BANGALORE SAHODAYA SCHOOLS COMPLEX ASSOCIATION (BSSCA)
PRE-BOARD EXAMINATION (2023-2024)
CLASS: XII

DATE: 13.12.2023 **MAX. MARKS: 70**
SUBJECT: BIOLOGY (CODE 044) **TIME: 3 HOURS**

SET 1 - MARKING SCHEME

General Instructions:

i. All questions are compulsory.
ii. The question paper has five sections and 33 questions. All questions are compulsory.
iii. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
iv. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
v. Wherever necessary, neat and properly labelled diagrams should be drawn.

1	b. Papaya	1
2	a. A is cotyledon of monocot embryo, situated towards lateral side of embryonal axis	1
3	d. B,A,D,C	1
4	b. 3	1
5	d. 4	1
6	a. overproduction, variations, constancy of populations, natural selection	1
7	c. through a N glycosidic linkage at carbon atom number 1	1
8	b.	1
9	b. the cancer patients are administered with alpha interferon to destroy the tumour	1
10	c. Produced by biotechnology using restriction enzyne and ligases from *Bacillus thuringiensis*	1
11	c. Uptake of DNA through transient pores in the bacterial cell wall.	1
12	b. B is mortality and X is immigration	1
13	A	1
14	C	1
15	C	1
16	C	1

17	Primary oocyte- 46, secondary oocyte-23, ootid-23, follicular cells-46	½ X 4=2
18	a. rho factor b. polyadenylation, capping and splicing	½ 1 ½
19	a. As there is exposure to the allergen	½
	b. mast cells and histamines	½
	c. when anti histamines/adrenalins/steroids are administered, they block allergy causing antibodies.	1
20	• added methyl groups to DNA • cut DNA	1 1
21	a) GPP- R=NPP 10-5=5kg/m^2/year-NPP b) 1kg=10,000kJ as NPP is the available biomass for herbivores, 5 x 10,000=50,000kj	1 1
22	a) A - Withdrawl method B - Physical barriers C - Oral pills D - Vasectomy E - Tubectomy b) The hormone releasing IUDs, e.g. progestasert and LNG-20 are recommended to promote the cervix hostility to sperms	½X5 = 2½ **½**
23	**Ovarian event from 13-15 days -** A mature red ovum covered by corpus luteum is released. Progesterone is also secreted. **Ovarian hormone level from 16 to 23 days -** It is called luteal phase (Secretory Phase), where large amounts of progesterone is secreted to maintain endometrium. **Uterine events from 24 to 29 days -** The endometrium is maintained to sustain pregnancy. But In the absence of pregnancy the endometrium is shed off. This shedding off of ovum is called menstruation	1 1 1
24	a) Two fragments b) 5' ATTTTGAG 3' 5' GATCCGTAATGTCCT3' 3' TAAAACTCCTAG5' 3'GCATTACAGGA5' c) Restriction enzyme cuts the DNA of the vector at the same sequence and ligase will help in ligating the gene of interest with the vector. **OR**	1 1 1
	a) Disulfide bonds b) Pro hormone of insulin has 3 chains, A and B connected by C chain. The C chain is removed to make the hormone active. c) Genetically engineered insulin does not cause unwanted immunological reactions.	1 1 1

25	(a) Graphs which represent tropical region are : Dec 22 → X June 22 → Y The temperate regions are depicted by graphs: June 22 → X Dec 22 → Y (b) The tropical region will show high biological diversity. This is because it produces more solar radiations than temperate zones, and they have a stable climate and few seasonal changes. This encourages more productivity and hence more species richness, leading to higher biological diversity.	2 1
26	• In case of spermatogenesis, meiotic division begins at the time of puberty. Oogenesis begins in the female when the female is still in the womb. • Formation of primary oocytes stop by the 20th week of gestation of the female child. On the contrary. production of spermatocytes continues throughout the reproductive phase of a male. • In case of spermatogenesis. all the stages of meiosis take place quickly after one another. In the case of oogenesis, meiosis is suspended at the Prophase I state. • Meiosis resumes only once the puberty begins. **Following are some reasons for difference in patterns of oogenesis and spermatogenesis:** • Male gametes need to be formed in a very large number to ensure fertilization. Female gametes are not exposed to external hazards and hence a fewer number of them would be enough. • Limiting the production of female gametes helps in the conservation of resources from the female body. The resources can then be properly utilized during the development of foetus.	2 1
27	a) Industrial melanism b) Herbicide and pesticide resistance in parasitic bacteria due to indiscriminate use. c) Antibiotic resistant varieties in bacteria By taking the above examples meaningful explanations.	3
28	a) Once the BOD of sewage or waste water is reduced significantly, the effluent is then passed into a settling tank where the bacterial 'flocs' are allowed to sediment. This sediment is called activated sludge. b) A small part of the activated sludge is pumped back into the aeration tank to serve as the inoculum. The remaining major part of the sludge is pumped into large tanks called anaerobic sludge digesters. Here, other kinds of bacteria, which grow anaerobically, digest the bacteria and the fungi in the sludge. During this digestion, bacteria produce a mixture of gases such as methane, hydrogen sulphide and carbon dioxide. These gases form biogas and can be used as source of energy as it is inflammable	1 2
29	a. III lane- 3 cleavage sites so three fragments. OR lane-ii b. EcoRI is better for creating rDNA as the plasmid has only one restriction site for EcoRI c. Genes can be moved between species. Because of the universality nature of the genetic code, the polymerases enzyme is able to accurately transcribe a gene from another organism	1 1 2

30

a) B+I ≤ D+E (A declining population) **1**

b) B+I≥ D+E (A growing population) **1**

c) i. They have high reproductive rate. **2**

ii. Type 1 survivors have

* Complete internal development of the young one/Internal fertilisation and development.
* Parental care

31

a)

Sl no.	Type of units involved	No. of these units involved	Provide explanation for each of your answer
1.	Pollen grains	160	Each pollen grain has one male gamete that fuses with the egg to form the zygote/ one pollen grain is required for formation of a seed.
2.	Ovules	160	Each ovule has one egg to form the seed.
3.	Mega spore mother cells	160	Every megaspore mother cell divides by meiosis to form 4 cells of which only one forms functional embryosac.
4.	Microspore mother cells	640	MMC's undergo meiosis to form 4 microspores, each needs to fuse with the egg.

½ X 8 =4

b) Black pepper- persistent nucellus called perisperm is present.It is diploid.
Maize seed endosperm is the nutritive tissue. It is triploid. **1**

OR

a) Micropylar end
b) Meiosis
c) Megaspore
d) 3 Meiotic divisions
e) Embryo sac
f) Nourishing the ovum/directing the pollen tube
g) Nutrition of embryo/providing positional information of the embryo sac
h) PEN
i) Egg
j) Triploid endosperm

½ X10=5

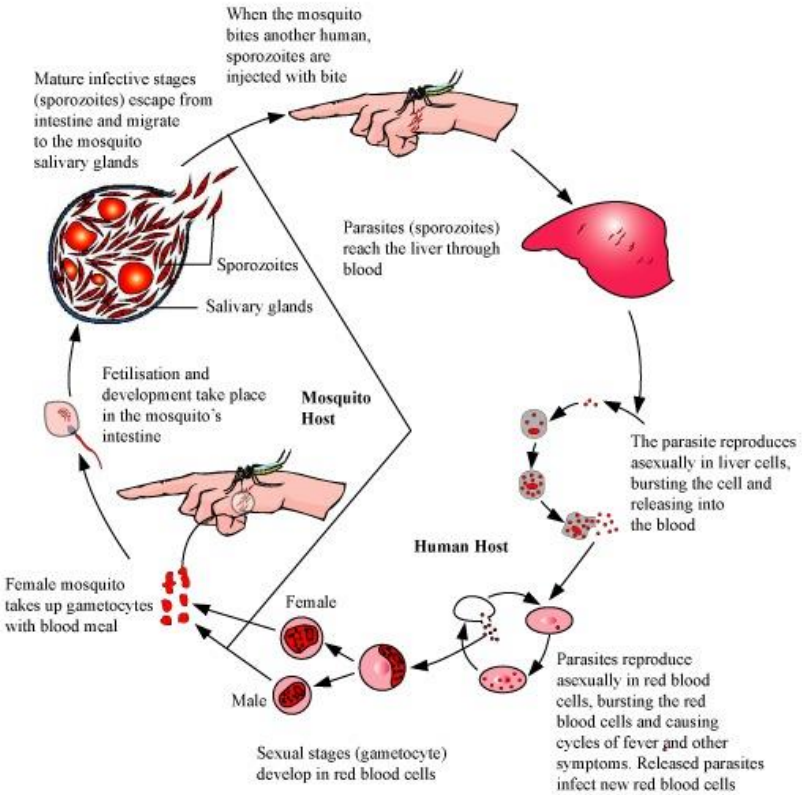
32

Test cross with parent generation, gametes, offspring genotype and phenotype in the punnet square 4

Frequency = (135 + 120)/(135+120+390+430)= 24% 1

OR

a) AaBb X aabb ½
Gametes: AB,Ab,aB,ab X a ½
Offspring: 1

	<table><tr><td>Male/female</td><td>AB</td><td>Ab</td><td>aB</td><td>ab</td></tr><tr><td>ab</td><td>AaBb</td><td>Aabb</td><td>aaBb</td><td>aabb</td></tr><tr><td>Genotype and phenotype</td><td>Big ears and bulgy eyes</td><td>Big ears and normal eyes</td><td>Small ears and bulgy eyes</td><td>Small ears and normal eyes</td></tr><tr><td colspan="5">Ratio 1:1:1:1 Genotype Phenotype</td></tr></table> b) As the parental combination is more compared to the recombinants, we can conclude that **A and B genes are linked** and distance between them is less so the recombinant percentage is relatively very less.	1 1 1
33	 Key words- sporozoite,liver cells,asexual reproduction, RBC,gametocytes,fertilization Asexual and sexual phases **OR** a) Any 3 health damages caused by drugs with meaningful explanation b) Opioids c) Can be taken by snorting and injection.	3 2 3 1 1