CKS Code: 2303

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MODEL EXAMINATION 2023-2024
BIOLOGY- (044)
ANSWER KEY

Max. Marks: 70

Class: XII **Time: 3.00 Hrs**

Section - A **(1 mark each)**

1.(b).Emasculation→ Bagging→ Cross pollination→ Rebagging
2. c)Rete testis to vasdeferns
3.(d) It increases phagocytosis of sperm within the uterus
4.(b) Blood group B- antigen B, antibody A
5.c) The additional sequences of mRNA that are not translated are present only at one end.
6.(c) Both (i) and (iv)
7. (d) Reserpine-tranquilizer
8.(c) Punnett square
9.(d) Agarose gel electrophoresis
10.c) 200,000
11. (b) 0.4
12.(d) Zostera
13.Option-d
14. Option-c
15. Option-a
16. Option-c

Section-B

17.a) Chain- A

b) Substitution of glutamic acid by valine in the 6th position of the polypeptide chain .

c) The RBC becomes sickle shaped causing a disease sickle cell anemia / Affect the oxygen carrying capacity of RBC. (1/2+1/2 +1)

18. a) Palindromic sequence- - sequence of base pairs that reads the same on opposite strands.

b) Restriction endonuclease enzyme

c) The enzyme cuts at specific nucleotide sequences and gets sticky ends.The same restriction

enzyme is used to cut both foreign DNA and cloning vectors (1+ 1/2+ ½).

19.a) streptokinase

b) Trichoderma polysporum

c) Immunosuppressant in organ transplant patients

d) Statins (½ x2)

or

a) Yes, if pollution load increases ,BOD increases

b) biochemical oxygen demand. The BOD test measures the rate of uptake of oxygen by microorganismsinasampleofwater. (½+½+1)

20 .A – motor

B – Foam breaker

C- Flat bladed impeller

D – Acid or base for PH Control (½ x2)

21. a) GPP – Gross primary productivity, NPP – Net primary productivity

Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis.

b) NPP = GPP-R

Net primary productivity is the available biomass for the consumption of heterotrophs (1+1)

Section-C

22.

a) Bt cotton

b) cry gene

c) Bacillus thuringiensis

d) The cry gene produces the insecticidal protein which solubilises in the alkaline PH of insect gut and make pores in the epithelial cells.This causes the death of insect .

.(½ x3 +1.5)

or

Transformation**:** The bacterial cells are treated with calcium chloride. The cells are then incubated in ice and then subjected to very high temperatures. This creates pores in the bacterial cell wall and the foreign DNA is taken up by the bacterial cell.

Microinjection**:** In this, the recombinant DNA is directly injected into the nucleus of the animal cell with the help of a microneedle.

Biolistics/Gene gun Method**:** The cells are bombarded with very high-velocity microparticles of gold and tungsten coated DNA. (1+1+1)

23 a) a- plumule
b - cotyledons
c – hypocotyl
d- radicle

b) In monocots single cotyledon-Scutellum, presence of coleoptile and coleorhiza covering plumule and radicle. (2+1)

24. The following types of diseases are likely to occur in human
(a)Phenylketonuria
(b)Down'syndrome
(c) Klinefelter's syndrome

(d)Symptoms of above diseases are
Phenylketonuria Accumulation of phenylketonuria causes mental retardation.
Down's syndrome Affected individuals are short statured with small round heads.
Klinefelter's syndrome The individuals are sterile. (1.5+1.5)

25.a) They were suffering from ADA deficiency

b) Girl A was given enzyme replacement therapy, in which lymphocytes isolated from the patient's blood are cultured in vitro.
A functional ADA coding DNA was introduced into these lymphocytes using retrovirus into the lymphocytes of the patient which were subsequently returned to the patient. As these cells are mortal the patient requires a periodic infusion of such genetically engineered lymphocytes.

c) Girl B was treated with gene therapy in which the gene isolated from bone marrow cells producing ADA is introduced into cells at early embryonic stages, which is a permanent cure.

(1+1+1)

26.After implantation / Finger-like projections appear on the trophoblast called chorionic villi, which are surrounded by the uterine tissue and maternal blood. The chorionic villi and the uterine tissue become interdigitated with each other and jointly form a structural and functional unit between foetus and maternal body, i.e. placenta.

It facilitates the supply of oxygen and nutrients / removal of carbon dioxide and waste materials produced by the foetus / also acts as an endocrine tissue and produces several hormones like human Chorionic Gonadotropin (hCG), human Placental Lactogen (hPL), estrogen, progesterone, etc

(1+1+1)

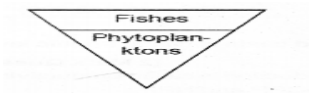
27. Genus-Nucleopolyhedrovirus

species specific / narrow spectrum insecticidal application /

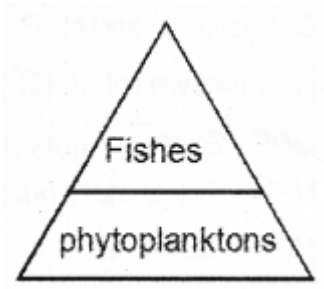
no negative impact on other plants and animals (1+2)

.

28..a) Inverted Pyramid



b) Upright Pyramid



(1 ½+ 1 ½)

Section-D

29**a)** It is only possible if the growth of the model is Exponential, i.e., having unlimited resources .

b) This notion seems to be an unrealistic situation because resources are limited. Hence, it follows a logistic growth model.

c)The carrying capacity of an organism is the maximum population size of the species that the environment can sustain indefinitely beyond which there is no further growth. (1+1+2)

or

i) Curve (A) is known as exponential growth curve & curve (B) is known as a logistic growth curve.

ii) Food & space is plenty in curve 'A' whereas less food & space is available in curve 'B'

iii) curve A

iv) When the food resources in a given place become unlimited the curve (B) assumes a J – shape & changes into a curve (A) (1+1+1+1)

.

30 a)It proposed the chemical evolution of life. According to this hypothesis, the first form of life came from pre-existing non-organic molecules.

b) amino acids

c) H_2

d) Electrode, gasses, liquid water in trap (1x4)

or

a)Oparin and Haldane proposed that first form of life could have been could have come from the pre-existing nonliving organic molecules and that formation of life was preceded by the chemical evolution

b)Oparin and Haldane stated that (i)life originated from pre-existing non-living organic molecules e.g. RNA, Protein etc. (ii)The conditions on earth favouring chemical evolution were having high temperature, volcanic storms, reducing atmosphere containing CH4,NH3 etc

c)The most accepted theory on the origin of life is the theory of biochemical evolutionThe most accepted theory of the origin of life is the Oparin-Haldane theory. This theory explains the origin of life through the aggregation of non-living inorganic matter that gave rise to complex substances called in a reducing environment.This theory proposes that life has originated from inorganic compounds such as amino acids. (1+1+2)

Section-E

31. In this method, the fusion of ovum and sperm is done outside the body of a woman (in vitro fertilization to form zygote which divides to form embryo. The embryo is then implanted in the uterus where it develops into a foetus and then into the child.
Zygote intra fallopian transfer(ZIFT) zygote upto 8 blastomeres are introduced into the fallopian tube
Intrauterine transfer (IUT) Embryos more than 8 blastomeres are introduced into the uterus.
Intracytoplasmic Sperm Injection (ICSI) In this technique, an embryo is formed in the laboratory by directly injecting the sperm into the ovum followed by embryo transfer.

Artificial Insemination Technique (AIT) Semen (containing sperms) from husband or donor is

artificially introduced into the vagina or into the uterus uterus (IUI).

Gamete Intra Fallopian Transfer (GIFT) - Transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce ova. (1x5)

or

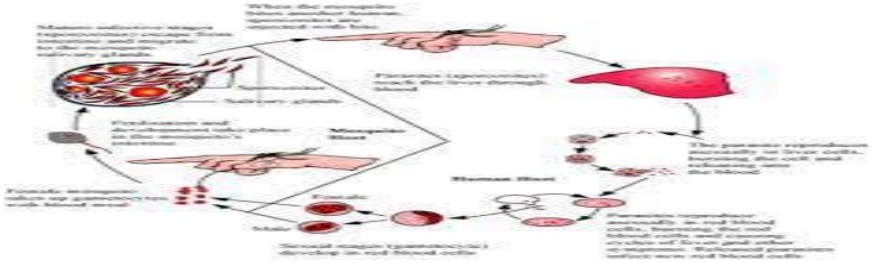
i) Secondary oocytes complete meiosis-II only when a sperm enters into its cytoplasm. It forms a larger cell, the ootid and a small cell, the second polar body

(ii) (a) The secondary oocyte is released by the rupture of the Graafian follicle in the process called ovulation.
(b) It is moved into the Fallopian tube with the help of fimbriae.
(c) It reaches the ampullary-isthmic junction of the Fallopian tube where fertilization takes place.
(d) After fertilization, cleavage starts in the zygote.
(e) Cleavage results in the formation of 2, 4, 8 and 16 daughter cells called blastomeres. The embryo with 8-16 blastomeres is a solid spherical structure called a morula.
(f) Morula continues to divide and blastomeres rearrange themselves as it moves further into the uterus. (1x5)
(g) As a result, blastocyst is formed, which contains trophoblast (outer layer) and inner cell mass.
(h) The trophoblast attaches to endometrium and blastocyst gets embedded in it (implantation)

32.Primary Lymphoid Organs: . Bone marrow and Thymus . Bone Marrow is the main lymphoid organ that actively produces all types of blood cells including lymphocytes. It helps in the development and maturation of T lymphocytes and B lymphocytes. Thymus: is located beneath the breastbone near the heart. T lymphocytes are also produced and nurtured in the thymus. The thymus is large at the time of birth but keeps shrinking with age. Secondary Lymphoid Organ They help the lymphocytes to interact with the antigen and destroy them. Spleen: It is a large bean-shaped organ that contains mainly lymphocytes and phagocytes. It is regarded as the graveyard of RBC. It acts as a filter for blood by trapping blood-borne microorganisms. Lymph Node: They are responsible for trapping the microorganisms and antigens that enter the lymph and tissue fluid. The lymphoid tissues located within major tracts are called mucosa-associated lymphoid tissue (MALT). (1x5)

or

(a) Malaria **(b)** Different species of Plasmodium viz P. vivax, P. Malariae and P. falciparum.**(c)** Malaria is caused by the toxins (hemozoin) produced in the human body by the malarial parasite. This toxin is released by rupturing RBCs.**(d)** Life cycle
(½ x10)



33.They proved that DNA is the hereditary material. Grown bacteriophage in radioactive sulphur and radioactive phosphorus and allowed to infect bacteria. The steps involved are infection. Blending and centrifugation. Consider the diagram from textbook. (2.5+2.5)
(
OR
.Transcripion in prokaryotes- it is a continuous process . occurs in the cytoplasm, only one type of RNA polymerase is used to synthesise RNA. mRNA formed is fully functional Transcription in eukaryotes- Three types of RNA polymerase enzymes are involved in the process. mRNA is known as hnRNA.It undergoes splicing in which introns are removed and subjected to capping and tailing. Methyl guanosine tri phosphate is added at the 5' end and poly adenylation takes place at the 3' end.