

GOVERNMENT OF KARNATAKA
KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD
II YEAR PUC EXAMINATION – March 2017
“SCHEME OF EVALUATION”

SUBJECT CODE: 36(NS)

SUBJECT: BIOLOGY

| NOTE: (1) Unlabelled, incorrect and wrongly labeled diagrams attract ZERO mark. (2) Answers written in Kannada should also be evaluated. | | | |
|---|---|------------------------|------------------|
| C. No. | ANSWER / VALUE POINTS | Marks | P. No. in the TB |
| PART – A | | | |
| 1 | What are hermaphrodites? • Hermaphrodites are bisexual animals. OR • The organisms having both male and female reproductive structures in one individual. | 1 | 11 |
| 2 | Mention the asexual reproductive structure in sponges. • Gemmule | 1 | 6 |
| 3 | What is euchromatin? • It is loosely packed (coiled) and lightly stained region of chromatin. OR • It is loosely packed (coiled) and lightly stained & transcriptionally active region of chromatin. | 1 | 100 |
| 4 | Why DNA replication is called semiconservative? • Because after the completion of replication, each daughter DNA molecule will have one parental strand and one newly synthesized strand. OR • Because each strand of parental DNA acts as template during replication and hence the newly synthesized DNA has one parental strand and a newly synthesized strand. | 1 | 104 |
| 5 | Name the microbe used in the production of citric acid. • <i>Aspergillus niger/A.niger</i> | 1 | 183 |
| 6 | What is micro-injection? • It is the method of introduction of the rDNA /recombinant DNA directly into the nucleus of animal cell (host cell). | 1 | 201 |
| 7 | Define mortality. • It is the number of deaths in the population during a given period. | 1 | 228 |
| 8 | Give an example for gaseous cycle. • Carbon cycle / Nitrogen cycle ANY ONE | 1 | 253 |
| 9 | Define endemism. • It is the phenomenon of a species being confined to a particular area and not found anywhere else. | 1 | 266 |
| 10 | What is eutrophication ? • It is the natural aging of a lake by nutrient enrichment of its water. | 1 | 276 |
| PART – B | | | |
| 11 | List the hormones produced by the placenta during pregnancy. • Human chorionic gonadotropin (hCG), Human placental lactogen (hPL), Estrogens, Progesterone (Progesterone) | $\frac{1}{2} \times 4$ | 53 |
| 12 | List any two simple principles to prevent sexually transmitted diseases. • To avoid sex with unknown partners or multiple partners • To use barriers like condoms during coitus • To approach a doctor for early detection & proper treatment when a person is in doubt ANY TWO | 1 x 2 | 63 |

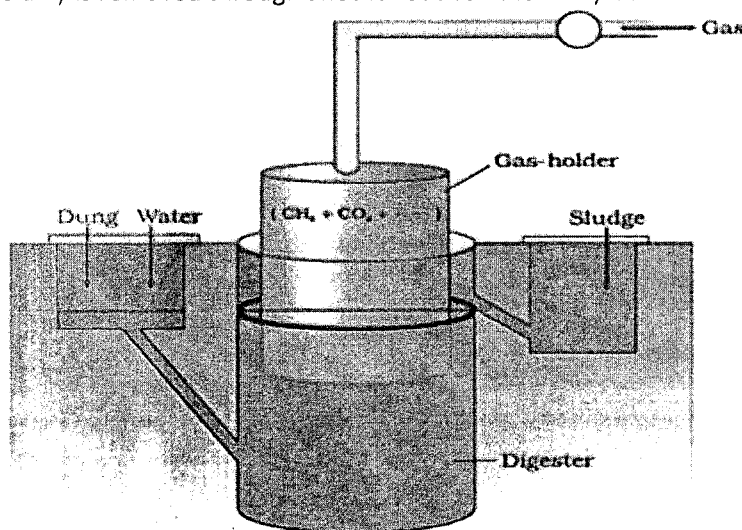
| | | | |
|-----------------|--|------------------------|----------------------------|
| 13 | <p>Mention four symptoms of Down's syndrome.</p> <ul style="list-style-type: none"> • Short stature – Small round head – Furrowed tongue – Broad flat face – Partially open mouth – Broad palm with characteristic palm crease – Physical, psychomotor and mental retardation-Big and wrinkled tongue-Congenital heart disease-Many loops on finger tips-Broad Flat face-Flat back of the head. <p>ANY FOUR</p> | $\frac{1}{2} \times 4$ | 90-91 |
| 14 | <p>What is incomplete dominance? Give an example.</p> <ul style="list-style-type: none"> • It is inheritance in which one allele is not completely dominant over the other because of which an intermediate character is produced. <p>OR</p> <p>It is the expression of intermediate character in the offspring obtained by a cross between two pure breeding varieties differing in a pair of contrasting characters.</p> <p>OR</p> <p>The appearance of an intermediate phenotype in F_1 hybrid that does not resemble the phenotype of either of the two parents and is in between the two.</p> <p>Ex: Inheritance of flower colour in dog flower (snapdragon / <i>Antirrhinum</i>),</p> <p>OR</p> <p>Starch grain size considered as phenotype in pea seeds of intermediate size.</p> | 1 | 76 78 |
| 15 | <p>Write any two factors affecting Hardy – Weinberg principle.</p> <ul style="list-style-type: none"> • Gene flow (Gene migration) – Genetic drift – Mutation – Genetic recombination – Natural selection <p>ANY TWO</p> | 1×2 | 137 |
| 16 | <p>What is the significance of selectable marker in cloning vector?</p> <ul style="list-style-type: none"> • It helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants. | 2 | 199 |
| 17 | <p>Codon AUG has dual function. Justify.</p> <ul style="list-style-type: none"> • AUG codes for methionine (<i>met</i>) during translation • AUG also acts as initiator codon / AUG initiates protein synthesis. | 1 1 | 112 |
| 18 | <p>What are the criteria of DNA to act as a genetic material?</p> <ul style="list-style-type: none"> • It has the capacity of replication or duplication. • Structurally and chemically it is stable. • It has the property of undergoing mutations that are required for evolution. • It is able to express itself in the form of 'Mendelian characters'. ANY TWO | 1×2 | 103 |
| PART – C | | | |
| 19 | <p>Name the types of vegetative propagules in the following:</p> <p>(a) Potato – Tuber/eyes of potato</p> <p>(b) Ginger – Rhizome</p> <p>(c) Bryophyllum – Leaf buds / Adventitious buds on leaf / Epiphyllous buds</p> | 1 1 1 | 7 / 8 |
| 20 | <p>What is pollination? Mention any four features of wind pollinated flowers.</p> <p>It is the transfer of pollen grains from the anther to the stigma of pistils.</p> <p>Features of wind pollinated flowers:</p> <ul style="list-style-type: none"> • Production of large number of pollen grains compared to the number of ovules available for pollination. • The pollen grains are light and non-sticky. • Stamens are well exposed in the flowers so that the pollen grains are easily dispersed. • Stigma is large and feathery to trap the pollen grains. • Each ovary has usually one ovule. • Many flowers are packed into a single inflorescence with tassels so that pollen grains can be easily trapped. <p>ANY FOUR</p> | $\frac{1}{2} \times 4$ | 27 / 29 |

| | | | |
|----|--|---|---------|
| 21 | <p>What is infertility? Give reasons for infertility in humans.</p> <ul style="list-style-type: none"> • Infertility is the inability to produce children in spite of unprotected sexual co-habitation / sexual intercourse. <p>Reasons for infertility:</p> <ul style="list-style-type: none"> • Physical – Congenital – Diseases – Drugs – Immunological – Psychological <p style="text-align: right;">ANY FOUR</p> | 1 | 63 |
| 22 | <p>What are analogous organs? Give any two examples.</p> <ul style="list-style-type: none"> • These are organs which are different in structure and origin (ancestry)/anatomically not similar but which perform similar functions. • Ex: eyes of octopus and mammals, flippers of penguins and dolphins, root of sweet potato and stem of potato → wings of butterfly and bird, tendrils of pea and <i>Vitis</i>, thorns of pomegranate and spines of prickly pear / <i>Opuntia</i>, phylloclade, cladode and normal leaves of <i>Opuntia</i>, <i>Asparagus</i> and any plant respectively, mandibles of cockroach and vertebrates. <p style="text-align: right;">ANY TWO</p> | 1 | 130-131 |
| 23 | <p>Mention the types of carcinogens with an example for each.</p> <ul style="list-style-type: none"> • Physical agents: X-rays, gamma rays, UV rays • Chemical agents: Chemicals present in tobacco smoke • Biological agents: Oncogenic viruses | $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ | 157 |
| 24 | <p>Write the meaning of following terms:</p> <p>(a) Explant – It is any part of the plant that is used to produce whole plant in tissue culture.</p> <p>OR</p> <p>It is any part of the plant that is used to produce whole plant in a test tube under sterile condition in a special nutrient media.</p> <p>(b) Totipotency – It is the capacity of any cell/explant of a plant to grow into a whole plant.</p> <p>(c) Somaclones – These are plants obtained through tissue culture which are genetically identical to the original / parent plant.</p> | 1 1 1 | 177 |
| 25 | <p>Draw neat labeled diagram of simple stirred tank bioreactor.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">6 CORRECT LABELLINGS</p> | $\frac{1}{2} \times 6$ | 204 |
| 25 | <p>Mention three causes for biodiversity loss.</p> <ul style="list-style-type: none"> • Habitat loss and fragmentation – Over-exploitation – Co-extinction – Alien species invasion <p style="text-align: right;">ANY THREE</p> | 1 x 3 | 264-265 |

PART D
Section - I

| | | | | | | | | | | | | |
|----|--|-----------------------|----|---|---|------------|------------|---|------------|-------------|---------------------------------|---------|
| 27 | <p>Describe the structure of pollen grain of angiosperms.</p> <ul style="list-style-type: none"> • A mature pollen grain has hard and resistant outer exine made up of sporopollenin and a thin intine made up of cellulose and pectin. • The exine has designs and patterns like knobs, ridges, grooves, etc and also germ pores. • In majority of the angiosperms, at the time of shedding, it has two cells, the vegetative cell and generative cell and in a few, the generative cell divides and forms two male gametes and the pollen grains are shed at this three celled stage (vegetative cell and two male gametes). • The vegetative cell is larger in size with large amount of reserve food material and a large, irregular nucleus. • The generative cell is smaller in size; spindle shaped and floats inside the cytoplasm of vegetative cell. It has dense cytoplasm and a prominent nucleus. | 1 1 1 1 1 | 23 | | | | | | | | | |
| 28 | <p>Draw neat labeled diagram of human male reproductive system.</p> <p align="center">(ANY ONE OF THE ABOVE TWO DIAGRAMS) WITH TEN CORRECT LABELLINGS</p> | ½ x 10 | 43 | | | | | | | | | |
| 29 | <p>Explain Mendel's experiment to describe inheritance of one gene with reference to height of pea plants.</p> <ul style="list-style-type: none"> • Mendel crossed a true breeding tall pea plant with a true breeding dwarf plant. • All the offspring (hybrid) in the F₁ generation were tall indicating that tallness is dominant over dwarf character. • Then he allowed the F₁ tall plants to undergo self pollination. In the F₂ generation, both tall and dwarf plants were produced in the ratio 3:1 • The reappearance of dwarf character in the F₂ generation indicates that alleles for tallness and dwarf character have segregated during gamete formation. <p>Phenotype: Pure tall X Pure dwarf</p> <p>Genotype: TT tt</p> <p>Gametes: T T t t</p> <p>F₁ generation: Tt (All tall)</p> <p>F₁ selfing: F₁ tall X F₁ tall</p> <p>Genotype: Tt Tt</p> <p>Gametes: T t T t</p> <p>F₂ generation:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td align="center">T</td> <td align="center">t</td> </tr> <tr> <td align="center">T</td> <td align="center">TT Tall</td> <td align="center">Tt Tall</td> </tr> <tr> <td align="center">t</td> <td align="center">Tt Tall</td> <td align="center">tt Dwarf</td> </tr> </table> <p align="center">Phenotypic ratio – Tall : Dwarf → 3 : 1 Genotypic ratio – TT : Tt : tt → 1 : 2 : 1</p> <p align="center">OR</p> <p align="center">Detailed explanation with genotypic ratio and phenotypic ratio (5marks)</p> | | T | t | T | TT Tall | Tt Tall | t | Tt Tall | tt Dwarf | ½ ½ ½ ½ 2 ½ ½ | 71 - 72 |
| | T | t | | | | | | | | | | |
| T | TT Tall | Tt Tall | | | | | | | | | | |
| t | Tt Tall | tt Dwarf | | | | | | | | | | |

| | | | |
|---------------------|--|------------------------|--------------|
| 30 | <p>List the salient features of Human Genome.</p> <ul style="list-style-type: none"> • The human genome contains 3164.7 million nucleotide bases. • The average gene consists of 3000 bases. Dystrophin gene which is the largest known human gene has 2.4 million bases. • The total number of genes is estimated at 30,000. • Almost all (99.9%) nucleotide bases are exactly the same in all people. • The functions are unknown for over 50 per cent of the discovered genes. • Less than 2% of the genome codes for proteins. • Repeated sequences make up very large portion of the human genome. These are thought to have no direct coding functions, but they shed light on chromosome structure, dynamics and evolution. • Chromosome-1 has most genes (2968), and the Y has the least (231). • There are 1.4 million locations where single base DNA differences (SNPs) occur. These help in finding chromosomal locations for disease-associated sequences and tracing human history. <p style="text-align: center;">ANY FIVE</p> | 1 x 5 | 120 |
| 31 | <p>Name the diseases caused by following organisms:</p> <p>(a) Rhino virus – Common cold (b) <i>Epidermophyton</i> – Ringworms / Ringworm disease (c) <i>Salmonella typhi</i> – Typhoid (d) <i>Wuchereria malayi</i> – Filariasis / Elephantiasis (e) <i>Plasmodium vivax</i> – Malaria</p> | 1 1 1 1 1 | 146-149 |
| 32 | <p>What is bee-keeping? Write any four points for successful bee-keeping.</p> <p>Bee-keeping is the maintenance of hives of honey bees for the production of honey and wax.</p> <p>Requirement for successful bee keeping:</p> <ul style="list-style-type: none"> • Knowledge of the nature and habits of bees • Selection of suitable location for keeping the bee-hives • Catching and hiving of swarms (groups of bees) • Management of bee-hives during different seasons and • Handling and collection of honey and of bee wax <p style="text-align: center;">ANY FOUR POINTS</p> | 1 1 x 4 | 169 |
| Section – II | | | |
| 33 | <p>Describe the biogas plant with a neat labeled diagram.</p> <ul style="list-style-type: none"> • The biogas plant consists of a concrete tank (10-15 feet deep) into which wastes and slurry of dung are filled. • A floating cover is placed over the slurry, which keeps on rising as the gas is produced in the tank due to the microbial activity. • The biogas plant has an outlet, which is connected to a pipe to supply biogas to nearby houses. • The spent slurry is removed through another outlet which may be used as fertilizer. | ½ ½ ½ ½ | 3 185-186 |



| 34 | <p>(a) What is biopiracy? (2)</p> <ul style="list-style-type: none"> • Biopiracy is the use of bio-resources by multinational companies and other organizations without proper authorization from the countries and people concerned without compensatory payment. <p>(b) How ADA deficiency is cured by gene therapy? (3)</p> <ul style="list-style-type: none"> • Lymphocytes from the blood of the patient are grown in a culture outside the body. • A functional ADA cDNA is introduced into these lymphocytes using a retroviral vector and the lymphocytes are introduced back into the patient. • Periodic infusion of such genetically engineered lymphocytes is given as these cells are not immortal. If the gene isolate from marrow cells producing ADA is introduced into cells at early embryonic stages, it could be a permanent cure. | 2 1 1 1 | 214 211 | | | | | | | | | | |
|-------------------------|---|--|------------------------|------------------------|---|-------------------------|----------|-----------------------|----------|-----------------------|-----------|------------|---------------------------|
| 35 | <p>(a) What is ecological succession? (1)</p> <ul style="list-style-type: none"> • It is the gradual and fairly predictable change in the species composition of a given area. <p>(b) Write types of plant succession. (2)</p> <ul style="list-style-type: none"> • Hydrarch succession and Xerarch succession <p>(c) Represent pyramid of number in grassland ecosystem. (2)</p> <div style="text-align: center;"> <p>Trophic level</p> <table border="1"> <thead> <tr> <th>Trophic level</th> <th>Number of individuals</th> </tr> </thead> <tbody> <tr> <td>TC (Tertiary consumer)</td> <td>3</td> </tr> <tr> <td>SC (Secondary consumer)</td> <td>3,54,000</td> </tr> <tr> <td>PC (Primary consumer)</td> <td>708, 000</td> </tr> <tr> <td>PP (Primary producer)</td> <td>5,842,000</td> </tr> </tbody> </table> </div> <p>(The numbers at each trophic level need not be the same as given in the diagram)</p> | Trophic level | Number of individuals | TC (Tertiary consumer) | 3 | SC (Secondary consumer) | 3,54,000 | PC (Primary consumer) | 708, 000 | PP (Primary producer) | 5,842,000 | 1 2 | 250 251 248 |
| Trophic level | Number of individuals | | | | | | | | | | | | |
| TC (Tertiary consumer) | 3 | | | | | | | | | | | | |
| SC (Secondary consumer) | 3,54,000 | | | | | | | | | | | | |
| PC (Primary consumer) | 708, 000 | | | | | | | | | | | | |
| PP (Primary producer) | 5,842,000 | | | | | | | | | | | | |
| 36 | <p>Explain mutualism with examples.</p> <p>Mutualism is a type of interaction in which both the interacting species are benefited.</p> <p>Ex:</p> <ul style="list-style-type: none"> • Lichens represent close relationship between a fungus and an alga or cyanobacteria. The fungi help the plant in the absorption of essential nutrients from the soil while the plant provides the fungi with carbohydrates. • The mycorrhizae are associations between fungi and the roots of higher plants. The fungi help the plant in the absorption of essential nutrients from the soil while the plant provides the fungi with carbohydrates. • Plants and pollinating animal agents – Animals pollinate the flowers of plants. Plants provide pollen and nectar for pollinators. • Plants and seed dispersing animal agents – Animals disperse the seeds of plants. Plants provide juicy and nutritious fruits for seed dispersers. • A particular species of fig tree is pollinated by a specific species of wasp only. The wasp pollinates the fig inflorescence while searching for suitable sites for oviposition (egg-laying). In return, the fig provides the wasp some of its developing seeds as food for the developing wasp larvae. <p style="text-align: right;">ANY FOUR</p> | 1 1 X 4 | 237-238 | | | | | | | | | | |
| 37 | <p>Write a brief account of electrostatic precipitator with a neat labeled diagram.</p> <ul style="list-style-type: none"> • The electrode wires that are maintained at several thousand volts 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. But the velocity of air between the plates is kept low to allow the dust to fall. <div style="text-align: center;"> </div> | 1 1 1 | 271 | | | | | | | | | | |