Sample Question Paper II
Class XII (2016-17)
CLASS: XII
Biology (044)

MARKING SCHEME

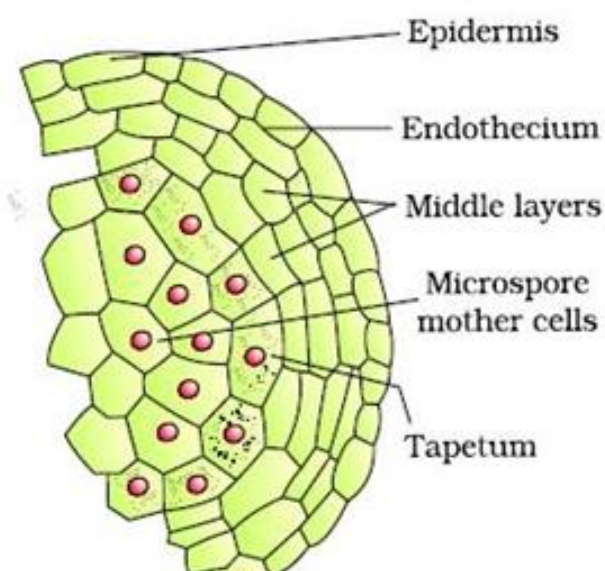TIME: 3HOURS   MM: 70

SECTION A

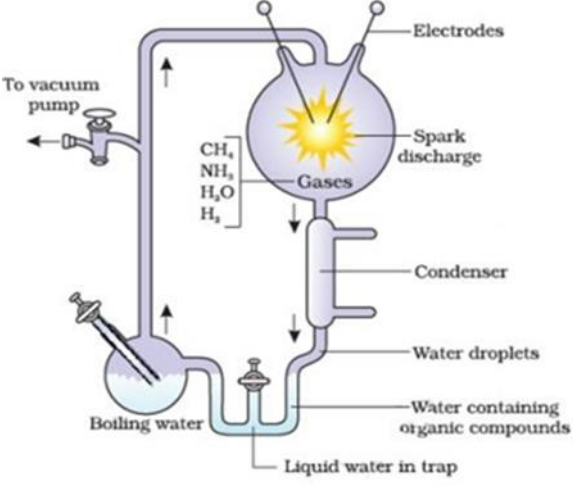| 1.	Tissue culture using meristematic tissue as it is virus free	½+ ½ =1
2.	RNA interference	½+ ½ =1
3.	Intra Cytoplasmic Sperm Injection (No marks for abbreviation - ICSI)	½+ ½ =1
4.	Answer:-The use of a thermostable DNA polymerase Thermus aquaticus which remain active during the high temperature induced denaturation of double stranded DNA.	1
5.	Frequency of recombination will be higher	½+ ½ =1

SECTION B

6.	Population control measures other than contraception are: - Advertisements in the media, to generate awareness - Statutory raising of marriageable age of the female to 18 years and that of males to 21 years, to delay the number of births - Incentives given to couples with small families, to motivate others to comply (Any two of the above measures with explanation)	2
7.	Down's syndrome is due to Trisomy of chromosome number 21, total number of chromosome is 47 Turner's syndrome is due to monosomy of the X -Chromosome, total number of chromosome is 45	½x4=2
8.	*Spirulina* – Produces large quantities of food rich in protein, minerals, fats, carbohydrates and vitamins. Methylophilus methylotrophus – 250 gm of this microorganism produces 25 tonnes of protein per day 1 x 2 = 2	2

	OR	
	Multiple Ovulation Embryo Transfer Technology 1 increases herd size, in a short time ½ x 2 = 1	
9.	a) Streptokinase, *Streptococcus* b) Curd contains Lactic Acid Bacteria, which play beneficial role in checking disease causing microbes. It is a source of vitamin B$_{12}$.	1+1=2
10.	- Decline in plant production/Decline in number of animal species - Lowered resistance to environmental perturbations such as drought - Increased variability in certain ecosystem processes such as plant productivity/ water use / pest & disease cycles - Species may become endangered/increased rate of species extinction	½x4=2

SECTION C

11.	 (Any four of the labels) ½ x 4 = 2 Tapetum nourishes the developing pollen grains 1	3
12.	a) Isogametes 1 b) Fertilization and zygote ½ x 2 = 1 c)*Cladophora / Clamydomonas* 1	3

13.	(Any six different labels)	½ x 6 = 3

14.	a) Axial position	½
	b)	½
	AA x aa P (Axial) (Terminal) A a	
	Aa (Axial) F_1	½
	Aa x Aa Selfing	
	A a A a	½
	F_2 AA Aa Aa aa	
	c) ¼ ½ ¼	1

15.	a) Adaptive radiation - The process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography (habitats). b) Convergent evolution c) Wolf is a placental mammal, whereas Tasmanian wolf is a marsupial mammal	3

16.	Doctor confirms pneumonia on the basis of the following symptoms - fever/chills/grey - blue lips and finger nails (any two); and not common cold as the following symptoms are not observed - Nasal	3

	congestion/sore throat/hoarseness (any two)	
	Precautions – 1) Cover the nose when near the patient 2) Do not share glasses and utensils / articles used by the infected person	
17.	Methanogens are present in Cow dung. Breakdown of cellulose Anaerobic condition	3
18.	Gene Therapy ADA (Adenosine deaminase) deficiency Lymphocytes from the blood of the patient are grown in a culture, a functional ADA cDNA is introduced into these lymphocytes, which are subsequently returned to the patient. The permanent cure is done by introducing ADA cDNA into cells at early embryonic stages.	3
19.	Drug dependence - is the tendency of the body to manifest a characteristic and unpleasant withdrawal syndrome if regular dose of drugs is abruptly discontinued / because of perceived benefits, drugs are frequently used repeatedly from which the person may not be able to get out. Measures: - Education and counseling - to face problems and stresses/ to channelize the energy into healthy pursuits like reading, music, yoga and other extracurricular activities - Seeking help from parents - to guide the person appropriately and immediately - Seeking professional and medical help – to help the person to get rid of the problem completely with sufficient efforts and will power (any two)	3
20.	a) Positive terminal - 'B' ½ x 2 = 1 Negative terminal - 'A' b) DNA being negatively charged, moves towards the positive ½ x 2 = 1 electrode (anode) c) By elution - separated bands of DNA are cut out from the ½ x 2 = 1 agarose gel and extracted from the gel piece **OR** a) Bt corn ½ b) Cry I Ab/ Bt toxin gene codes for crystal protein; the Bt toxin protein exists as an inactive protein, but once an insect ingests it, it gets converted into an active form due to the alkaline pH of the gut which solubilizes the crystal. The activated toxin binds to the surface of mid gut and creates pores that cause swelling, lysis and eventually death of the insect. ½ x 5 = 2½	3
21.	a) Bam HI should be used, as restriction site for this enzyme is present in tet^R region b) PvuI will not be used, as restriction site for this enzyme is present in amp^R region (not in tet^R) EcoRI will not be used, as restriction site for this enzyme is not present in selectable marker tet^R	3

| 22. | a) 'X' axis - Mean annual precipitation (cm) ½ x 2 = 1
'Y' axis - Mean annual temperature (0C)

b) Grassland - B ½ x 2 = 1
Coniferous forest - E

c) The mean annual temperature ranges from -12 to 20C (error accepted ± 2) and mean annual precipitation ranges from 10 - 125 cm, these are the optimum conditions in tundra biome ½ x 2 = 1 | 3 |

SECTION -D

| 23. | Father explains that it will lead to generation of e - waste;
Difficulty in recycling e - waste / hazardous nature of recycling of e - waste / exposing workers to toxic substances present in e - waste (Any one) 1

Son's wish to update his father with modern techniques, Awareness about trends and technologies, well versed with their applicability in daily life (any other similar / appropriate values) ½ x 3 = 1½

Concern for environment, scientific thinking, inquisitive nature, social awareness, judicious use of money, sense of responsibility (any other similar /appropriate values) ½ x 3 = 1½ | 4 |

SECTION –E

| 24. | a) A is able to penetrate/ fertilize the ovum, whereas B and C are unable to penetrate/ fertilize // B and C will degenerate ½ x 2 = 1

b) Zona pellucida ensures the entry of only one sperm into the ovum 1

c) Induces completion of meiotic division of the secondary oocyte, formation of second polar body and a haploid ovum ½ x 2 = 1

d)Enzymes of acrosome help (½ mark if only 'acrosome' is written) 1

e) Ampullary - isthmic junction of the fallopian tube1 1

<div align="center">**OR**</div>

a) A - Estrogen ½ x 2 = 1
B - Progesterone

b) A - Maturing ovarian follicle / Graafian follicle ½ x 2 = 1
B - Corpus luteum | 5 |

	c) Formation of Graaffian follicle (releases estrogen) is followed by the formation of corpus luteum (releases progesterone) 1 d) Role of A (Estrogen) - leads to changes in the ovary and uterus / regeneration of endometrium through proliferation ½ Role of B (Progesterone) - Maintenance of endometrium for implantation of the fertilized ovum/ maintenance of other events of pregnancy ½ e) In case of pregnancy 1		
25.	For initiation, the ribosome binds to the mature m RNA at the start codon (AUG) that is recognized by the initiator t - RNA. During elongation, charged t RNA sequentially binds to the appropriate codon in m- RNA with the aniticodon present on tRNA. The ribosome moves from one codon to another adding amino acids one after the other to form polypeptide, i.e. translation. During termination, the release factor binds to stop codon (UAA, UAG, UGA), terminating translation and releasing the polypeptide chain. ½ x 10 = 5 **OR** Methodology used - Sequence Annotation - total DNA from a cell is isolated, ½ x 2 = 1 converted into random fragments of relatively smaller sizes ½ and cloned in suitable host using specialized vectors. ½ The cloning results in amplification of each piece of DNA fragment. ½ The fragments are sequenced using automated DNA sequencers, ½ these sequences are then arranged based on some overlapping regions (present in them). ½ This requires generation of overlapping fragments (for sequencing). ½ Specialized computer based programmes are developed, and ½ these sequences are subsequently annotated and assigned to each chromosome. ½		5
26.	i) Productivity - conversion of inorganic into organic material with the help of solar energy by the autotrophs ½ x 2 = 1 ii) Energy flow - unidirectional movement of energy towards higher trophic level (and its dissipation and loss as heat to the environment) ½ x 2 = 1 iii) Decomposition - fragmentation, leaching, catabolism, humification, mineralization by bacteria, fungi and flagellates (abundant at the bottom of lake) ½ x 2 = 1 iv) Nutrient cycling - decomposition of dead matter to release the nutrients back to be re-used by the autotrophs ½ x 2 = 1		5

Food chain in aquatic ecosystem (lake)   1

Phytoplanktons $\Longrightarrow$ Zooplanktons $\Longrightarrow$ Small fish $\Longrightarrow$ Big fish
(Any other appropriate example)

OR

a) Pioneer species, lichen   ½ x 2 = 1

b) Phytoplankton - hydric   ½ x 7 = 3½
   ⇩
   Submerged plant stage
   ⇩
   Submerged free floating plant stage
   ⇩
   Reed swamp stage
   ⇩
   Marsh - meadow stage
   ⇩
   Scrub stage
   ⇩
   Forest stage - Mesic

c) Forest   ½