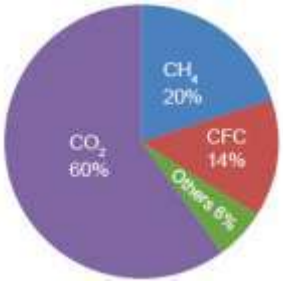
PUBLIC EXAMINATION - MARCH - 2020

STD: XII **20.03.2020**

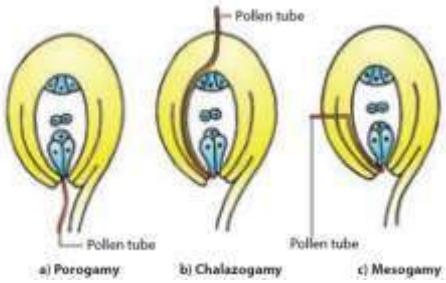
SUBJECT: BIO-BOTANY **TENTATIVE ANSWER KEY** **MARKS : 35**

Q. NO			MARKS
	SECTION - I		**8x1=8**
	TYPE – A	**TYPE - B**	
1.	c) Meristem culture	c) Half red flowered	1(BB)
2.	b) Malaivembu, Kadambu	d) Atomita - 2	1 (Interior)
3.	c) Half red flowered	b) Malaivembu, Kadambu	1 (Interior)
4.	d) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)	b) Microspore	1 (Interior)
5.	b) Microspore	c) Bad Ozone	1(BB)
6.	c) GFP	c) Meristem culture	1 (Interior)
7.	c) Bad Ozone	c) GFP	1 (Interior)
8.	d) Atomita - 2	d) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)	1 (Interior)
	SECTION -B **II. ANSWER ANY FOUR QUESTIONS FROM THE FOLLOWING**		**4X2=8**
9.	**Cybrid:** The fusion product of protoplasts without nucleus of different cells is called a cybrid.		2
10.	**Any four uses of Seed ball:** ❖ Seed ball is suitable for barren and degraded lands for tree regeneration ❖ Vegetation before monsoon period where the suitable dispersal agents become rare.		2
11.	**Objectives of clean development mechanism:** **Clean Development Mechanism** (CDM) is defined in the **Kyoto protocol** (2007) which provides project based mechanisms with two objectives to prevent dangerous climate change and to reduce green house gas emissions.		2

12.	**Organic farming:** Organic farming is an alternative agricultural system in which plants/crops are cultivated in natural ways by using biological inputs to maintain soil fertility and ecological balance thereby minimizing pollution and wastage.	2
13.	**Botanical Name of Nilavembu:** Andrographis paniculata **Family:** Acanthaceae **Uses:** ❖ Andrographis is a **potent hepatoprotective** and is widely used to treat liver disorders. ❖ Concoction of *Andrographis paniculata* (Nilavembu Kudineer) is effectively used to treat malaria and dengue.	1 1
14.	**Enzymes involved in genetic engineering:** ❖ Restriction enzyme ❖ DNA ligase ❖ Alkaline phosphatase	2
	Section - C **III. Answer any 3 questions:(Question No. 19 is Compulsory)**	**3x3=9**
15.	Pale green leaved plant (Male) × Dark green leaved plant (Female) ↓ **F1 Dark green leaves** **Type of inheritance:** It is found in 4 O' Clock plant (*Mirabilis jalapa*). In this, there are two types of variegated leaves namely dark green leaved plants and pale green leaved plants. When the pollen of dark green leaved plant (male) is transferred to the stigma of pale green leaved plant (female) and pollen of pale green leaved plant is transferred to the stigma of dark green leaved plant, the F1 generation of both the crosses must be identical as per Mendelian inheritance. But in the reciprocal cross the F1 plant differs from each other. In each cross, the F1 plant reveals the character of the plant which is used as female plant.	1 2
16.	**p^{BR322} plasmid:** ❖ pBR 322 plasmid is a reconstructed plasmid and most widely used as cloning vector; it contains 4361 base pairs. ❖ In pBR, ***p*** denotes plasmid, ***B***and ***R*** respectively the names of scientist **B**oliver and **R**odriguez who developed this plasmid. ❖ The number **322** is the number of plasmid developed from their laboratory. ❖ It contains ampR and tetR two different antibiotic resistance genes and recognition sites for several restriction enzymes. (*Hind III, EcoRI, BamH I, Sal I, Pvu II, Pst I, Cla I*), ori and antibiotic resistance genes. ❖ Rop codes for the proteins involved in the replication of the plasmid.	1 1 1

17.	**Green House Effect:** Green House Effect is a process by which radiant heat from the sun is captured by gases in the atmosphere that increase the temperature of the earth ultimately.  	2 1
18.	**Cryo preservation:** ❖ Cryopreservation, also known asCryo-conservation, is a process by which protoplasts, cells, tissues, organelles, organs, extracellular matrix, enzymes or any other biological materials are subjected to preservation by cooling to very low temperature of –196°C using liquid nitrogen. ❖ At this extreme low temperature any enzymatic or chemical activity of the biological material will be totally stopped and this leads to preservation of material in dormant status. ❖ Later these materials can be activated by bringing to room temperature slowly for any experimental work. ❖ Protective agents like dimethyl sulphoxide, glycerol or sucrose are added before cryopreservation process. ❖ These protective agents are called cryoprotectants, since they protect the cells, or tissues from the stress of freezing temperature.	3
19.	**Three differences between Habitat and Niche:**	1 1 1

	Habitat	Niche
1.	A specific physical space occupied by an organism (species)	A functional space occupied by an organism in the same eco-system
2.	Same habitat may be shared by many organisms (species)	A single niche is occupied by a single species
3.	Habitat specificity is exhibited by organism.	Organisms may change their niche with time and season.

	SECTION -D **IV. Answer the following questions**	**2x5=10**
20.	**a) Different mode of entry of pollen tube into the ovule:** **Entry of pollen tube into the ovule**: There are three types of pollen tube entry into the ovule. **Porogamy**: when the pollen tube enters through the micropyle. **Chalazogamy**: when the pollen tube enters through the chalaza. **Mesogamy**: when the pollen tube enters through the integument.  	3 2
	(OR)	
	b) Gene mapping : The diagrammatic representation of position of genes and related distances between the adjacent genes is called **genetic mapping**. **Uses:** ❖ It is used to determine gene order, identify the locus of a gene and calculate the distances between genes. ❖ They are useful in predicting results of dihybrid and trihybrid crosses. ❖ It allows the geneticists to understand the overall genetic complexity of particular organism.	2 1 1 1
21	**a) Protect the ecosystem:** It is a practice of protecting ecosystem at individual, organisational and governmental levels for the benefits of both nature and humans. Threats to ecosystems are many, like adverse human activities, global warming, pollution, etc. Hence, if we change our everyday life style, we can help to protect the planet and its ecosystem. **"If we fail to protect environment, we will fail to save posterity".** Therefore, we have to practice the following in our day today life: • Buy and use only ecofriendly products and recycle them. • Grow more trees • Choose sustained farm products (vegetables, fruits, greens, etc.) • Reduce the use of natural resources. • Recycle the waste and reduce the amount of waste you produce. • Reduce consumption of water and electricity. • Reduce or eliminate the use of house-hold chemicals and pesticides. • Maintain your cars and vehicles properly. • Create awareness and educate about ecosystem protection among your friends and family members and ask them to find out solution to minimise this problem.	5

	(OR)	
	b) (i) Somu will get new variety. Because he selected the mixed population method. **(ii) Advantages Self fertilization method:** ❖ The result of repeated self-pollination from a single homozygous individual. Hence, a variety formed by this method shows more homozygosity with respect to all genes. **Disadvantages:** ❖ The disadvantage of this type is that the new genotypes are never created and they are less adaptable and less stable to the environmental fluctuations. **Advantages Mixed population method:** ❖ The disadvantage of mass selection is that it is difficult to distinguish the hereditary variation from environmental variation.	1 2 2

MARK ANALYSIS

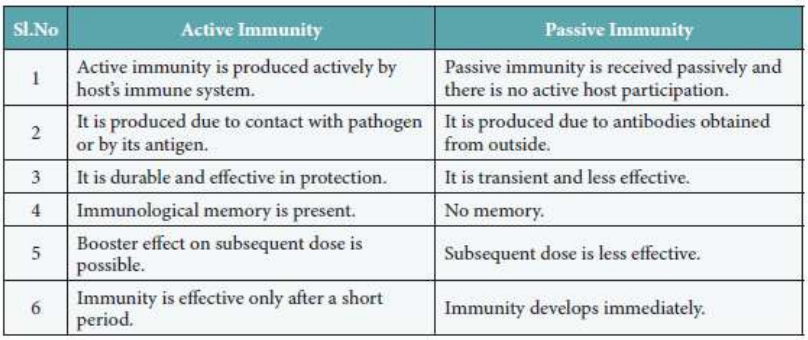
(WITHOUT CHOICE)

PART	Questions	Total Questions	Book Back Questions	Interior Questions	Total Marks
I	1 Mark	8	2	6	8
II	2 Marks	6	2	4	12
III	3 Marks	5	3	2	15
IV	5 Marks	4	1	3	20
Total Marks		**23**	**8**	**15**	**55**
Percentage			34.78%	65.21%	100%

12th Standard- Bio- Zoology

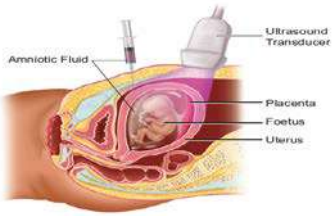
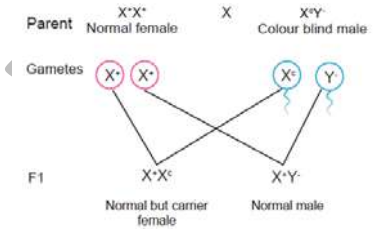
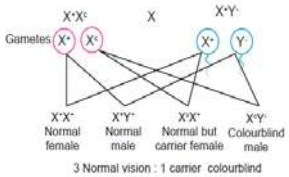
STD: XII 20.03.2020

SUBJECT: BIO- ZOOLOGY MARKS : 35

Q. NO	TENTATIVE ANSWER KEY (TYPE A)	MARKS
	SECTION -I	
1.	a) (1) – (iv), (2) – (i), (3) – (ii), (4) – (iii)	1
2.	c) E.coli does not have the machinery for glycosylation of proteins.	1
3.	c) Formation of three germ layer embryo form single layer embryo	1
4.	d)One sperm is fertilizing one egg	1
5.	c)Detection of pathogens	1
6.	c)Both (A) and (R) are wrong	1
7.	d) Amphibians	1
8.	d)One oxygen atom less in deoxyribose sugars	1
	SECTION -II	
9.	❖ In Menstrual cycle Both LH and FSH attain peak level in the middle of the cycle (about the 14th day). Maximum secretion of LH during the mid cycle called **LH surge** induces the rupture of the Graafian follicle and the release of the ovum (secondary oocyte) from the ovary wall into the peritoneal cavity. This process is called as **ovulation**. ❖ It occurs at 14th day	1 1
10.	❖ Several autosomal aneuploidies have been reported in human being e.g. Down's syndrome (21-Trisomy), Patau's syndrome (13-Trisomy). ❖ Trisomic condition of chromosome - 21results in Down's syndrome	1 1
11.	❖ . Usually, small extracellular or intracellular metabolites trigger initiation or inhibition of gene expression. The clusters of gene with related functions are called **operons**. They usually transcribe single mRNA molecules. ❖ In *E.coli*, nearly 260 genes are grouped into 75 different operons.	1 1
12.		(any 2)
13.	❖ Ethanol is referred to as Industrial alcohol. ❖ It is used for industrial, laboratory and fuel purposes. So ethanol is referred to as **industrial alcohol**.	1 1
14.	❖ The most important and potential application of human stem cells is the generation of cells and tissues that could be used for cell based therapies. ❖ Human stem cells could be used to test new drugs.	1 1

Sl.No	Active Immunity	Passive Immunity
1	Active immunity is produced actively by host's immune system.	Passive immunity is received passively and there is no active host participation.
2	It is produced due to contact with pathogen or by its antigen.	It is produced due to antibodies obtained from outside.
3	It is durable and effective in protection.	It is transient and less effective.
4	Immunological memory is present.	No memory.
5	Booster effect on subsequent dose is possible.	Subsequent dose is less effective.
6	Immunity is effective only after a short period.	Immunity develops immediately.

SECTION –III (Q.No. 19 is Compulsory)

15.	❖ Oxytocin causes the "**Let-Down" reflex**-the actual ejection of milk from the alveoli of the mammary glands. ❖ During lactation, oxytocin also stimulates the recently emptied uterus to contract, helping it to return to pre - pregnancy size.	$1\frac{1}{2}$ $1\frac{1}{2}$
16.	 Fig. 3.1 Amniocentesis ❖ Amniocentesis involves taking a small sample of the amniotic fluid that surrounds the foetus to diagnose for chromosomal abnormalities ❖ Amniocentesis is generally performed in a pregnant woman between the 15th and 20th weeks of pregnancy by inserting a long, thin needle through the abdomen into the amniotic sac to withdraw a small sample of amniotic fluid. The amniotic fluid contains cells shed from the foetus.	1 1 1
17.	❖ The hormone secreted by Thymus gland is **thymosin**. ❖ It stimulates the T cell to become mature and **immunocompetent**.	3
18.	❖ **Gene Banks:** Gene banks are a type of biorepository which preserve genetic materials. Seeds of different genetic strains of commercially important plants can be stored in long periods in seed banks, gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques. ❖ However, it is not economically feasible to conserve all biological wealth and all the ecosystems. ❖ The number of species required to be saved from extinction far exceeds the conservation efforts.	1 1 1
19.	❖ Colour blind trait is inherited from the male parent to his grandson through carrier daughter, which is an example of criss-cross pattern of inheritance   Marriage between colour blind man and normal visioned woman	1 1 1

20. ❖ *Homo sapiens* or modern human arose in Africa some 25,000 years ago and moved to other continents and developed into distinct races. They had a brain capacity of 1300 – 1600 cc. They started cultivating crops and domesticating animals. — 1

21. **Populationdensity**

The density of a population refers to its size in relation to unit of space and time. Population density is the total number of that species within a natural habitat. The size of the population can be measured in several ways, including abundance (absolute number in population), numerical density (number of individuals per unit area (or) volume) and biomass density (biomass per unit area (or) volume). The population density of a species can also be expressed with reference to the actual area of habitat available to the species (ecological density). When the size of individuals in the population is relatively uniform then density is expressed in terms of number of individuals (numerical density). — 1

S.No.	Indices of Density	Keys
1	Population density	It is usually expressed as the number of individuals per unit area or volume. Eg.100 trees per acre
2	Crude density	It is the size of a population in relation to the numbers per unit of total space. Eg.1000 fish in a pond.
3	Ecological density	It is the size of a population in relation to the numbers per unit of habitat space. (Available area or volume that can be colonized by a population). Eg. 1000 fish in the volume of water in the pond.
4	Relative abundance	These are time relative indices which can show the changes in number (increase and decrease) with respect to time. Number of birds of a species spotted per hour in an unit area over a specified time.

— 1

Natality

Populations increase because of natality. Natality is equivalent to birth rate and is an expression of the production of new individuals in the population by birth,

fertility and crude birth rate number of organisms born per female per unit time. — $1^{1/2}$

Mortality

Mortality is the population decline factor and is oppposite to natality. Mortality can be expressed as a loss of individuals in unit time or death rate. Generally, mortality is expressed as specific mortality, that is, the number of members of an original population dying after the lapse of a given time. The crude death rate of a population can be calculated by the equation.

$$\text{Death rate (d)} = \frac{\text{number of deaths per unit time}}{\text{average population}}$$

The rate of mortality (death) is determined by density. Mortality is high at high density because of the hazards of overcrowding, increased predation and spread of disease. Mortality rates vary among species and are correlated and influenced by a number of factors such as destruction of nests, eggs or young by storms, wind, floods, predators, accidents and desertion by parents. — $1^{1/2}$

	(OR)	
	Chemicals which are used in agriculture for growth of plants and pest control are called agrochemicals or agrichemicals. Overuse of agrochemicals have been observed to generate residues that cause nutrient imbalance, and ❖ May kill beneficial bacteria and soil organisms. ❖ Can cause eutrophication in water bodies. ❖ Affect aquatic animals and their productivity. ❖ Pesticide containing water, even in trace quantities is unfit for human consumption. ❖ Particles (aerosols) and residues of these chemicals cause air pollution. ❖ Inhalation of contaminated air can cause respiratory problems. ❖ Consumption can lead to poisoning, side effects and after effects. ❖ Chemicals can cause skin rashes and irritation of eyes. ❖ Many of these chemicals are reported to be carcinogenic. ❖ They can trigger hormonal disorders and neurotoxicity. Beneficial insects and animals can be affected.	1 1 1 1 1

MARK ANALYSIS

PART	Book Back Questions	Interior questions	Total No. of Questions	Total Mark
I	3	5	8	8
II	-	6	6	12
III	-	5	5	15
IV	-	4	4	20
Total	3	20	23	55