



CREATIVE LEARNING CLASSES, KARKALA
SECOND PU ANNUAL EXAMINATION MARCH – 2023
BIOLOGY
ANNUAL EXAM DETAILED SOLUTION

PART - A

Answer the correct alternative from the choices below:

1) Which among these one is not a post-fertilization event?

- a) Gametogenesis b) Embryogenesis
c) Fruit formation d) Seed formation

ANS: (a) Gametogenesis – (NCERT PAGE NO – 10)

2) The most resistant organic material present on exine of pollen grains is

- a) Tapetum b) Germ pore c) Sporopollenin d) Cellulose

ANS: (c) Sporopollenin - (NCERT PAGE NO – 23)

3) The first movements of the foetus are observed during which month of the pregnancy?

- a) First trimester b) Second trimester c) Fifth month d) Sixth month

ANS: (c) Fifth month – (NCERT PAGE NO – 54)

4) Tassels in Corn cob represent

- a) Ovary b) Anther c) Filament d) Stigma and style

ANS: (d) Stigma and style - (NCERT PAGE NO – 29)

5) Which of the following sexually transmitted diseases is not completely curable?

- a) Gonorrhoea b) Genital warts c) Genital herpes d) Chlamydia

ANS: (c) Genital herpes – (NCERT PAGE NO – 63)

6) An example for non-medicated IUD is

- a) Cu – T b) Lippes Loop c) LNG-20 d) Multiload 375

ANS: (b) Lippes loop - (NCERT PAGE NO – 60)

7) Who notes that the behavior of Chromosomes was parallel to the behavior of genes?

- a) T.H. Morgan b) Gregor. J. Mendel
c) Alfred Sturtevant d) Walter Sutton & Theodore Boveri

ANS: (d) Walter Sutton & Theodore Boveri - (NCERT PAGE NO – 81)

8) The first genetic material could be

- a) Protein b) Carbohydrates c) DNA d) RNA

ANS: (d) RNA - (NCERT PAGE NO – 104)

9) Which of the following is used as an Industrial pollution indicator?

- a) *Lepidoptera* b) Lichens c) *Lycopersicon* d) *Lycopodium*

ANS: (b) Lichens – (NCERT PAGE NO – 132)

10) The disease Chikungunya is transmitted by

- a) House flies
b) *Aedes* Mosquitoes
c) Cockroach
d) Female anopheles

ANS: (b) *Aedes* Mosquitoes – (NCERT PAGE NO – 150)

11) Sonalika and Kalyan Sona are varieties of

- a) Wheat b) Rice c) Millet d) Tobacco

ANS: (a) Wheat – (NCERT PAGE NO – 173)

12) Which one of the following alcoholic drinks is produced without distillation?

- a) Wine b) Whisky c) Rum d) Brandy

ANS: (a) Wine – (NCERT PAGE NO – 182)

13) Plant cells bombarded with high velocity microparticles of gold or tungsten coated with DNA in method known as

- a) Microinjection b) Biolistics c) Heat shock d) Vector mediated

ANS: (b) Biolistics – (NCERT PAGE NO – 201)

14) The commonly used vector for cloning genes in animals is

- a) Retrovirus b) Disarmed retrovirus
c) Disarmed Ti plasmid d) *Agrobacterium tumifaciens*

ANS: b) Disarmed retrovirus – (NCERT PAGE NO – 200)

15) According to Allen's rule the mammals from colder climates have

- a) Shorter ears and longer limbs b) Longer ears and shorter limbs
c) Longer ears and longer limbs d) Shorter ears and shorter limbs

ANS: (d) Shorter ears and shorter limbs – (NCERT PAGE NO – 226)

I. Fill in the blanks by choosing the appropriate word or words from those given below. 5X1=5

(food web, standing state, Gause's- competitive exclusion principle, atmosphere, single base pair of DNA)

16) Point mutation arises due to the change in _____.

ANS: Single base pair of DNA - (NCERT PAGE NO – 88)

17) _____ states that two closely related species competing for the same resources cannot co-exist indefinitely and competitively inferior one will be eliminated eventually.

ANS: Gause's-competitive exclusion principle - (NCERT PAGE NO – 235)

18) The amount of nutrient, such as carbon, nitrogen, phosphorus and calcium present in the soil at any given time is called as _____

ANS: Standing state - (NCERT PAGE NO – 253)

19) The reservoir of gaseous type of nutrients cycle exist in the _____

ANS: Atmosphere - (NCERT PAGE NO – 254)

20) The natural interconnection of food chains make it a _____

ANS: Food web - (NCERT PAGE NO – 246)

PART – B

II. Answer any five of the following question in 3-5 sentences each, wherever applicable.

21) What are hermaphrodites? Mention one example.

ANS: Animals that possess both male and female reproductive organs are called hermaphrodite.

Ex. Earth worm **OR** Sponge **OR** Tape worm **OR** Leech (any one example)

(NCERT PAGE NO – 11)

22) Distinguish between Menstrual cycle and Oestrous cycle.

ANS:

Menstrual cycle	Oestrus cycle
The cyclical changes in the activities of ovaries of primate mammals	The cyclical changes in the activities of ovaries of non-primate mammals
The shedding of endometrium and bleeding occurs	The shedding of endometrium do not occur and there is no bleeding
There is no heat period	There is a heat period
Ex. Monkey, Apes and humans	Ex. Cow, Sheep, Rats

(NCERT PAGE NO –09)

23) Mention the four symptoms of Down's syndrome.

ANS: (a) Short statured with small round head

(b) Furrowed tongue and partially open mouth

(c) Palm is broad with characteristic palm crease

(d) Physical, psychomotor and mental development is retarded.

(NCERT PAGE NO –92)

24) Write the genotype of the parents when their children are with A, B, AB, O blood groups.

ANS: The parents blood group are $I^A i$ and $I^B i$

(NCERT PAGE NO – 77)

25) Write the two basic amino acids residues which are rich in histones.

ANS: Lysine and Arginine

(NCERT PAGE NO – 99)

26) Differentiate between Geitonogamy and Xenogamy.

ANS:

Geitonogamy	Xenogamy
Transfer of pollen grains from the anther to the stigma of another flower of the same plant	Transfer of pollen grains from the anther to the stigma of a different plant.
Genetically it is similar	Genetically it is different

(NCERT PAGE NO – 28)

27) Mention any two examples of evolution by anthropogenic action.

ANS: Example 1 – Overuse of herbicide and pesticide resulted in the evolution of many resistant varieties.

Example 2 – Industrial melanism – It is a evolutionary process in which darker coloured moth individuals came to predominate over lighter coloured individuals since the industrial revolution is a result of natural selection

(NCERT PAGE NO – 132)

28) The use of CNG is better than Petrol or Diesel. Give four reasons.

ANS: (i) CNG burns most efficiently, unlike petrol or diesel, in the automobiles and very little of it is left unburnt.

(ii) CNG is cheaper than petrol or diesel

(iii) CNG cannot be siphoned off by thieves.

(iv) CNG cannot be adulterated like petrol or diesel

(NCERT PAGE NO – 273)

PART – C

29) a) Why is oxytocin necessary for Parturition?

b) List any four hormones secreted by Placenta.

ANS: (a) Oxytocin acts on the uterine muscle and causes stronger uterine contractions, which in turn stimulates secretion of oxytocin, this leads to expulsion of the baby out of the uterus.

(b) (i) Human Chorionic Gonadotropin(hCG)

(ii) Human Placental Lactogen(hPL)

(iii) Estrogen

(iv) Progestogens

(v) Relaxin (Any four)

(NCERT PAGE NO – 53)

30) What is infertility? Give reasons for infertility in humans.

ANS: Couples who are unable to produce children in spite of unprotected sexual co-habitation.

Reasons: Physical, congenital, diseases, drugs, immunological or even psychological

(NCERT PAGE NO – 63/64)

31) Mention any three applications of DNA finger printing technique

ANS: (i) In forensic science

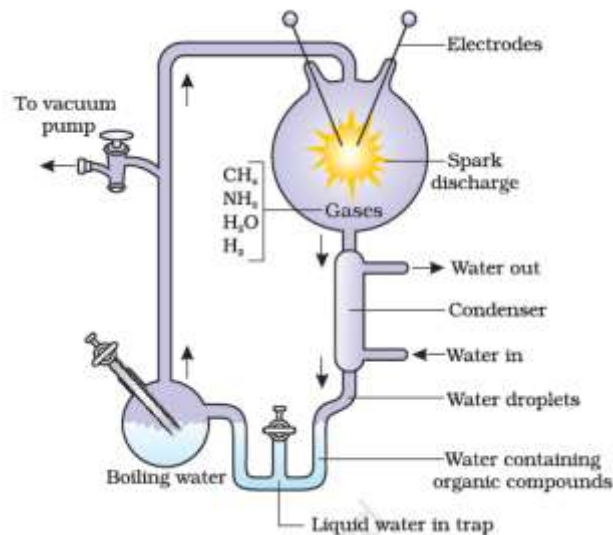
(ii) In determining population and genetic diversities

(iii) helpful in paternity testing, in case of disputes.

(NCERT PAGE NO – 123)

32) Draw a neat labelled diagram of Miller's experiment.

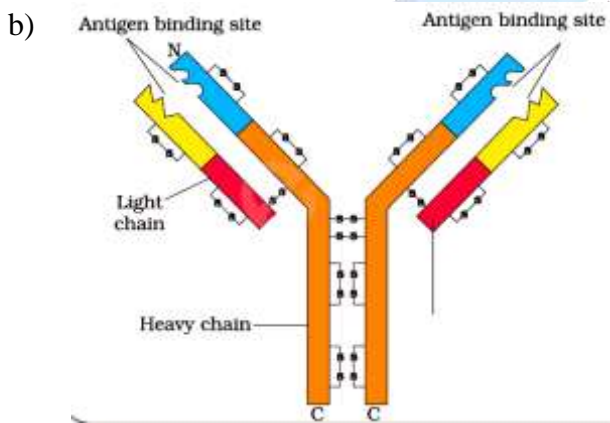
ANS:



(NCERT PAGE NO – 128)

- 33) a) Write the infectious forms of *Plasmodium* which enter human body through mosquito bite. (1)
 b) Draw a neat labelled diagram of structure of an antibody molecule. (2)

ANS: a) Sporozoites



(NCERT PAGE NO: 147, 151)

- 34) What is Poultry? Mention two important components of poultry farm Management.

ANS: Poultry is the class of domesticated fowl (birds) used for food or for their eggs including, chicken and ducks, and sometimes turkey and geese.

Important components of poultry farm management:

- Selection of disease free and suitable breeds
- Proper and safe farm conditions, proper feed and water
- Hygiene and health care.

(NCERT PAGE NO: 166)

- 35) What is Ecological Succession? Distinguish between Primary succession and Secondary succession.

ANS: The gradual and fairly predictable change in the species composition of a given area is called ecological succession.

- A process of succession that starts in an area where no living organisms are there, these could be areas where no living organisms ever existed, say bare rock is called **primary succession**.

- A process of succession that starts in areas that somehow, lost all the living organisms that existed there is termed **secondary succession**.

(NCERT PAGE NO: 250-251)

36) a) Mention four “Evil Quartet”, which cause deletion of biodiversity. (2)

b) Among vertebrates which group of animals has the highest number in global biodiversity. (1)

ANS: a) (i) Habitat loss and fragmentation:

(ii) Over-exploitation:

(iii) Alien species invasions:

(iv) Co-extinctions:

b) Fishes

(NCERT PAGE NO: 264-265, 260)

PART – D

V. Answer any three of the following questions in about 200 – 250 words each, wherever applicable:

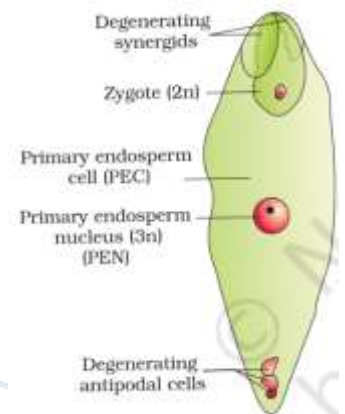
(3×5 = 15)

37) What is double fertilization? Describe fertilized embryosac with a neat labelled diagram.

ANS: The phenomenon of two types of fusions i.e., syngamy and triple fusion that take place in an embryo sac of flowering plants is termed double fertilisation.

Structure of fertilized embryosac:

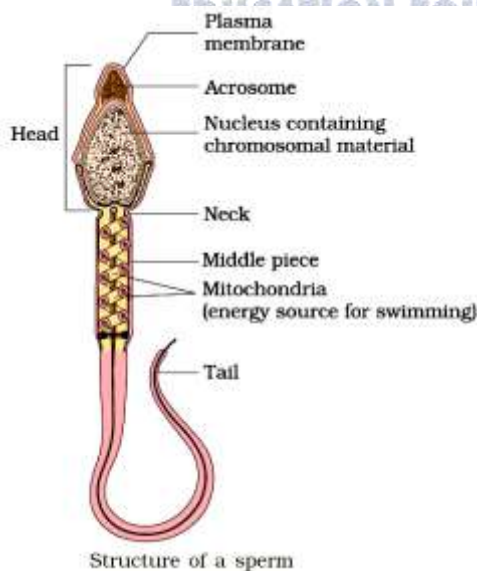
- The fertilized embryosac consist large primary endosperm cell consisting triploid primary endosperm nucleus.
- It also consists diploid zygote.
- At chalazal end it consist degenerating antipodal cells and at micropylar end it has degenerating synergids.



(NCERT PAGE NO: 34)

38) Draw a neat labelled diagram of human sperm.

ANS:



(NCERT PAGE NO: 48)

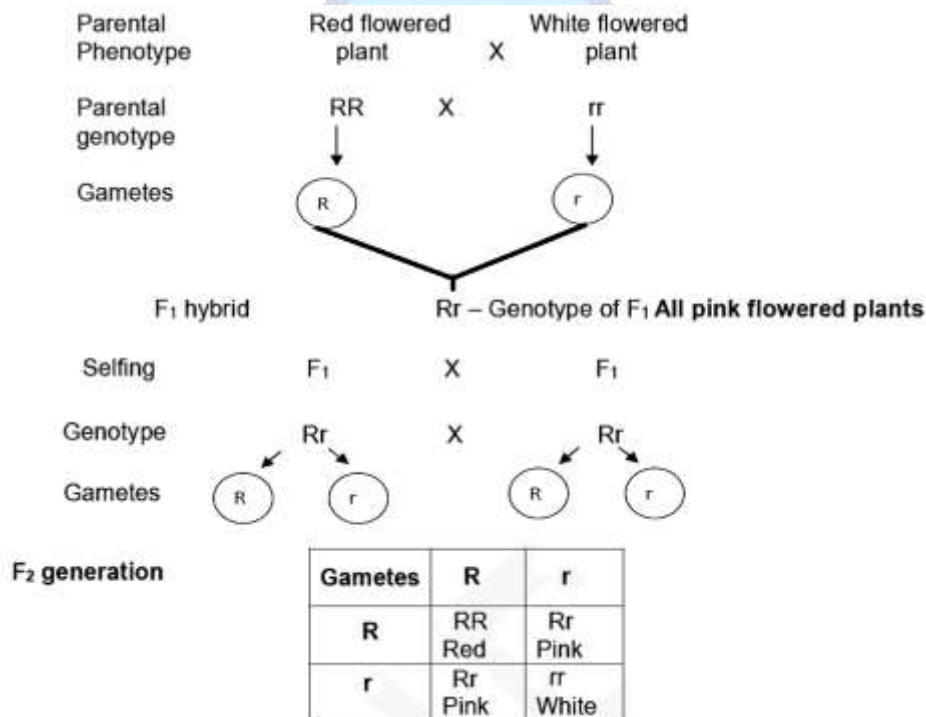
39) What is incomplete dominance? Explain it with reference to flower colour in snapdragon.

ANS: A phenomenon where both the alleles of a character express incompletely producing a new intermediate phenotype in the heterozygous condition is called incomplete or partial dominance or blended inheritance.

- Eg: Flower colour in Dog flower or snapdragon (*Antirrhinum sp*)

Explanation: -

- Correns crossed homozygous red flowered plant (RR) with homozygous white flowered plant (rr), surprisingly in F1 generation all hybrids were pink flowered plants (Rr).
- Because the dominant gene (R) fails to mask the recessive gene (r) completely.
- When F1 pink flowering plants were self-crossed, the F2 generation produce 25% red flowered plants, 50% pink flowered plants and 25% white flowered plants in 1:2:1 ratio.



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- From the above checker board we can observe that both F₂ phenotypic & genotypic ratio in incomplete dominance are same i.e.,

1 : 2 : 1
 Homozygous Heterozygous Homozygous
 Red Pink White

- The appearance of red and white flowered plants in F₂ generation indicates 2 important features.
 - ✓ The genes for Red & white colour did not mix.
 - ✓ Genes segregated in F₂ indicates that there is no specific gene for pink colour.

(NCERT PAGE NO: 76)

40) Explain five benefits of creating Transgenic animals.

ANS: Some of the common reasons for the production of transgenic animals include:

(i) Normal physiology and development:

- Transgenic animals can be specifically designed to allow the study of how genes are regulated, and how they affect the normal functions of the body and its development, e.g., study of complex factors involved in growth such as insulin-like growth factor.
- By introducing genes from other species that alter the formation of this factor and studying the biological effects that result, information is obtained about the biological role of the factor in the body.

(ii) Study of disease:

- Many transgenic animals are designed to increase our understanding of how genes contribute to the development of disease.
- These are specially made to serve as models for human diseases so that investigation of new treatments for diseases is made possible.
- Today transgenic models exist for many human diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's.

(iii) Biological products:

- Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (α -1-antitrypsin) used to treat emphysema.
- Similar attempts are being made for treatment of phenylketonuria (PKU) and cystic fibrosis.
- In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk.

(iv) Vaccine safety:

- Transgenic mice are being developed for use in testing the safety of vaccines before they are used on humans.
- Transgenic mice are being used to test the safety of the polio vaccine.
- If successful and found to be reliable, they could replace the use of monkeys to test the safety of batches of the vaccine.

(v) Chemical safety testing:

- This is known as toxicity/safety testing.
- The procedure is the same as that used for testing toxicity of drugs.
- Transgenic animals are made that carry genes which make them more sensitive to toxic substances than non-transgenic animals.
- They are then exposed to the toxic substances and the effects studied.

- Toxicity testing in such animals will allow us to obtain results in less time.

(NCERT PAGE NO: 212-213)

41) Name the disease caused by following organisms:

- | | |
|---------------------------------|-----|
| a) <i>Entamoeba histolytica</i> | (1) |
| b) <i>Epidermophyton</i> | (1) |
| c) <i>Salmonella typhi</i> | (1) |
| d) <i>Wuchereria malayi</i> | (1) |
| e) <i>Plasmodium vivax</i> | (1) |

ANS: a) *Entamoeba histolytica*: Amoebiasis/Amoebic dysentery

b) *Epidermophyton*: Ringworm

c) *Salmonella typhi*: Typhoid

d) *Wuchereria malayi*: Filariasis/Elephantiasis

e) *Plasmodium vivax*: Malaria

(NCERT PAGE NO: 148,149,146,149,147)

42) Name the technology that can successfully increase the herd size of cattle in a short time and explain the steps involved in this technology.

ANS: Multiple Ovulation Embryo Transfer Technology (MOET) is one programme for herd improvement.

- In this method, a cow is administered hormones, with FSH-like activity, to induce follicular maturation and super ovulation – instead of one egg, which they normally yield per cycle, they produce 6-8 eggs.
- The animal is either mated with an elite bull or artificially inseminated.
- The fertilised eggs at 8–32 cells stages, are recovered non-surgically and transferred to surrogate mothers.
- The genetic mother is available for another round of super ovulation.
- This technology has been demonstrated for cattle, sheep, rabbits, buffaloes, mares, etc.
- High milk-yielding breeds of females and high quality (lean meat with less lipid) meat-yielding bulls have been bred successfully to increase herd size in a short time.

(NCERT PAGE NO: 168-169)

VI. Answer any two of the following questions in about 200 – 250 words each, wherever applicable:

(2×5=10)

43) Explain the role of microbes in industrial products.

ANS: Microbes are also used for commercial and industrial production of certain chemicals like organic acids, alcohols and enzymes.

- Examples of acid producers are
- ✓ *Aspergillus niger* (a fungus) of citric acid,
- ✓ *Acetobacter aceti* (a bacterium) of acetic acid;

- ✓ *Clostridium butylicum* (a bacterium) of butyric acid and
- ✓ *Lactobacillus* (a bacterium) of lactic acid.
- Yeast (*Saccharomyces cerevisiae*) is used for commercial production of ethanol.
- Microbes are also used for production of enzymes.
- Lipases are used in detergent formulations and are helpful in removing oily stains from the laundry.
- The bottled juices are clarified by the use of pectinases and proteases.
- Streptokinase produced by the bacterium *Streptococcus* and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.
- Cyclosporin A, that is used as an immunosuppressive agent in organ-transplant patients, is produced by the fungus *Trichoderma polysporum*.
- Statins produced by the yeast *Monascus purpureus* have been commercialised as blood-cholesterol lowering agents. It acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

(NCERT PAGE NO: 181-183)

44) a) Write any four tools used in recombinant DNA technology. (2)

b) Mention any two methods of introducing alien DNA into host cells. (2)

c) Name the stain used to visualize DNA fragments in Gel electrophoresis. (1)

ANS: a) Genetic engineering or recombinant DNA technology following key tools, i.e.,

- Restriction enzymes, polymerase enzymes, ligases,
- Vectors and the
- Competent host organism.
- Desirable gene
- Gel electrophoresis, PCR, Bioreactors

b) Chemical treatment method, Microinjection method, Biolistic method/gene gun method

c) Ethidium bromide

(NCERT PAGE NO: 195, 201, 198)

45) Describe Fredrick Griffith experiment to show transformation in Bacteria.

ANS: In 1928, Frederick Griffith, in a series of experiments with *Streptococcus pneumoniae* identified transformation in the bacteria.

- Mice infected with the S strain (virulent) die from pneumonia infection but mice infected with the R strain do not develop pneumonia.

S strain → Inject into mice → Mice die

R strain → Inject into mice → Mice live

- Griffith was able to kill bacteria by heating them. He observed that heat-killed S strain bacteria injected into mice did not kill them.

S strain (heat-killed) → Inject into mice → Mice live

- When he injected a mixture of heat-killed S and live R bacteria, the mice died. Moreover, he recovered living S bacteria from the dead mice.

S strain (heat-killed) + R strain (live) → Inject into mice → Mice die

- He concluded that the R strain bacteria had somehow been transformed by the heat-killed S strain bacteria.
- Some ‘transforming principle’, transferred from the heat-killed S strain, had enabled the R strain to synthesise a smooth polysaccharide coat and become virulent.
- This must be due to the transfer of the genetic material.
- However, the biochemical nature of genetic material was not defined from his experiments.

(NCERT PAGE NO: 100-101)

- 46) a) **Mention any two mechanisms how human body compensates low oxygen availability at higher altitude.** (2)
- b) **Write two suspended activities in animals against abiotic stresses with suitable examples.** (2)
- c) **The Abingdon tortoise in Galapagos Islands become extinct after goats were introduced on the Island. Mention the type of interaction.** (1)

ANS: a) Gradually body get acclimatised and stop experiencing altitude sickness. The body compensates low oxygen availability by increasing red blood cell production, decreasing the binding affinity of haemoglobin and by increasing breathing rate.

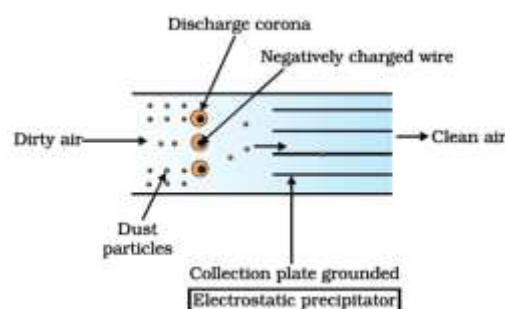
b) In animals, the organism, if unable to migrate, might avoid the stress by escaping in time. The familiar case of bears going into **hibernation** during winter is an example of escape in time. Some snails and fish go into **aestivation** to avoid summer-related problems-heat and desiccation.

c) Competition

(NCERT PAGE NO: 226, 225, 234)

- 47) **Write a brief account of electrostatic precipitator with a neat labelled diagram**

ANS: The electrostatic precipitator:



- It can remove over 99 per cent particulate matter present in the exhaust from a thermal power plant.
- It has electrode wires that are maintained at several thousand volts, which produce a corona that releases electrons.
- These electrons attach to dust particles giving them a net negative charge.
- The collecting plates are grounded and attract the charged dust particles.
- The velocity of air between the plates must be low enough to allow the dust to fall.

(NCERT PAGE NO: 271)

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