

മികവിലേക്ക് Hcp sSI mSv

പൊതുവിദ്യാലയങ്ങൾ പുത്തനുണർവ് നേടി ശക്തമായ കുതിച്ചു കയറ്റം നടത്തുന്ന കാഴ്ചയാണ് പോയ രണ്ട് വർഷങ്ങളിൽ കേരളത്തിൽ കാണാനാവുക, ഭൗതിക സൗകര്യ വികസനത്തോടൊപ്പം അക്കാദമിക മികവുറപ്പുവരുത്താൻ ഓരോ വിദ്യാലയവും തയ്യാറാക്കിയ മാസ്റ്റർ പ്ലാനുകൾ പ്രവൃർത്തിപഥത്തിലെത്തുന്നതോടെ മുന്നേറ്റത്തിന്റെ ഗതിവേഗം കൂടും. അക്കാദമിക മികവാണ് യഥാർഥ മികവ് എന്ന പൊതു വിദ്യാഭ്യാസ സംരക്ഷണയജ്ഞം മുന്നോട്ടുവച്ച കാഴ്ചപ്പാടിന്റെ സാക്ഷാത്കാരമാണ് വിദ്യാഭ്യാസ മേഖലയിലെ പ്രവർത്തനങ്ങൾ.

തകർച്ച നേരിട്ട പൊതുവിദ്യാഭ്യാസ മേഖലയെ എങ്ങനെ പുതുക്കിപ്പണിയണമെന്നത് സംബന്ധിച്ച് ഒരു കമ്മീഷനെ തന്നെ വച്ച് സൂക്ഷ്മതലത്തിൽ പഠനം നടത്തി റിപ്പോർട്ട് തയ്യാറാക്കിയ സംഘടനയാണ് കെ.എസ്.ടി.എ. അതുകൊണ്ടുതന്നെ ഇടതുപക്ഷ ജനാധിപത്യമുന്നണി സർക്കാർ നടപ്പാക്കുന്ന പൊതു വിദ്യാഭ്യാസ സംരക്ഷണയജ്ഞത്തിന്റെ മുന്നണിപ്പോരാളിയായും അണിയറ ശില്പിയായും ഈ മഹാപ്രസ്ഥാനം നിലകൊള്ളുന്നു. 173 വിദ്യാലയത്തിൽ നിറവ് സമഗ്ര വിദ്യാലയ വികസന പരിപാടി നടപ്പിലാക്കിക്കൊണ്ട് സംഘടന കഴിഞ്ഞ വർഷമുണ്ടാക്കിയ മുന്നേറ്റം തുടരുന്നതോടൊപ്പം ഈ വർഷം ഓരോ ഉപജില്ലയിലും ഒന്ന് എന്ന രീതിയിൽ വിദ്യാലയത്തിൽ മികവ് 2018 നടപ്പാക്കുകയാണ്. വിജയ ശതമാനം വർദ്ധിപ്പിക്കുക എന്നതിലാണ് പോയവർഷങ്ങളിൽ വിദ്യാഭ്യാസ പ്രവർത്തനങ്ങൾ കേന്ദ്രീകരിച്ചതെങ്കിൽ ഈ വർഷം ഗുണനിലവാരത്തിലൂന്നി കൂടുതൽ എ പ്ലസുകൾ സൃഷ്ടിക്കുക എന്ന ലക്ഷ്യമാണ് മുന്നോട്ടുവയ്ക്കുന്നത്. അതിന് സഹായകമായവിധം ഹൈസ്കൂൾ, ഹയർ സെക്കന്ററി വിഭാഗങ്ങളിലേക്ക് 20 മൊഡ്യൂളുകൾ തയ്യാറാക്കി നൽകുകയാണ്. ഇവ ഏറ്റവും ഫലപ്രദമായി ഉപയോഗപ്പെടുത്തിയും സബ്ജക്ട് ക്യാമ്പുകളും ക്ലിനിക്കുകളും സംഘടിപ്പിക്കുകയും പരീക്ഷാകേന്ദ്രീകൃതമായ പ്രവർത്തനങ്ങൾ ഏറ്റെടുത്തും 2019 വർഷത്തെ എസ്.എസ്.എൽ.സി, ഹയർസെക്കന്ററി റിസൽട്ടിന്റെ ഗുണനിലവാരം മെച്ചപ്പെടുത്താനുള്ള പ്രവർത്തനങ്ങളിൽ പങ്കാളികളാകണമെന്ന് അഭ്യർഥിക്കുന്നു.

കെ.സി.ഹരികൃഷ്ണൻ
ജനറൽ സെക്രട്ടറി

KSTA Niravu 2019

CHAPTER - 1 REPRODUCTION IN ORGANISMS

Important Points:

- | | |
|---------------------------|---|
| Life Span | - The period from birth to the natural death of an organism. |
| Reproduction | - It is the process in which an organism give rise to young ones |
| Asexual reproduction | - Offspring (youngone) is produced by single parent. |
| Binary fission | - Parent divides into two daughter organism |
| Budding | - Daughter organism arise from the parental body |
| Zoospore | - Asexual motile reproductive structure of algae and fungi |
| Conidia | - Asexual reproductive structure of fungi. They are exogenously non motile spore |
| Gemmules | - Asexual reproductive structure of Sponge. They are internal buds |
| Vegetative propagation | - Regeneration of new plant from the portion of vegetative organ |
| Runner | - Long internode run on the surface, from each node adventitious root and axillary bud develops. |
| Rhizome | - Horizontally growing underground stem with axillary and terminal bud |
| Sucker | - Lateral branches originate from the basal and underground portion of main stem come upward giving rise to a shoot. |
| Tuber | - Irregular shaped underground stem modification for storage and propagation. |
| Offset | - A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of root |
| Bulb | - Disc shaped underground stem. The fleshy leaf store food and arranged as bulb shaped |
| Vegetative propagules | - Plant parts are capable of giving rise to new offsprings |
| Sexual reproduction | - Reproduction involves the formation of male and female gametes. Gametes fuse to form Zygote. Zygote develops into new organism. |
| Zygote | - The fusion product of Male and Female gametes. |
| Juvenile phase | - The period of growth |
| Reproductive phase | - This phase shows reproductive behavior. e.g.: production of flower. |
| Monocarpic plant | - Flowering once in their lifetime |
| Polycarpic plant | - Flowering occur every year or season |
| Oestrus cycle | - The females of placental mammals exhibits cyclic changes in the activities of ovaries and accessory ducts as well as hormones during the reproductive phase of non primate mammals. |
| Menstrual cycle | - The cyclic change during the reproduction phase of primate mammals. |
| Senescence | - Slowing of metabolism leads to old age |
| Pre-fertilisation event | - First step of sexual reproduction where gametogenesis and gamete transfer occur |
| Gametogenesis | - Process of development of two type of gametes. ie: Male and female gamete |
| Parthenogenesis | - Female gamete undergoes development to form new organism without fertilisation |
| External fertilisation | - Syngamy occur in external media. (water) ie: outside the body of organism |
| Internal fertilisation | - Syngamy occurs the inside of the body of organism |
| Post fertilisation events | - Events in sexual reproduction after the formation of Zygote |

KSTA Niravu 2019

Zygote	- Zygote is the fused gametes
Embryogenesis	- The processes of development of embryo from Zygote.
Oviparous	- Egg Lying Organisms
Viviparous	- Organism give birth to young one
Calcarious shell	- Fertilized egg is covered by calcium shell
Embryo	- Mature Zygote
Seed	- Mature Ovule
Fruit	- Mature ovary
Pericarp	- Fruit wall
Isogamete (Homogamete)	- Similar type of gametes. ie; Morphologically and Physiologically similar.
Heterogametes	- Female gametes are larger than male gamete. ie; Morphologically and Physiologically dissimilar gametes.
Anthrozooid (sperm)	- Male gamete
Egg (Ovum)	- Female gamete
Bisexual	- Both male and female reproductive structures are seen in the same organisms.
Unisexual	- Male and female reproductive structures are seen in different individuals.
Homothallic and Monoecious	- It is the bisexual condition.
Heterothallic and Diecious	- It is the unisexual condition.
Staminate	- Unisexual flower bearing stamen.
Pistillate	- Unisexual flower bearing pistil.
Monoecious plant	- Male and female flowers found in single plant.
Dioecious plant	- Male and female flowers found in different plants.
Meocytes	- It is the gamete mother cell
Pollen grain	- The male gamete produced in anther.
Ovule	- Female gamete found in ovary.
Pollination	- Transfer of pollen grain to stigma.
Fertilization	- Fusion of gametes.
Syngamy	- Fusion of male gamete with egg.

Questions and Solutions

- Q 1. Name the vegetative propagules of angiosperm. (2 score)
Ans 1. Eyes of potato 2. Rhizome of ginger 3. Bulbil of agave 4. Leaf bud of bryophyllum 5. Offset of water hyacinth
- Q 2. Which plant is known as terror of Bengal. Justify
Ans Water hyacinth is known as terror of Bengal because it is most invasive weeds founds in standing water and drain oxygen from the water and leads the death of fishes.
- Q 3. Write the unisexual reproductive structures from the following.
Ans a) Zoospores of chlamydomonas b) Conidia of penicillium
c) Buds in Hydra d) Gemmules in sponge
- Q 4. Define parthenogenesis give an example
Ans It is the development of an organism from unfertilized female gamete. eg: honey bee
- Q 5. Name the unisexual reproductive structure of the following.
a) Clamydomonas b) Penicillium c) Hydra d) Sponges
Ans a) Zoospore b) Candia c) Bud d) Gemmules
- Q 6. A unisexual flower having no androecium is called
Ans Pistillate
- Q 7. Match Column A with B
1. Bulbil - Bryophyllum

KSTA Niravu 2019

2. Offset - Sponge
3. Gemmules - Water hyacinth
4. Leaf buds - Agave
- Ans. 1 (d) 2 (c) 3 (b) 4 (c)
- Q 8. From the following select the two having a haploid chromosome number
a) Egg b) Endosperm c) Zygote d) Pollen
- Ans Egg and pollen
- Q 9. Morphologically and genetically similar individual called
Ans Clones
- A 10. In asexual reproduction, offsprings are produced by a single parent with or without the involvement of gamete formation. Name the asexual reproductive structure of a and b.
a) hydra b) penicillium
- Ans a) Bud b) Conidia
- Q 11. In papaya, male and female flowers are present in separate plants. They are said to be-----
Ans Dioecious
- Q 12. Pre-fertilization events of sexual reproduction in all organism are gametogenesis and gamete transfer. What are the post fertilization events.
Ans Zygote formation and embryogenesis
- Q 13. Find out which statement are true
a) Ovary develop into fruit
b) In flowering planto zygote is developed outside the ovule.
c) Ovule develop into embryo
- Ans a and c

CHAPTER 2

SEXUAL REPRODUCTION IN FLOWERING PLANT

Important Points

- | | |
|-----------------------------|--|
| Stamen | - Male reproductive part of flower |
| Pistil | - Female reproductive part of flower |
| Microsporogenesis | - The processes of development of pollen grain. |
| Exine | - Outer wall of pollen grain |
| Sporopollenin | - Most resistant organic (biological) material found in exine |
| Intine | - Inner wall of pollen grain |
| Palynology | - The study of pollen grain |
| Pollen viability | - The duration of pollen grain remain functional |
| Pollen bank | - Storage of pollen grains for years in liquid nitrogen at -196°C |
| Megasporogenesis | - The processes of development of megaspore. |
| Monocarpellary | - Flower with one pistil |
| Multicarpellary | - Flower with numerous pistil |
| Syncarpous | - Fused carpels |
| Apocarpous | - Free carpels |
| Stigma | - The terminal receptive part of pistil |
| Style | - Elongated tube of pistil |
| Ovary | - The basal bulged part of pistil with ovule |
| Megasporangium | - Nucellus is enclosed by one or more protective envelopes, known as integument. |
| Micropyle | - Small opening of integument at egg apparatus region of ovule. |
| Chalaza | - The region opposite to micropylar end. |
| Megaspore mother cell (MMC) | - Initial diploid cells develop as megaspore |
| Monosporic development | - Embryosac develop from single spore mother cell. |

KSTA Niravu 2019

Egg apparatus	- Association of two haploid synergids and one egg cells in embryosac.
Synergids	- Two haploid cells associate with egg cells
Antipodals	- Three haploid cells organized at chalazal region of embryosac
Central cell	- Two haploid polar nucleus organized at central portion of embryosac.
Pollination	- The mechanism of transfer of pollen grain.
Autogamy	- Transfer of pollen grain in between the anther and stigma of the same flower.
Chasmogamous flower	- Opened flower
Cleistogamous flower	- Flower don't open at all.
Geitonogamy	- Transfer of pollen grain from staminate flower to pistillated flower of same plant.
Xenogamy	- Transfer of pollen grain from one flower to stigma of another flower of same species.
Pollen or Nectar Robbers	- Insect robes pollen or nectar without bringing pollination.
Emasculation	- Removal of anther
Bagging	- Covering of stigma
Double fertilization	- Syngamy and triple fusion
Syngamy	- Fusion of male gamete with female gamete
Triple fusion	- Fusion of diploid nucleus with male gamete
PEN	- Primary Endosperm Nucleus
PEC	- Primary Endosperm Cell
Endosperm	- Reserved food material for the development of embryo.
Cellular endosperm	- Cell wall formation occurs in endosperm.
Free nuclear endosperm	- Endosperm without cell wall or liquid endosperm
Embryogeny	- The processes of development of embryo
Pro-embryo	- Terminal cell divide into from multicellular glob shaped embryo
Heart-shaped embryo	- Globular embryo modified into heart shaped embryo
Epicotyl	- The region above the cotyledon
Hypocotyl	- The region below the cotyledon
Radicle	- Embryonal axis which initiated to root
Plumule	- Embryonal axis which initiated to shoot
Scutellum	- Single plate like colyledon formed in monocot
Coleorrhiza	- Root cap enclosed with an undifferentiated mass called Coleorrhiza
Coleoptile	- Leaf primodia enclosed in a structure called coleoptile.
Non albuminous seed	- Seed without endosperm
Albuminous seed	- Seed with endosperm
Perisperm	- Persistent nucellus.
Dormancy	- Entry of embryo into a state of inactivity
Pericarp	- Fruits wall (epicarp, mesocarp and endocarp)
False fruit	- Fruits develop other than ovary.
True fruit	- Fruit develop from ovary.
Parthenocarpic fruit	- Fruit develop without fertilisation
Apomixis	- Seed develop without fertilisation
Poly embryony	- More than one embryo in the seed

Questions and solutions

Q 1.The development of pollen grain in Angiosperm called

(1 score)

KSTA Niravu 2019

Ans Microsporogenesis

Q 2. Which of the following part of the flower is haploid (1 score)

- a) Anther wall b) Pollen mother cell c) Synergids d) Secondary nucleus

Ans Synergids

Q 3. Write the adaptation for wind pollination (2 score)

- Ans 1) Well exposed stamen
2) Light weight-and non sticky pollengrain
3) Feathery stigma
4) Single ovule in each ovary
5) Flowers packed into an inflorescence
6) Stigma and style which wave in wind

Q 4. Point out adaptation for water pollination (2 score)

- Ans 1) Pollen grain have mucilaginous cover
2) Long ribbon shaped pollen grain
3) Colourless flower
4) Nectar less flower

Q 5. Write the adaptation for animal pollination (2 score)

- Ans 1) Colourful flower
2) Aromatic flower
3) Flower rich in nectar
4) Flowers are in cluster
5) Pollen grains sticky and spiny
6) Sticky stigma

Q 6. What are the outbreeding devices in flower to control self pollination (2 score)

- Ans 1) Pollen release and stigma release not synchronized
2) Anther and stigma placed in different position
3) Self compatibility
4) Unisexual flowers
5) Dioecy
6) Protandry (Anthers mature first)
7) Protogyny (Stigma mature first)

Q 7. In aquatic plant like water hyacinth and water lily the pollination agent is (1 score)

Ans Water and insects

Q 8. The hard outer layer of pollen composed of (1 score)

Ans Sporopollenin

Q 9. In some seeds nucellus may persist. Such nucellus is called (1 score)

Ans Perisperm

Q 10. What is a false fruit? cite an example (2 score)

Ans. Fruits are formed from any other part of the ovary. eg: Apple

Q 11. Many of the flowering plant have developed some devices for discouraging inbreeding write any of two (2 score)

- Ans 1) Pollen release and stigma receptivity not synchronized
2) Self-incompatibility

Q 12. After the Syngamy and triple fusion in embryo sac embryo will be diploid and endosperm will be..... (1 score)

Ans Triploid (3n)

Q 13. In maize, the chromosome number present in the meiocyte is 20. Give the no of chromosome present in the following (2 score)

- a) Maize pollen b) Maize endosperm

Ans a) 10 b) 30

KSTA Niravu 2019

CHAPTER 3

STRATEGIES FOR ENHANCEMENT OF FOOD PRODUCTION

Important Points:

- Animal Husbandry
 - Dairy farm
 - Agriculture Practice of breeding and raising live stock animals
 - Management of animals for milk and milk products for humanuse.
 - Poultry farm
 - Management of domesticated fowl (birds) used for egg and meat.
 - Breed
 - A group of animals related by descent and similar in most characters like general appearance, features, size, configuration, etc.
 - Inbreeding
 - When breeding is between animals of the same breed it is called inbreeding.
 - Outbreeding
 - When cross between different breeds are called out breeding
 - Homozygosity
 - The state of possessing two identical form of particular gene. One inherited from each parent
 - Inbreeding depression
 - Close inbreeding, usually reduces fertility and even productivity. This is called inbreeding depression
 - Out breeding
 - Breeding of unrelated animals which may belong to same breed but have no common ancestors for 4-6 generation or different-breeds of same species .
 - Out crossing
 - The method of mating animals with in the same breed, but having no common ancestors on either side of pedigree up to 4-6 generation.
 - Crossbreeding
 - The method of mating superior male of one breed with superior females of another breed.
 - Hisardale
 - Is a new breed of sheep developed in punjab by crossing bikaneri ewes and marino rams through cross breeding.
 - Interspecific hybridizations
 - The method of mating male and female animals of two different related species. eg: mule. (male donkey x Female horse)
 - Artificial insemination
 - Semen collected from superior male parents is injected into the reproductive tract of the selected female parent.
 - MOET
 - Multiple ovulation embryo transfer technology.
 - Apiculture
 - The process of catching, processing and selling of fish or other aquatic animals such as brown, crab, lobster, edible oyster for food.
 - Blue revolution
 - Aquaculture and pisciculture leads to the development of fishery industry. The income of farmers and country increased. This achievement is termed as Blue revolution.
 - Aquaculture
 - Growing and harvesting of aquatic plants and animals in different type of water bodies.
 - Pisciculture
 - Cultivation, breeding, rearing and harvesting fishes by artificially called pisciculture.
 - Plant breeding
 - It is the purposeful manipulation of plant species in order to create desirable plant.
 - Green revolution (1960)
 - Dramatic increase in production of high yielding varieties of wheat and rice is known as Green revolution.
 - Germ plasm collection
 - The entire collection (of plant/seeds) having all diverse alleles for all genes in a given crop is called gene plasm collection.
 - Mutation
 - Sudden hevitable in genotype of an organism.
 - Induced mutation
 - Mutation induced artificially through the use of chemicals or radiation.

KSTA Niravu 2019

Mutation breeding	- The use of induced mutations in plant breeding to develop improved varieties.
Biofortification	- Breeding crop with increasing the nutritional qualities like protein, vitamin, minerals and fat in crops.
Disease resistant plant	- Breeding and development of cultivars resistant to disease enhances food production.
Himagiri	- A disease resistant variety of wheat, resistant against leaf stripe and hill blight.
Karan raj (pusa swarnim)	- A disease resistance variety of brassica resistant against white rust.
Pusa Shubhra, Pusa snowball-k	- It is a disease resistant variety of cauliflower against black rot and curl blight.
Pusa komal	- Disease resistant variety of cow pea resistant against bacterial blight.
Pusa sadabahar	- Disease resistant variety of chilli resistant against chilli mosaic virus, Tobacco mosaic virus and leaf miner.
Pusa Gaurav	- It is a pest resistant brassica against insect pests aphids.
Pusa sem2, Pusa sem3	- It is a pest resistant flat bean resistant against insect pests jassids, aphids and fruit borer.
Pusa savani	- It is a pest resistant okra (bhindi) resistant against shoot and fruit borer.
Hidden hunger	- Suffer from micronutrient, protein and vitamins.
Single cell protein (SCP)	- The term refers to protein obtained from large scale growth of micro organism like, yeast bacteria, algae. The protein may be used human consumption or animal feed.
Tissue culture	- Cells or small pieces of tissue are grown in special culture solutions. The process is known as tissue culture.
Microprojection	- It is the propagation of cells or small pieces of tissue.
Explant	- The cell/Tissue/organ of the plant to be used in plant tissue culture.
Callus	- An undifferentiated mass of tissue is developed on explant during tissue culture.
Totipotency	- The capacity of generate a whole plant from ovary/cell or explant.
Semicondons	- The Plants produced from tissue culture are genetically identical to the original plant from which they are grown. So they are called semicondons.
Meristem	- A group of undifferentiated cells with the capacity of continuous division.
Somatic hybridization	- Isolated protoplast from two different varieties of plants each having desirable characters can be fused to get hybrid protoplast, which can be further grown to form a new plant.

Questions and Solutions

1. What things are considered to manage a dairy farm
 - 1) Selection of food cattle breeds have high yielding potential and disease resistant.
 - 2) They have to be housed well
 - 3) Should have adequate water
 - 4) They have to be maintained disease free.
 - 5) The feeding of cattle should be carried out in a scientific manner.
 - 6) Food must be quality and quantity
 - 7) Keep stringent cleanliness and hygiene in both cattle and the handlers.
 - 8) Paramount importance while milking, storage and transport of milk and its products.

KSTA Niravu 2019

- 9) Need regular and keep proper records
10) Regular visit veterinary doctor would be mandatory
- 2) How to manage a poultry farm
- 1) Selection of disease free and suitable breeds
 - 2) Proper and safe farm conditions
 - 3) Proper feed and water
 - 4) Hygiene and health care
- 3) What is bird flu virus
Ans Bird flu viruses cause bird flu. It is an influenza virus H5N1. The virus attack and kills monocytes of birds. It also affects human beings
- 4) What are the objectives of animal breedings
Ans
- 1) Improve the yield
 - 2) To produce better quality of animal product
 - 3) High growth and resistance to various diseases.
 - 4) High reproductive rate
- 5) Differentiate inbreeding and outbreeding
Ans Inbreed refers to mating between more closely related individuals within the same breed for 4-6 generation but breeding in the breeding of the unrelated animals, which may belong to same breed but have no common ancestors for 4-6 generation.
- 6) Define out crossing
Ans Mating of animal milk in a same breed that have no common ancestors on either side of their pedigree upto 4-6 generations.
- 7) Mention the advantages and disadvantages of inbreeding
Ans
- 1) Advantages**
- a) Inbreeding helps to develop pureline in animals ie: homozygosity
 - b) Inbreeding exposes harmful recessive genes that are eliminated by selection
 - c) Inbreeding helps in accumulation of superior genes and elimination of less desirable genes.
- 2) Disadvantages of inbreeding**
- a) Continued inbreeding, especially close inbreeding usually reduces fertility and even productivity.
 - b) Inbreeding increase the chance of expression of harmful recessive genes.
- 8) How to overcome inbreeding depression
Ans A single outcross often help to overcome inbreeding depression
- 9) Give an example of interspecific hybrid. Write its advantages.
Ans Eg: Mule. Progeny may combine desirable features of both the parents and high economic value.
- 10) Name the type of controllable breeding experiments in cattles.
Ans
- a) Artificial insemination
 - b) Multiple ovulation embryo transfer technology (MOET)
- 11) What are the advantages of artificial insemination
Ans
1. The semen of a single superior bull can be used to inseminate a number of female cattle
 2. The collected semen be used immediately or can be frozen and used at the later date.
 3. Frozen semen can be transported where female is housed.
 4. It helps to overcome the normal mating.
- 12) What is multiple ovulation embryo transfer technology write its advantages.
Ans It is a quicker method of herd improvement. It is one of the successful methods of production of hybrid animals like cattle, sheep, rabbits, buffaloes, mares, etc..
- 13) Explain the steps of MOET in cow.
Ans
- 1) A cow is administered hormones, with FSH. (Follicle Stimulating hormone)
 - 2) FSH induce follicular maturation and super ovulation.
 - 3) So the cow produce 6-8 eggs instead of one egg per cycle.
 - 4) The super ovulated female is either mated with an elite bull or artificially inseminated.

KSTA Niravu 2019

- 5) When fertilized cells attain 8-32 cell stage are recovered non-surgically from female and transferred to surrogate mother.
- 6) The genetic mother is again indeed to super ovulation.
- 14) What are the steps for the successful beekeeping
- Knowledge of the nature and habits of honeybee
 - Selection of suitable location for keeping the hives.
 - Catching and hiving of swarms (group of bees)
 - Management of beehives during different seasons.
 - Handling and collection of honey and bee wax.
- 15) How honeybees beneficial for crop improvement honey yield while keeping hives in crop field.
- Honey bee increases pollination efficiency and improve the yield.
 - Honey yield increases where huge flowering in crop field.
- 16) Name three common fresh water fish
- Ans Catla, Rohu, and common carp
- 17) Name some marine edible fish
- Ans Hilsa, Sardines, Mackerel and Pomfrets
- 18) Most common spices of bee
- Ans Apis Indica
- 19) What are the purposes of plant breeding
- Ans
- Desired plant types that are better suited for cultivation
 - Create better yields
 - Produce disease resistant plant
- 20) What are the steps of classical plant breeding
- Crossing or hybridisations of pure lines
 - Artificial selection
- 21) What methods are adapted in plant breeding recently
- Genetic and molecular biology
 - Tissue culture
 - Molecular genetic tools (rDNA)
- 22) What do you mean about Green revolution
- Ans Development of various breeding techniques leads to dramatic increase in wheat and rice production in our country referred as green revolution.
- 23) What are the main steps in breeding a new variety crop
- Ans
- Collection of variability
 - Evaluation and selection of parents
 - Cross hybridization among the selected parent
 - Selection and testing of superior recombinant
 - Testing, release and commercialisation of new cultivars.
- 23) What do you mean by germ plasm collection
- Ans Collection and preservation of all the different wild varieties, species and relatives of the cultivated species of a given crop is called germ plasm collection.
- 24) Name two semi-dwarf varieties of wheat introduced in 1963 which were high yielding and disease resistant.
- Ans
- Kalyan sona
 - Sonalika
- 25) Name one semi dwarf variety developed at IRRI
- Ans IR-8
- 26) Expand IRRI where it is situated
- Ans International rice research institute. It is situated at Philippines.
- 27) Who developed semi dwarf varieties of wheat and rice
- Ans Nobel laureate Norman Borlaug at international centre for wheat and maize improvement in Mexico.

KSTA Niravu 2019

28) Which plant part is free of virus

Ans Meristem

29) Mention the step for developing somatic hybrid by somatic hybridisation in tomato and potato

a) Select a single cell of tomato and potato

b) Cell wall of both digested by pectase and cellulase

c) The naked (without-cell wall) protoplast can be fused to get hybrid protoplast

d) Hybrid protoplast vegetative cell wall in nutrient medium and grow to form a new plant called somatic hybrid tomato

CHAPTER 4

BIOTECHNOLOGY-PRINCIPLES AND PROCESSES

Important point

Biotechnology	- The integration of natural science and organisms, cells, parts thereof, and molecular analogues for product and service
Genetic engineering	- Techniques to do after the chemistry of genetic material (DNA and RNA), and introduce these into host organisms and thus change the phenotype of host
Bio processes engineering	- Maintenance of sterile media in chemical engineering processes for to cultivate desirable microbes or eukaryotic cells in large quantity for the manufacture of biotechnological product like antibiotics, vaccines, enzymes, etc.
Recombinant DNA	- It is the DNA with desirable DNA and one host DNA linked (rDNA)
Gene cloning	- It is the technique for making identical copies of rDNA
Genetransfer	- Transfer of one desirable gene to another organism.
Origin of replication (ori)	- This is a bp sequence of DNA from where replication starts. Any piece of DNA when linked with this sequence can be made to replicate with in the host cell.
Cloning	- Making identical copies of parents.
Plasmids	- They are autonomously replicating circular extra chromosomal DNA
Molecular scissors	- Restriction enzymes
Vector	- It is pieces of DNA attached to it.
Restriction Enzymes	- Enzymes responsible for restricting the growth of bacteriophage in E coli
Restriction endonuclease	- Cuts at specific position within the DNA
Exonucleases	- Remove nucleotide from the end of the DNA
Palindromic nucleotide sequence	- Base pair sequence of DNA that reads same on two stands when orientation of reading kept same.
Sticky end	- Restriction enzyme and DNA at little away from the centre of palindromic site, but between the same two bases opposite strands. This living a single standard portion called sticky ends.
Gel electrophoresis	- The DNA treatments can be separated by a technique were they forcing to move towards the anode under an electric field through agarose gel medium.
Ethidium bromide	- It is a due used to stain DNA. We can see bright orange coloured brands of DNA in ethidium bromide stained gel exposed to UV light.
Cloning vector	- A DNA used to make multiple copies of desirable DNA.

KSTA Niravu 2019

Selectable marker	- Are the base pair sequences of vector which helps in identifying and eliminating non recombinant or non transformer.
Transformation	- It is a processed through which a piece of DNA is introduced in a bacterium.
Cloning site	- It is the recognition site or commonly used restriction enzymes in vector.
Insertional Inactivation	- The inactivation of an enzyme due to inactivation of foreign DNA is called insertional inactivation.
T-DNA	- Tumor inducing DNA in Agrobacterium tumifaciens.
Ti-plasmid	- The tumor inducing plasmids of Agrobacterium tumifaciens.
Competent host	- The cell which capable to taking up alien DNA
Micro injection	- The method of injection of rDNA into the nucleus of animal cells.
Biolistic or genegun	- Plants cells are bombarded with high velocity micro particles of gold or tungsten coated with DNA
Disarmed pathogen Vector	- The method of transfer of rDNA into cell by infecting disarmed pathogen
Lysozyme	- The enzyme used to dissolve bacterial cell wall.
Cellulase	- An enzyme used to dissolve plant cell wall
Chitinase	- It is an enzyme used to dissolve fungal cell wall
DNA Spooling	- DNA precipitated by adding of chilled ethanol, this can be seen as collection of fine threads in the suspension. It is separated out to be copper wire with +recharge.
Ribonuclease	- Enzyme used for remove RNA
Protease	- It is an enzyme used for removal of protein.
PCR	- Polymerase chain reaction used to amplification of gene of interest.
DNA Polymerase	- It is an enzyme for DNA polymerization
recombinant protein (r-protein)	- The protein encoded gene is expressed in heterologous host, is called recombinant protein.
Bioreactor	- They are the vessels in which raw materials are biologically converted into specific product using microbes.
Down streaming	- Separation and purification of biosynthetic product referred as down streaming.

Questions and Solutions

Q 1. Name the major selectable markers used in cloning vector.

Ans Can you say ampicillin, chloramphenicol, tetracycline and kanamycin resistance gene site in a vector.

Q 2. What is cloning site in vector (1 score)

Ans The recognition with in the vector, for commonly used restriction enzymes.

Q 3. What you mean about insertional inactivation (2 score)

Ans When an alien DNA linked with selectable marker, due to the insertion of desirable gene the antibiotic resistant gene will be silent or inactivate is known as insertional inactivation.

Q 4. Expand PCR write the steps of PCR (2 score)

Ans Polymerase chain reaction 1. Denaturation, 2. Primer annealing, 3. Extension of primers.

Q 5. What are primers (2 marks)

Ans Primers are small chemically synthesized radionucleotide that are complementary to the region of DNA

Q 6. Name commonly used bioreactor. Specify its significance (3 score)

Ans Stirring type

Significance

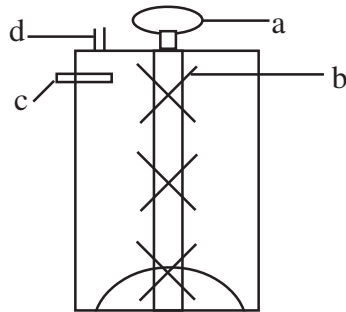
a) Usually cylindrical or curved base

b) Curved base facilitate the missing reactor contents

KSTA Niravu 2019

- c) Stirrer facilitates even mixing and oxygen availability through out the bioreactor
- d) An agitator, oxygen delivery and form control system
- e) Temperature and P^H control system
- f) Sampling port (culture small volume of can be withdrawn periodically)

Q 7. Observe the figure and answer the following



- a) Name the bioreactor (1 marks)
- b) Label a,b,c,and d (2 marks)

Ans a) Stirring type bioreactor
 b) A-motor
 c- Form braker
 d- P^H controller (Acid/base)

Q 8. Define genetic engineering (2 marks)

Ans It is the technique to alter the chemisrty of gene the material (DNA and RNA) for introduced to host organism for their phenotype change

Q 9. Who create the first rDNA (1 score)

Ans Stanley cohon and Herbert boyer

Q 10. Define plasmid (1 score)

Ans Autonomously duplication circular extrachromosomal DNA found bacteria

Q 11. Name the first restriction endonuclease identified (1 score)

Ans Hind 11

Q 12. Name the source Eco RI (1 score)

Ans Escherichia coli RY 13

Q 13. Match the following (2 score)

- Ans a) RNA-cellulase
 b) Fungi-Lysozyme
 c) Bacteria-Ribonuclease
 d) Plant cell-Chitinase

Ans a) Ribonucleases, b) chitinase, c) Lysozyme, d) Cellulase

Q 14. How rDNA directly injected into the nuclease of animal cell (1 score)

Ans Micro injection

Q 15. How histones removed from DNA (1 score)

Ans By using protease

Q 16. Write the palindromic nucleotide sequence of EcoRI (1 score)

Ans 5¹GAATTC3¹
 3¹CTTAAG5¹

Q 17. When alien DNA linked with tet^R site of PBR322. What will happen to Tet^R gene (1 Marke)

Ans Transformation losses antibiotic resistance due to insertional inactivation

Q 18. What are the key tools of biotechnology (2 score)

Ans a) Restriction enzyme, b) Polymerase enzyme, c) Ligases, d) Host, e) Vectors

Q 19. Write the rule for Nomenclutre of restriction enzyme (2 score)

KSTA Niravu 2019

Ans First capital letter for genus, second two small letter for species, third letter for strain, Roman letter for identified order number.

CHAPTER-5

BIOLECHNOLOGY AND ITS APPLICATIONS

Important points

GMO	- Genetically Modified organism
BT	- Bacillus Thurengensis
Bio-Pesticide	- Toxin-gene has been cloned from the bacteria and been expressed in plants to provide resistance to insects without the need of insecticides known as Bio-pesticide.
Bt-Cotton	- It is a GMC of cotton with Bt-toxin
Cry 1 Ac	- Bt toxin coded gene-control ball worm
Cry 11 Ab	- Bt toxin coded gene-control ball worm.
Cry 1 Ab	- Bt toxin coded gene-controls corn borer.
Pest Resistant plants	- GMC resist parasites, known as pest resistant plants.
RNAi	- RNA Interference
RNA interference	- Is the method involving the silencing of a specific MRNA due to a complementary is RNA molecules bind to and prevents translation of the mRNA (silencing)
Transposons	- Virus have a RNA genome or mobile genetic elements known as transposons.
Gene Therapy	- Correction of deleted gene in embryonic stage.
ADA	- Adenosine diaminase
Elisa	- Enzyme linked Immuno-sorbent Assay
Transgenic animals	- Animal DNA with an extra foreign gene are known as transgenic animals.
α -I anti trypsin	- Human protein used to treat emphysema
PKU	- Phenylketonuria
Alpha-Lact albumin	- Human milk protein
GEAC	- Genetic engineering Approval committee.
Biopiracy	- Use of bio-recources by multinational companies and other organization without proper authentication
Biopantent	- Certain companeirs of individuals take athonity for biological product or processes by us patent and trace mark office.

Questions and Solutions

- Q 1. What are the application of biotechnology (3 score)
Ans Therapeutics, Diagnostics, genetically modified crops for agriculture, processed food, bioremediation, waste treatment and energy production are the applications of biotechnology.
- Q 2. Mention the three critical research area of biotechnology (3score)
Ans 1) Microbe or pure enzyme used as the best catalyst
2) For the action of catalyst creating optimal conditions through genetic engineering.
3) Down stream technologies to purifies the modified gene product (1½ score)
- Q 3. What are the applications of biotechnology in agriculture (2score)
a) Agrochemical based agriculture
b) Organic agriculture
c) Genetically engineered crop based agriculture
- Q 4. What genetic modifications is useful in GM plants (3 score)
Ans 1) Made crop more tolerant to abiotic strees

KSTA Niravu 2019

- 2) Reduce use of chemical fertilizers
- 3) Help to reduce post harvest losses
- 4) Increase the efficiency of mineral usage by plants
- 5) Enhanced nutritional value of food

Q 5. What is Bt. which protein is produced by Bt (2 score)

Ans Bacillus thuringiensis. It contains a toxic insecticidal protein

Q 6. Why does Bt toxin not kill bacillus (1 score)

Ans Bt toxin protein exists as inactive protoxin. It converts into an active toxin in alkaline P^h

Q 7. How Bt toxin kills the insects

Ans When protoxin reaches the gut of insects, due to alkaline P^h in gut region protoxin crystals solubilise. The activated toxin binds with mid gut epithelial cells and creates pores that cause cell swelling and lysis and eventually cause death.

Q 8. What are cry proteins. Write its roles (2 score)

Ans Cry proteins are toxic crystalline proteins produced by *Bacillus thuringiensis*. This toxin kills insects, so genes encoding for cry proteins Cry 1Ac, Cry 1Ia, Cry 1Ab, Cry 1AB control cotton bollworm and corn borer.

Q 9. What is gene therapy. Explain with examples of ADA deficiency (3 score)

Ans It is the method of correction of defective genes during the embryonic stage in a child. Here the defective gene may be replaced by a normal gene. ADA is an enzyme crucial for the function of the immune system. Its deficiency causes failure of the immune system and ultimately causes death. ADA deficiency can be cured by gene therapy. The functional ADA cDNA is introduced into lymphocytes by using a retroviral vector. These lymphocytes are injected into the patient's bone marrow cells.

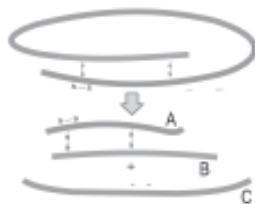
Q 10. *Meloidogyne incognita* is a nematode that infects the root of a tobacco plant. How to overcome this nematode infection.

Ans Tobacco plants are made pest resistant by a process called RNA interference (RNAi). Using an *Agrobacterium* vector, a nematode-specific gene is introduced into the bacterium. It produces both sense and antisense RNA in the host cell. These two RNAs may be complementary to each other, forming a double-stranded (dsRNA) which initiates the RNAi process. This dsRNA binds with the specific mRNA of the nematode and prevents translation (mRNA silencing). As a result, the nematode would not survive in the transgenic host due to RNA interference.

Q 11. Observe the figure and answer the following

a) What process is indicated by this figure (1 score)

b) How polypeptide chains are arranged in pro-Insulin and insulin (1 score)



Ans a) The maturation of pro-Insulin into Insulin

b) In pro-Insulin, polypeptide chains A, B, and C are connected with disulfide bridges. Insulin has polypeptide chains A and B only.

Q 12. How did Eli Lilly's company prepare genetically engineered insulin (2 score)

Ans Eli Lilly's company prepared two DNA sequences corresponding to polypeptide chains A and B of human insulin and introduced them into *E. coli* plasmids. Two polypeptidic chains were extracted and combined by creating disulfide bonds to form human insulin.

Q 13. What are the benefits of transgenic animals (3 score)

Ans Transgenic animals are normally used in the following purposes

a) Normal physiology and development

b) Study of disease

KSTA Niravu 2019

- c) Biological products
- d) Vaccine safety testing
- e) Chemical safety testing

Q 14. Define molecular diagnosis. Write three type of molecular diagnosis.

Ans By using molecular technique early detection of disease or diagnosis. Polymerase Chain Reaction (PCR), Enzyme linked immuno-sorbent-Assay (ELISA) and Recombinant DNA technology are the three type of molecular diagnosis.

Chapter-6

ORGANISMS AND POPULATIONS

Important points

Ecology	- It is the study of the interaction of organism and its environment
Desert	- The area with average temperature 50°C and average rainfall 23cm
Grass land	- The area with average temperature 25°C and average rainfall 100cm
Tropical forest	- The area with average temperature 25°C and average rainfall 400cm
Temperate forest	- The area with average temperature 10-25°C and average rainfall 225cm
Coniferous forest	- The area with average temperature 10-15°C and average rainfall 250cm
Arctic and alpine tundra	- The area with average temperature 10°C and average rainfall 125cm
Eurythermal	- Organism can tolerate and thrive in a wide range of temperature
Stenothermal	- Organism cannot tolerate and restricted to narrow range of tolerance
Euryhaline	- Organism are tolerant a wide range of salinities
Stenohaline	- Organism are restricted to narrow range of salinity
Homeostasis	- Organism try to maintain the convection of its internal environment despite varying external environmental conditions.
Regulator	- Those organism are able to maintain homeostasis
Conform	- Those organism are unable to maintain homeostasis by osmoregulation
Migrate	- The organism can move away temporarily from stressful habitat to most hospitable area.
Suspend	- Organism become metabolically inactive and suspend to their various activities under stressful conditions to tide over unfavorable conditions
Hibernation	- Animals undergoes winter sleep during winter to escape the extreme cold situation
Aestivation	- Snails and fishes go into summer sleep to avoid summer heat.
Diapause	- Zooplankton in lakes and ponds enter into suspended development during adverse conditions.
Adaptation	- Any physiological, morphological and behavioural adjustment of the organisms that enable the organism to survive and reproduce in its habitats called adaptation.
Population	- A group of similar organism in an area at a particular time
Birth rate	- It is the rate of production of new individuals in a population per unit time
Death rate	- It is the rate of loss of individuals from population per unit time by death
Sex ratio	- The percentage of female or male in a population at specific time.
Age group	- Individuals of different age in a population.

KSTA Niravu 2019

- Age pyramid - It is a graphical representation of age group of a population. pyramid base with pre-reproductive, middle-reproductive and postreproductive group at top
- Expanding age pyramid - Population with more number of pre-reproductive group. Reproductive group lesser and post reproductive group fewer.
- Stable age pyramids - Pre reproductive groups equal to reproductive group. Post reproductive group fewer.
- Declining age pyramid - Pre reproductive individuals lesser than reproductive individuals. Post reproductive group fewer.
- Population density - It is a total no. of individuals per unit area at a given time.
- Population growth - It is the number of individuals added in a population per unit time due to birth and immigration over the rate of death and emigration.
- Natality (B) - Natalty is the number of birth in a population at a given period.
- Mortality (D) - It is the number of death in a population at a given period
- Immigration (I) - Entry of number of same species from elsewhere during a given period
- Emigration (E) - The number of individuals of population who left the habitat during a given period.
- Carrying capacity (K) - It is the maximum no of individuals of a population provide all necessary resources.
- Exponential growth - When food and resources unlimited there is an initial period of slow lag phase is followed very rapid growth or log phase.
- Logistic growth - Initial lag, middle log and end deceleration phase. Logistic growth curves is S shaped.
- Log plate - Initial period of slow growth
- Acceleration phase - Rapid growth phase
- Deceleration phase - Growth slow down
- Stagnant phase (asymptote) - Growth equilibrium phase
- Darwinian fitness - The reproductive fitness is called Darwinian fitness
- Predation (+-) - It is a food relation between two organism in which one organism captures and feeds on another
- Camouflaged - Coloured to avoid detected easily by the predator
- Phytophagous - Insects feeding on plant sap
- Cardiac glycosides - Poisonous glycosides cause cardiac arrest
- Competition (--) - It is an intention between two or more organism for obtaining same resources fitness of one species significantly lower in the presence of another species
- Gause's Competitive exclusion principle - When resources are limited, the competitively superior species will slowly eliminate the inferior species called competitive exclusion principle.
- Interference competition - The feeding efficiency of one species might be reduced due to the interfering or inhibitory presence of other species.
- Competitive release - When competitively superior species experimentally removed from a small geographical area, the small species established. It is called competitive release.
- Co-existence or Resource partitioning - When two species compete for the same resources, they could avoid competition by choosing, different times for feeding or different foraging patterns.
- Parasitism (+-) - During interaction of two species one organism drives food from other organism here one get benefited and other harmed.

KSTA Niravu 2019

Ectoparasites	- Parasite feed on external surface of the host organism
Endoparasite	- Parasite live inside the host today.
Brood parasitism	- Parasite lay eggs in the nest of the host.
Commensalism (+0)	- Interaction between two species one benefitted other neither harmed nor benefits
Mutualism (++)	- Interaction between two different species both are benefitted.
Psuedo copulation	- Petal of flower recomplents to female bee in style and shape. Male bee falsly copulates with modified leaves.
Amensalism	- It is an interspecific intraction one harmed and other either harmed or benefitted
Sexual deceit	- Psuedo copulation in Mediterranean orchids by bees.

Questions and Solutions

Q 1. What are the levels of biological organizations in Ecology.

Ans Organism, Populations, Communities and biomes.

Q 2. Name the biome distributions with respect to annual temperature and precipitation (2 score)

Ans Desert, gransland, tropical forest, temperate forest, coniferous forest, Arctic and alpine tundra

Q 3. What are the major biomes of India (1 score)

Ans Tropial rain forest, Deciduous forest, Desert and Sea coast

Q 4. Name the major abiotic factors

Ans Temperature, water, light and soil are the major abiotic factors

Q 5. Name an animal not drinking water in their life

Ans Kangaroo rat

Q 6. How water requirement is done in kangaroo rat

Ans During internal fat oxidation water is a by product.

Q 7. List out the adaptation of desert plants (3 score)

- Ans
- 1) Thick cuticle on leaf surface
 - 2) Leaves reduced or absent
 - 3) Sunken stomata
 - 4) Special type of photosynthesis (CAM Pathway)
 - 5) Succulent plants
 - 6) Leaf modified into spines

Q 8. What are the morphological adaptation of animals in cold climates (2 score)

- Ans
- a) Shorter ears and limps reduced surface area for minimise heat loss (Allenn rule)
 - b) Thick layer of fat (blubber) below skin. It act as an insulator reduce heat loss.

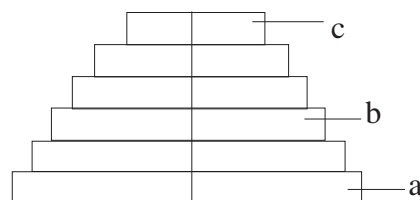
Q 9. Write the physiological adaptation in stressful situation

- Ans
1. Over come attitude sickness by increasing red blood cell productions.
 2. Increasing binding efficiency of haemoglobin
 3. Increasing breathing rate
 4. Lizards expose body to sunlight and absorb heat
 5. Rodent hide their burrow

Q 10. What are the attributes of population (1score)

Ans Birth rate, Death rate, Sex ratio and Age group

Q 11. According to the age periods the organism are classified in following pyramids Observe the pyramid answer the following



KSTA Niravu 2019

a) Name the pyramid

b) Label a, b, c

Ans a) Expanding, stable and declining

b) Pre-reproductive b) Reproductive c) Post reproductive

Q 12. What are the characteristics of age pyramids (2 score)

Ans 1) It shows age distribution of male and female

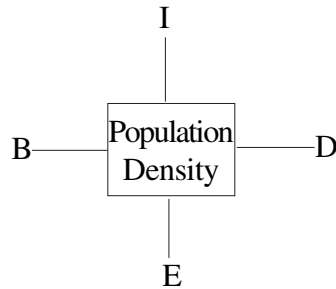
Q 13. Define population density (2 score)

Ans It is a total number of individuals present per unit area at a given time.

Q 14. The growth of population in a given habitat changes due to four processes name it (1 score)

Ans Natality (B), Mortality (D), Immigration (I), Emigration (E)

Q 15. a) Name the following labelled parts-I, D, E, B



b) Give an equation for population density at a given time

Ans a) I-Immigration

D-Mortality

E-Emigration

B-Natality

b) $N_t + I = N_t + [(B + I) - (D + E)]$

Q 16. $N_t = N_0 e^{rt}$ what indicate the letters (2 score)

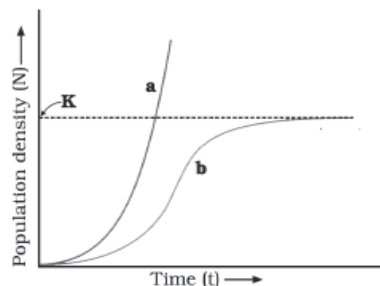
Ans N_t = Population density after time t

N_0 = Population density at time zero

r = Intrinsic rate of natural increase

e = The base of natural log

Q 17. Observe the figure and answer the following



a) Give an equation for logistic growth (1 score)

b) Define carrying capacity (2 score)

Ans a) $\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$

b) Carrying capacity is the maximum number of individuals of a population that can be supported by the available resources in an environment for a long period.

Q 18. Define resource partitioning mechanism in competition (2 score)

Ans When two species compete for the same resources, they avoid competition by choosing different times for feeding or different patterns of foraging.

KSTA Niravu 2019

Q 19. Can you illustrate Cause's of competitive exclusion principle?

Ans It states that two closely related species competing for the same resources can't co-exist indefinitely and competitively inferior one will be eliminated.

Q 20. Define brood parasitism

(2 score)

Ans It is a type of parasitism seen in parasitic birds which lays eggs in the nest of crow for incubation, hatching and rearing of young ones

Q 21. What is sexual deceit? Give an example.

Ans Petals of flower are modified to bee size and shape. Male bee copulated with flower petals as identified as its partner is called sexual deceit. eg: Mediterranean orchid ophrys

Chapter - 7 ECOSYSTEM

Important Points

Ecosystem	- It is a functional unit of nature where living organisms interact with each other and also with its surrounding physical environment
Abiotic	- Non living
Biotic	- Living
Stratification	- Vertical distribution of different species occupying different levels is called stratification
Productivity	- The rate of biomass production
Primary production	- The amount of biomass or organic compound produced per unit area over a time period by plants during photosynthesis.
Gross Primary Productivity (GPP)	- It is the rate of production of organic matter during photosynthesis
Net Primary Productivity	- Is the available biomass for the consumption to heterotrophs (herbivores and decomposers)
Gross primary productivity	- Respiration loss - Net primary productivity
Secondary Productivity	- It is the rate of formation of biomass or new organic matter by consumers
Decomposition	- It is the breaking down of the complex organic matter present in detritus into inorganic substances like carbon dioxide, water and nutrients
Detritus	- Dead remains of plants such as leaves, bark, flowers and dead remains of animal including faecal matter. It is the raw material for decomposition
Detritivores	- The organisms which break down detritus are called detritivores. Eg: earthworm
Fragmentation	- Break down of detritus into smaller particles by detritivores.
Leaching	- Water soluble inorganic substances go down from detritus into the soil horizon and get precipitated as unavailable salt water is called leaching.
Catabolism	- It is the enzymatic degradation of detritus into simpler inorganic substances by extracellular enzymes released by bacteria and fungi.
Humification	- Formation of dark coloured partially decomposed amorphous substances from detritus is known as humification
PAR	- Photosynthetically active radiation.
Producers	- The green plants in the ecosystem
Consumers	- All animals depend on plants directly or indirectly for their food needs

KSTA Niravu 2019

Herbivores	- Primary consumers will be herbivores
Primary Carnivores	- Consumers that feed on herbivores are primary carnivores
Secondary Carnivores	- Those animals that depend on the primary carnivores for food are labelled secondary carnivores
GFC	- Grazing food chain
DFC	- Detritus food chain
Saprotrophs	- Decomposers meet their energy and nutrient requirement by degrading dead organic matter or detritus
Food web	- The natural interaction of food chain make it a food web
Trophic level	- Based on the nature of food chain or nutrition, organism occupy a specific place in the food chain is trophic levels
Standing Crop	- Each trophic level has a certain mass of living material at a particular time called standing crop
Biomass	- Mass of living organism
Ecological pyramids	- Diagrammatic representation showing the relationship between organism at different levels of an ecosystem in terms of biomass, number and energy contents in the form of a pyramid
Pyramid of Number	- It indicate the number of organism of the successive trophic level of an ecosystem
Pyramid of biomass	- It indicate the biomass of organisms of the successive trophic level of an ecosystem
Pyramid of Energy	- It indicate the energy used by organism of successive trophic levels in an ecosystem
Ecological succession	- The sequential gradual and predictable changes in the species composition in an area are called succession or ecological succession
Pioneer Species	- The first species that invade a bare area are called pioneer species
Climax community	- The final community that is near to equilibrium with the environment is called climax community
Primary Succession	- Succession that starts in an area where no living organisms ever existed
Secondary Succession	- The succession processes that starts in an area where natural biotic communities have been destroyed
Hydrarch Succession	- Succession takes place in water
Xerarch Succession	- Succession takes place in a dry area
Standing State	- The amount of nutrient present in the soil at any given time
Ecosystem Service	- The product of ecosystem processes
GNP	- Global gross national product

Questions and Solutions

Q 1. Use proper terms for the following in relation to Ecology

- Input
- Transfer of energy
- Output

Ans a) Productivity b) Food chain/web, Nutrient cycling

Q 2. What are the component of ecosystem are seem to be function as a unit (2 score)

Ans Productivity, Decomposition, Energy flow and Nutrient cycle

Q 3. Define Primary production (2 score)

Ans It is defined as the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis.

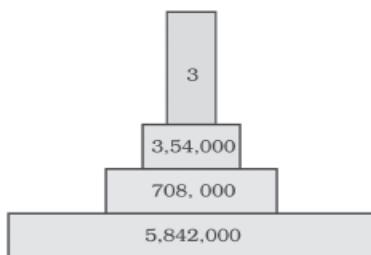
Q 4. Can you define productivity. How it is expressed (2 score)

Ans The rate of biomass production is called productivity. It is expressed in terms of $g^{-2}yr^{-1}$ or $(Kcalm^{-2}$

KSTA Niravu 2019

- yr⁻¹
- Q 5. What is Gross primary productivity or GPP (2 score)
It is the rate of production of organic matter during photosynthesis
- Q 6. Define Net primary productivity. Give an equation (2 score)
Ans Net primary productivity is the available biomass for the consumption to heterotrophs (Herbivores and Decomposers)
$$NPP = GPP - R$$
- Q 7. The annual net primary productivity of the whole biosphere is approximately 170 billion tones (dry weight) weight, of this how many percentage is Land and ocean production. (1 score)
Ans 70% Land and 30% Ocean
- Q 8. What is the primary productivity of ocean.
Ans 55 billion tones
- Q 9. Define Secondary productivity (2 score)
Ans It is the rate of formation of new organic matter or biomass by consumers is called Secondary productivity.
- Q 10. Robert Constanza and his colleagues have very recently tried to put price tags on nature's life-support services. What is the average price tag for fundamental ecosystem services (1 score)
Ans Us\$33 trillion
- Q 11. What will be the total cost of various ecosystem services (2 score)
Ans Soil formation-50% and protection, recreation and nutrient cycling-Less than 10%
Climate regulation and habitat of wildlife-6%
- Q 12. What are the ecosystem services.
Ans 1. Purify air and water
2. Mitigate droughts and floods
3. Climatic condition
4. Nutrient Cycling
5. Generate fertile soil
6. Protect soil
7. Wildlife habitat
8. Biodiversity maintenance
9. Pollinate crop
10. Provide aesthetic, cultural and spiritual values
11. Reduce global warming
- Q 13. What are the two types of nutrient cycle (1 score)
Ans Gaseous cycle and Sedimentary cycle
- Q 14. 1) What is ecological pyramids
2) Name three ecological pyramids usually studied
Ans 1) Ecological pyramid is the biological representation of organism and its relationship at different level of an ecosystem in terms of biomass, number and energy content in the form of a pyramid
2) Three ecological pyramids are a) Pyramid of number b) Pyramid of biomass c) Pyramid of energy

Q 15



Observe the above pyramid and answer the following

a) Name the pyramid

(1 score)

KSTA Niravu 2019

b) How many number of Top carivores supported by producers (1 score)

c) Name any two tropic levels (1 score)

Ans a) Pyramid of number

b) Three

c) Primary producers, Primary consumers

Q 16. Apex of pyramid is narrow due to less number of individuals. But base is broad due to primary producers number

What is the reason for less number of individulas in apex of pyramid (1 score)

Ans It is due to low energy in apex of pyramid

Chapter-8

ENVIRONMENTAL ISSUES

Important Points

Pollution	- Is an undesirable change in physical, chemical, or biological characteristics of air, land and water
Pollutant	- Agents that cause pollution
Electrostatic Precipitator	- The device used to remove particulate matter
CPCB	- Central pollution control board
CNG	- Compressed natural gas
Bharat stage III	- Mass emission standards in India- (2,3 and 4 wheelers since 2010)
Bharat stage IV	- Mass emission standards in 12 megacities since 2010. Cities- Delhi and NCR, Mumbai, Kolkata, Chennai, Banglore, Surat, Kanpur, Agra, Lucknow and Sholapur (since april 2010)
Water act	- Govt of India has passed the water act in 1974 for prevention and control of water pollution to safe guard our water resources
BOD	- Biological oxygen demands
Plantonic	- Free floating algae
Algal bloom	- Presence of large amounts of nutrients in water cause excessive growth of plantonic algae called an algal bloom
Biomagnification	- Increase in concentration of the toxicant at successive trophic levels
Eutrophication	- If the natural aging of a lake by nutrient enrichment of it water
Bog	- Large masses of bolting plants
Cultural or Accelerated Eutrophication	- Pollutants from man's activities likes from the industries and homes can radically accelerated the aging processes.
FOAM	- A citizens group called friends of arcata marsh
Municipal solid Sanitary landfills	- Waste form homes, offices, stores, schools, hospitals, etc. - Waste are dumped in dipression or trench after compaction, and covered with dirt every day
Ecosan	- Ecofriendly sanitary
Ecotriendly packing	- Avoid polystyrene and plastic packing and use of carrying cloth or other tuber carry bags.
Electronic wastes	- irreparable computers and other electronic goods
Green house effect	- Green house effect is a naturally occurring phonometer that is responsible for heating of earth surface
Green house gases	- Gases responsible for green house effect (CO_2 , CFC, CH_4 & N_2O)
CFCS	- Cholorofluoro carbons
Stratosphere	- The appear part of the atmosphere called stratosphere
Dabson Units (DU)	- Unit of measurement for the thickness of ozone.
Ozone hole	- The large area of thinned ozone layer

KSTA Niravu 2019

- Snow-blindness What is JFM - High dose of UV-B causes Inflammation of Cornea (1 Score)
 Montreal protocol. - In 1987 Protocol signed at Montreal (Canda) to control the emis-
 Ans Joint forest management sion of ozone depleting substances
- Desertification Q9. Can you write about Drip irrigation, unrestricted grazing deforestation and poor
 Ans Local women showed enormous bravery in protecting trees from the axe
 irrigation practices resulting patches of land. Extended and
 patches create deserti fication
- Soil Erosion Q 10. How can you differentiate reforestation and afforestation
 Removal of top soil due to heavy rain
- Water logging Reforestation is the processes of restoring a forest that once existed but afforestation is removal of
 Presence of water more than the field capacity of soil
- Soil Salinity forest - Water logging draws salt to surface of the soil
 Deforestation - Conversion of forested areas to non forested ones
- National Forest Policy Q 11. What are the effects of forest policy introduced India in 1988. Recommending 33% of (2 Score)
 forest cover for plains and 67% for the hills
 Ans a) Out break of serious diseases
- Slash and burn agriculture/
 Jum cultivation b) Biological oxygen demand
 Traditional practice of agriculture in north-eastern states of India;-
 farmers cut down the trees of forest and burn the plant remains.
- Reforestation c) Algal bloom
 Restoring of forest that once existed but was removed at some
 point of time in the past
- Afforestation d) Biomagnification
 Establishment of a forest or stand of trees in an area where there
 was no tree Amrita Devi Bishnoi wildlife (2 Score)
 Q 12. What is algal blooming
 Award for extraordinary courage and dedication for protecting wild-
 Ans Excessive growth of algae over water surface life
- Chipkomo Q13. What are the impact of Mugaahloosiang from Garhwal Himalayas to prevent felling (2 Score)
 of trees
 Ans 1) A distinct colour to the water bodies
 Joint Forest Management introduced by Govt.of India in 1980.
 2) Cause fish mortality
 Govt. involved local communities in protection and management of
 forest
 3) Toxic to human beings and animals

Questions and Solutions

- Q 1. In order to control environmental pollution, Indian government has passed an act in 1986. Name the
 act Q 14. Define biomagnification (1 score) (2 score)
 Ans Environment (protection) Act
 Ans. The toxic substances accumulated by an organism can't be metabolised or excreted and thus
 passed on to next higher tropic levels. eg: Mercury and DDT. (1 Score)
- Q 2. Expand CPCB
 Central pollution control board
 Ans Central pollution control board
- Q 3. Who is CNG. Write its advantages
 Compressed natural gas.
 Advantages :
 a) Distrub calcium metabolism
 b) Thinning of egg shell and premature egg formation
 1. CNG burn most of the engine parts and does not adulterated like petrol or diesel. 2. Cheaper than petrol or diesel. 3. Cannot be
 adulterated like petrol or diesel
 c) Bird population declines (2 Score) (2 score)
- Q 4. Beyond CNG, what are the parallel step to control air pollution (3 Score)
 Q 16. Define Eutrophication
 Ans 1. Enforcement of Euro II norms for vehicle
 2. Paris did the national cleanup lake by nutrient enrichment of its water is called Eutrophyication
 3. Use of unleaded petrol
 4. Use of law sulphur petrol and diesel (2 score)
 Q 17. What is sanitary landfills?
 Ans: It is the filling of waste on selected low lying land or biodegradable material can be put into deep pits
 for natural breakdown (2 score)
- Q 5. Which one is the worlds most problematic aquatic weeds (1 Score)
 Ans Eichhornia crassipes
- Q 6. All waste that we generate can be catagerised into three types. What are they (1 Score)
 Ans Biodegradable, nonbiodegradeble and recyclable
- Q 7. Suggest a solution for treat e-waste (1 Score)
 Ans Recycling