA**[69,70];** Solenoid structure **[70];**Euchromatin& Heterochromatin **[70];** Leading and lagging strand **[72]**; Subunits of RNA polymerase**[74];** Sigma & Rho factor **[74];**Types of RNA polymerase in Eukaryotes**[75].**

5MARKS: Transformation experiment **[65];** Hershey and chase (Blender) experiment on T2 Bacteriophage **[66];**Messelson and stahl experiment **[71,72];**Mechanism of replication **[72,73];** Process of transcription **[74,75].**

6.EVOLUTION [4 BITS]

2MARKS: Special creation theory [**94**];Abiogenesis [**94**]; Coecervates [**94**];Biogenesis [**94**];Relative and absolute dating [**96**]; Woolly mammoth [**97**];Connective link [**99**];Atavistic organs [**99**];Biogenetic law [**99,100**];Universal occurrence of variation [**101**];Origin of species by Natural selection [**101**]; ALX1 genes [**103**];Homo habilis[**107**]; Homo erectus [**107**];Neanderthal man [**107**];Cro-Magnon man [**107**];Homo sapiens [**107**].

3MARKS: Big bang theory [**94**], Oxygen revolution in primitive earth [**96**];Petrifaction [**97**]; Moulds and casts [**97,98**]; Differentiate homologous and analogous organs [**98**];Vestigeal organs [**99**]; Neo-Lamarckism [**100**]; Over production [**101**];Struggle for existence [**101**];Adaptive variation [**103**]; Marsupial and placental mammals [**103**];Centrifugal selection [**104**];Gene flow [**105**]; Sewall wright effect [**105**].

5MARKS:Chemical evolution and Oparin's experiment [**94**]; Organisms in various era [**94-96**];Urey miller's experiment [**97**]; Lamarckism and its objections [**100**];Objections to Darwinism and Neo-Darwinism [**101**];Mutational theory and its salient features [**102**];Modern synthetic theory and its five factors [**102**];Industrial melanism by Kettlewell [**102**];Types of selection pressure [**104**];Hardy- weinberg's equilibrium principle [**106**]; Assumptions/Conditions of Hardy-Weinberg law[**106**]; Evolution of Human [**107**].

7.HUMAN HEALTH AND DISEASES [6 BITS]

2MARKS: Communicable Disease [**111**];Non-infectious disease [**112**]; Widal test [**112**]; 3 phases of plasmodium life cycle [**116**];Signet ring stage [**116**];Schuffners granules [**116**]; Ookinete [**116**]; 3 methods to prevent malaria [**117,118**]; Malaria vaccine [**118**]; Tineapedis [**118**]; Ring worm [**118**]; Helminthiasis [**118**]; Immunology [**119**]; Resistance and Susceptibility [**120**];Haematopoiesis [**122**]; Booster response [**123**];Bursa of fabricius [**123**]; Peyer's patches [**124**]; Tonsils [**124**]; Spleen [**124**]; Adenoids [**124**];MALT [**125**]; GALT [**125**];BALT [**125**];Dendritic cells [**126**];Immunogen, Haptens& Adjuvants [**127**];Epitope &Paratope [**127**]; Endogenous & Exogenous antigen [**127**]; Antibody types [**127**]; Precipitin [**128**];Agglutinin [**128**]; Opsonin [**128**];Neutralization [**129**];Toxoid vaccines [**130**]; DNA vaccines [**130**]; Anaphylaxis [**131**]; HIV diagnostic test [**132**]; Autoimmunity [**132**]; Autoantibodies [**132**]; Examples for Autoimmunity [**132**]; Metastasis [**132**]; Contact inhibition [**133**];Drugs commonly abused [**134**]; Drugs for insomnia and depression [**135**].

3MARKS: Common human diseases chart [**112**]; Bacterial resistance [**112**]; Bacillary dysentery [**113**]; Black death [**113**]; Lock jaw [**113**]; Enteric fever [**113**]; Four Viral diseases types based on symptoms[**113**]; Break bone fever [**114**];Toga virus [**114**];DENV 1-4 virus [**114**]; Nipah virus [**115**]; Swine flu [**115**];Amoebiasis [**115**]; Kala azar [**116];** Malarial trophozoite [**116**];Schizogony&Sporogony [**116**]; Hemozoin [**117**]; Types of malaria [**117**]; Ascariasis [**118**]; Filariasis [**119**]; Antigen [**120**]; Innate and acquired immunity [**121**]; CMI and AMI [**121**]; Active and passive immunity [**122**]; Central and peripheral immunity [**123**]; Bone marrow [**124**]; Secondary lymphoid organ [**124**];Antigen-Antibody interaction chart [**129**]; Vaccination and Immunization [**130**]; Allergy & Allergens [**130**];

Immunotherapy of cancer [**133**]; Differentiate the normal cells with cancer cells [**133**]; Opioids [**134**]; Cannobinoids [**134**];Cocaine [**135**];Euphoria [**135**];Withdrawal symptoms [**135**]; Alcoholism [**135**]; Liver cirrhosis [**136**]; Korsakoff syndrome [**136**]; Alcoholic anonymous [**136**].

5MARKS: Bacterial diseases in human [**113**]; Viral diseases in human [**114**]; African sleeping diseases [**115**]; Life cycle of Plasmodium chart [**117**]; Maintenance of personal hygiene [**119**]; Innate immunity types and mechanism [**120**]; Differentiate Primary and secondary immune response [**122**]; Thymus [**123,124**]; Lymph node [**124,125**]; Lymphocytes [**126**];Structure of Antibody & its functions [**127,128**]; Binding force of antigen-Antibody[**128**]; Generation of vaccines [**129,130**]; Structure of HIV [**131**]; HIV transmission [**131**]; Classification of drugs table [**134**]; Prevention & Control of drug & Alcohol abuse[**136**]; Signs and symptoms of mental depression [**137**].

8.MICROBES IN HUMAN WELFARE [3 BITS]

2MARKS: LAB [**142**]; Yogurt [**143**]; Cheese [**143**]; Paneer [**143**];Baker's yeast [**143**];Antibiotic [**143**];Broad and narrow spectrum antibiotic [**144**];Zymology [**145**]; Oenology [**145**]; Distilled and undistilled alcoholic beverages [**145**]; Beer and whisky [**145**];Red and white wine [**145**]; Alcohol content in various beverages [**145**]; Toddy [**145**]; Human insulin [**146**];Flocs [**147**]; BOD [**147**]; Anaerobic sludge digester [**147**].

3MARKS: Prebiotic & Probiotic[**143**];SCP [**143**]; Bioreactor [**143**]; Origin of pencillin [**144**]; Antibiotics and Organisms[**144**];Industrial alcohol [**145**]; Biodiesel [**146**]; Various organic acids and bacteria involved [**146**]; Enzymes for bottle juices [**146**];Clot buster [**146**];Cyclosporin A [**146**]; Tertiary treatment [**148**]; Action plan to conserve water bodies [**148**]; Methanogen [**148**]; Biopesticides [**149**]; Cry toxin [**149**]; Delta endotoxin [**149**]; Mycoherbicide [**149**]; Baculovirus and NPV[**149,150**]; Key features of organic farming [**150**]; In-situ & Ex-situ bioremediation [**150,151** ;GEM [**151**];PETase [**151**]; Anaerobes involve in pollutant degradation [**151**].

5MARKS: Sewage water treatment[**147**].

9.APPLICATIONS OF BIOTECHNOLOGY [4 BITS]

2MARKS: Humulin [**156**];Totipotency&Pluripotency[**161**]; Multipotency [**161**]; Oligopotency&Unipotency [**161**];Cord blood banking [**162**]; Transgenesis [**165**];'Knock out mechanism[**167**].

3MARKS: Rosie cow [**157**]; Edible vaccine [**158**]; First synthetic vaccines [**159**]; First clinical gene therapy[**160**]; Somatic & Germ line gene therapy [**160**]; Gene augmentation and inhibition [**159,161**]; Process of Gene therapy [**160**]; Embryonic and adult stem cells [**161**]; List out biotechnological products [**165**]

5MARKS:Origin of recombinant insulin [**156**]; Human growth hormone [**157**]; Factor VIII [**157,158**]; Interferon [**158**]; Recombinant vaccines [**158**]; DNA vaccines [**159**];Enzyme linked immunosorbent assay [**162**]; Steps in PCR [**163**];Applications of PCR [**164**]; Production of transgenic organism & Uses [**165**]; Cloning of Dolly [**167**];Advantage and disadvantages of cloning [**167**].

10.ORGANISM AND POPULATION [4 BITS]

2MARKS: Ecology [**171**]; Habitat[**172**];Xerophytic adaptation in camel [**172**]; Aquatic adaptation in fish [**172**]; Niche [**172**]; Ecological equivalents [**172**]; Grasshopper and cricket [**172**]; Compare Catla, Rohu and mrigal[**172**];Bergmann's rule [**173**];Allen's rule [**173**]; Jordon's rule [**173**];Phototaxis[**174**]; Phototropism [**174**];Photokinesis[**174**]; 3states and 2 types of water [**175**];Pesosphere[**175**];Pedogenesis[**175**]; Porosity of soil [**176**];Coriolis effect [**176**]; Hygrometer &Anemometre[**176**];Conformers [**183**]; Hibernation, Aestivation & Diapause [**183**]; Biotic potential [**187**]; Carrying capacity [**187**]; Environmental resistance [**187**].

3MARKS:Van'thoff's rule [**173**];Eurytherms and eg[**173,174**];Stenotherms and Eg.[**174**]; Influence of light in various organism [**174**];Thermal zones in cold water bodies [**175**]; High altitude acclimatization [**176**]; Aquatic biomes of Earth [**177**]; organisms in tundra biomes [**178**];organisms in Taiga biomes [**179**]; organisms in Grassland biomes [**179**]; organisms in Alphine biomes [**180**]; Types of tropical forest based upon seasonal distribution of rainfall [**180**];Flora and fauna in Tropical forest [**180**];Classify temperate forest based upon seasonal distribution of rainfall [**181**];Flora and fauna in Temperate forest [**181**];Caumoflage[**183**];Natality[**185**];Mortality[**185**]; Age distribution pyramids [**186**].

5MARKS: Tundra biome [**178**]; Taiga biome [**178**];Grassland biome [**178**];Hot Desert biomes [**181**]; Cold desert biome [**182**];Organism response to environmental stressor [**182;183**]; Adaptations of aquatic organism [**184**]; Adaptation of terrestrial animals [**184**]; Indices of Density [**185**];Population dispersion [**186**];J ans S shaped curve [**187**]; r-Selected and k-Selected species [**187**]; Types of interaction [**188**].

11. BIODIVERSTIY AND ITS CONSERVATION [4BITS]

2MARKS: Biodiversity [**193**]; Levels of biodiversity [**194**]; George, The tree snail [**205**]; 8 categories of Red list [**205**];Sacred grooves [**208**].

3MARKS: Community/ecosystem diversity [**195**]; 'India is very rich in biological diversity'-Justify [**195**]; 'India is 7th largest country in world's total area'-Justify [**195**]; Habitat fragmentation [**201**]; Over exploitation [**201**];Jhum cultivation [**202**];Coextinction[**202,203**]; Pollutants role in biodiversity loss [**203**]; Hotspots [**204**]; Protected area [**206**];Off site collection [**208**]; Gene banks [**208**]; Distinguish In-situ & Ex-Situ conservation [**208**].

5MARKS: Genetic diversity [**194**];Species diversity [**194**]; Latitude and altitude gradients [**196**]; Species –Area relationship [**196,197**]; Importance of Biodiversity [**197**]; Causes of biodiversity loss [**200**]; Habitat loss [**201**]; Exotic/Alien species Invasion[**202**]; 3 types of extinctions [**204**];Project tiger [**206**]; National park [**206,207**].

12.ENVIRONMENTAL ISSUES [5 BITS]

2MARKS: Pollutant [**210**]; Global warming[**215,216**];Nitrogen oxides [**215**]; PAN [**216**] Ozone depletion [**216**]; Acid rain [**216**];MoEFCC[**219**]; Source of noise pollution [**220**];Bio-magnification [**221**]; Eutrophication [**222**]; Accelerated eutrophication[**222**]; Stages of ecosystem [**222**];Medical wastes[**223**]; 4 R's [**226**]; Ozone layer [**227**]; Ozone day [**228**]; Deforestation [**228**].

3MARKS: Degradable and non degradable pollutants [**210**]; Main sources of Air pollution [**215**]: Effect of air pollution in human [**215**]; Smog [**216**]; Control of Air pollution [**216**]; AQI [**217**]; Point and non-point source of water pollution [**217**]; 3 ways of water pollution by its source [**218**]; Effect of water pollution on ecosystem [**218**]; Prevention of water pollution [**219**]; Legal protection of Noise pollution [**220**]; Bio-Magnification of DDT [**221**];Organic farming [**223**]; Contribution of Nammalvar[**223**]; E-Waste [**226**]; Ozone depletion by anthropogenic action [**227**]; Effects of Ozone depletion [**228**];Ecosan[**229**].

5MARKS: Effect of noise pollution[**220**]; Control of noise pollution [**220**];Agrochemical [**220,221**]; Wastewater treatment [**222**]; Major source of solid wastes[**224**]; 3 ways of Control and management of Nuclear wastes [**225**]; people participation in conservation of forest [**228,229**].