

ISC Solved Paper 2022 Semester-1

Biology

Class-XII

(Maximum Marks : 40)

(Time allowed : One and a half hours)

(Candidates are allowed additional 15 minutes for only reading the paper.)

ALL QUESTIONS ARE COMPULSORY

Each question/subpart of a question carries one mark

Select and write the correct option for each of the following question

1. Which one of the following is NOT a part of a transcription unit in DNA?
- (a) The inducer (b) A terminator
(c) A promoter (d) The structural gene
- Ans. Option (a) is correct.**
Explanation:
A transcription unit is a segment of DNA that takes part in transcription. A structural gene, a terminator and a promoter are three main components of transcription unit. According to Molecular biology, the inducer is the molecule that regulates gene expression. It binds to protein repressors or acceptors.
2. The final proof for DNA as the genetic material came from the experiments conducted by:
- (a) Watson and Crick (b) Hershey and Chase
(c) Franklin and Wilkins (d) Har Gobind Khorana
- Ans. Option (b) is correct.**
Explanation:
In 1952, Alfred Hershey and Martha Chase conducted a series of experiments to prove that DNA was the genetic material. Bacteriophages (the viruses that infects bacteria) were the key elements for their experiment.
3. The codons used in chain termination are:
- (a) UAG, UAA, AUG (b) GAT, AAT, AGT
(c) AGT, TAG, UGA (d) UAA, UAG, UGA
- Ans. Option (d) is correct.**
Explanation:
The three chain-termination codons (in messenger RNA) are UAA, UAG and UGA. They are also called stop codons or non-sense codons as they do not code for any amino acid and instead signal the end of protein synthesis.
4. A woman has normal vision, but her father is colour blind . If she marries a colour blind man, then what is the probability of her son being colour blind?
- (a) 25% (b) 50%
(c) 75% (d) 100%
- Ans. Option (a) is correct.**
Explanation:
The woman would be a carrier of the trait, as her father is colour blind. When she marries a man, who is colour blind, the offsprings; 25% carrier daughter, 25% (colour blind daughter), 25% (normal son) and 25% colour blind son.
5. The genotype of a plant showing dominant phenotype can be determined by:
- (a) Test cross (b) Dihybrid cross
(c) Pedigree analysis (d) Back cross
- Ans. Option (a) is correct.**
Explanation:
Test cross is used to determine the genotype of the plant showing the dominant phenotype. Test cross is crossing a plant showing dominant trait with the homozygous recessive genotype.
6. ZZ/ZW type of sex determination is seen in:
- (a) Mammals (b) Insects
(c) *Drosophila* (d) Birds
- Ans Option (d) is correct.**
Explanation:
ZZ/ZW type of sex-determination system is a chromosomal system that determines the sex of offspring in birds. In the ZW system, the ovum determines the sex, in the sex of the offspring. Males are the homogametic sex (ZZ), while females are the heterogametic sex (ZW).
- *7. The lifespan of a rice plant is:
- (a) Four years (b) One month
(c) Four months (d) One year

*8. Which of the following organisms is a seasonal breeder?

- (a) Frog (b) Man
(c) Ape (d) Mice

9. How many pollen grains will be formed after meiotic division in 25 microspore mother cells?

- (a) 25 (b) 50
(c) 100 (d) 200

Ans. Option (c) is correct.

Explanation:

After one meiotic division, a pollen mother cell give rise to four microspores that develop into four pollen grains. Thus, after meiotic division in 25 microspore mother cells, 100 pollen grains will be formed i.e., $(25 \times 4 = 100)$.

10. If the root cells of an angiosperm have 38 chromosomes, then the number of chromosomes in the primary endosperm nucleus of this plant will be:

- (a) 57 (b) 38
(c) 19 (d) 76

Ans. Option (a) is correct.

Explanation:

Angiospermic plants are diploid in nature.

$$2n = 38$$

$$\therefore n = \frac{38}{2} = 19 \text{ (gametes)}$$

Primary endosperm nucleus (PEN) → Triple fusion.

$$= 1 \text{ male gamete} + 2 \text{ polar nuclei.}$$

$$= 3n = 19 \times 3 = 57$$

Thus, the number of chromosomes in the primary endosperm nucleus of this plant is 57.

11. The main constituent of the intine layer of the pollen grain is:

- (a) Sporopollenin (b) Pectocellulose
(c) Lignin (d) Lignification

Ans. Option (b) is correct.

Explanation:

Pollen grain is covered with two layers. The main constituent of the intine layer or inner layer is a thin and continuous layer, which is made up of cellulose or hemicellulose and pectin. The outer layer is made up of sporopollenin.

12. The transparent non-cellular layer of the ovum is called:

- (a) Zona pellucida (b) Theca externa
(c) Corona radiata (d) Granulosa layer

Ans. Option (a) is correct.

Explanation:

Zona pellucida is a transparent non-cellular layer of the ovum. It is a glycoprotein layer surrounding the plasma membrane of mammalian oocytes. The Zona pellucida is important for oocyte growth and fertilization.

13. What is the difference between spermiogenesis and spermiation?

- (a) In spermiogenesis, spermatids are formed; while in spermiation, spermatozoa are formed.
(b) In spermiogenesis, spermatozoa are formed; while in spermiation, spermatids are formed.
(c) In spermiogenesis, spermatozoa are released from sertoli cells; while in spermiation, spermatozoa are formed.
(d) In spermiogenesis spermatozoa are formed; while in spermiation, spermatozoa are released from the sertoli cells.

Ans. Option (d) is correct.

Explanation:

Spermiogenesis is the stage of spermatogenesis. It involves the maturation of the spermatids into spermatozoa. Spermiation, on the other hand is the release of mature spermatids from Sertoli cells.

14. The technique used to detect the genetic defects in the developing embryo is:

- (a) GIFT (b) Amniocentesis
(c) ICSI (d) MTP

Ans. Option (b) is correct.

Explanation:

Amniocentesis is a procedure in which small amount of the amniotic fluid (the fluid, that surrounds the developing embryo) is taken out for testing genetic disorders and open neural tube defects (ONTDs), etc.

GIFT -Gamete Intrafallopian Transfer

ICSI -Intracytoplasmic Sperm Injection

MTP -Medical Termination of Pregnancy.

15. Which of the following is a physical contraceptive device?

- (a) LNG-2 (b) Saheli
(c) i-pill (d) Cervical cap

Ans. Option (d) is correct.

Explanation:

Cervical cap is a physical contraceptive device. LNG-20 is hormone releasing Intra Uterine Device. Saheli is an oral contraceptive. i-pill is emergency contraceptive pill.

16. A patient brought to a hospital with myocardial infarction is immediately administered:

- (a) Penicillin (b) Cyclosporine-A
(c) Statins (d) Streptokinase

Ans. Option (d) is correct.

Explanation:

Myocardial infarction is also known as heart attack. A heart attack usually occurs when a blood clot blocks blood flow to the heart. Streptokinase, an enzyme, which function as clot buster is usually given immediately to a patient with myocardial infarction. It helps in clearing blood clots inside the blood vessels through the dissolution of intravascular fibrin.

17. Which of the following is NOT used as a biocontrol agent for plant diseases?

- (a) Baculovirus (b) Dragon fly
(c) *Bacillus thuringiensis* (d) *Trichoderma*

Ans. Option (b) is correct.

Explanation:

Dragonflies are very good biocontrol agents of mosquitoes; they do not produce any chemicals like others in controlling the plant diseases, so they are not helpful.

18. In the Hardy-Weinberg equation, the frequency of heterozygous individuals is represented by:

- (a) p^2 (b) q^2
(c) $2pq$ (d) pq

Ans. Option (c) is correct.

Explanation:

In the Hardy-Weinberg equation the frequency q heterozygous individual is represented by $2pq$. The Hardy-Weinberg equation is represented as: $p^2 + 2pq + q^2 = 1$.

p & q are the individuals allele frequencies.

p^2 = frequency of homozygous condition represented by p .

q^2 = frequency of homozygous alleles represented by q .

$2pq$ = frequency of heterozygous condition.

19. Genetic drift operates in a:

- (a) small isolated population.
(b) large isolated population.
(c) slow-reproducing population.
(d) morphologically similar population.

Ans. Option (a) is correct.

Explanation:

Genetic drift is a random fluctuations in the numbers of gene variants in a population. It occurs

in very small population. Genetic drift decreases genetic diversity.

20. Which of the following is not a vestigial organ of human beings?

- (a) Muscles of ear pinna
(b) Nictitating membrane
(c) Vermiform appendix
(d) Eyelids

Ans. Option (b) is correct.

Explanation:

Vestigial organs are those organs which were functional in our ancestors, but in the course of evolution, they have lost their original function. Eyelids are not vestigial organs as they cover and protect our eyes.

21. The abbreviation hnRNA stands for:

- (a) Heterogeneous nuclear Ribose nucleic acid
(b) Heterogeneous nuclear Ribonucleic acid
(c) Heterogeneous nucleus Ribose nucleic acid
(d) Homogeneous nucleic Ribose nucleic acid

Ans. Option (b) is correct.

Explanation:

hn RNA is the abbreviated form for heterogeneous nuclear ribonucleic acid an extra chromosomal RNA molecule in the nucleus that serve as primary transcript from DNA.

22. The abbreviation IUCD stands for:

- (a) Intra uterine contraceptive device
(b) Inter uterine contraceptive device
(c) Intra uterus contraceptive device
(d) Inter uterus contraceptive device

Ans. Option (a) is correct.

Explanation:

IUCD stands for Intra Uterine Contraceptive Device.

23. Who proposed the recapitulation theory?

- (a) Miller and Urey
(b) Sutton and Boveri
(c) Ernst Haeckel
(d) Oparin and Haldane

Ans. Option (c) is correct.

Explanation:

In 1866, Ernst Haeckel gave biogenetic law, also known as Recapitulation theory, based on the concept of Ontogeny recapitulates phylogeny.

24. The X-chromosome was discovered by:

- (a) Watson and Crick (b) Gregor Mendel
(c) F. Griffith (d) Henking

Ans. Option (d) is correct.

Explanation:

In 1890, Hermann Henking discovered the X-chromosome.

*25. The phase of life cycle of an organism which is characterised by gradual deterioration of vital capacities is called _____ phase.

- (a) Juvenile (b) Vegetative
(c) Senescence (d) Reproductive

26. The compatibility of the pollen-pistil interaction is determined by _____.

- (a) starch (b) special proteins
(c) lipids (d) lactose

Ans. Option (b) is correct.

Explanation:

Pollen-pistil interaction is the process of transfer of pollen grains of one plant to the pistil /stigma of the same or different plant. The compatibility is determined by special proteins.

27. If the Fallopian tubes in the human reproductive system get blocked, the gametes will NOT be transported from:

- (a) Ovary to uterus
(b) Epididymis to vas deferens
(c) Uterus to ovary
(d) Vas deferens to penis

Ans. Option (a) is correct.

Explanation:

Ovary is also known as primary sex organ, which forms female gamete. This female gamete, then enters into the fallopian tube which later open into uterus. Thus, if fallopian tubes are blocked, the gametes will not be transported from ovary to uterus.

28. Morula is a solid ball of _____ blastomeres.

- (a) 100 (b) 16
(c) 90 (d) 64

Ans. Option (b) is correct.

Explanation:

A morula is an early-stage embryo consisting of 16 cells (called blastomeres) in a solid ball contained within the Zona pellucida.

29. Which of the following is the most important component of a contraceptive pill?

- (a) FSH (b) LH
(c) Progesterone (d) Thyroxine

Ans. Option (c) is correct.

Explanation:

The hormones estrogen and progesterone are present in a number of contraceptive pills.

Progesterone disrupts the normal menstrual cycle along with estrogen and inhibits ovulation.

30. A human male with an extra X-chromosome suffers from a condition called:

- (a) Down's syndrome
(b) Haemophilia
(c) Klinefelter's syndrome
(d) Turner's syndrome

Ans. Option (c) is correct.

Explanation:

Klinefelter's syndrome is a sex chromosomal disorder, characterized by an extra X-chromosome in male. This syndrome affects physical and intellectual development.

31. The human genome contains more than _____ nucleotide pairs.

- (a) 6 million (b) 3 billion
(c) 4 million (d) 5 billion

Ans. Option (b) is correct.

Explanation:

The human genome contains more than three billion nucleotide pairs.

32. Gene migration is also called _____.

- (a) Bottle-neck effect
(b) Genetic erosion
(c) Gene flow
(d) Population crash

Ans. Option (c) is correct.

Explanation:

Gene flow is also known as gene migration. It is a transfer of genetic material from one population to another population.

33. Which of the following is used for the production of ethanol from starch at the industrial level?

- (a) *Bacillus thuringiensis*
(b) *Saccharomyces cerevisiae*
(c) *Penicillium notatum*
(d) *Lactobacillus bulgaricus*

Ans. Option (b) is correct.

Explanation:

Saccharomyces cerevisiae is used for the production of ethanol from starch at the industrial level. It is a two step process. In the first step, starch is converted into sugar with the help of an enzyme. In second step, which is a fermentation process, sugar is converted into ethanol.

34. _____ is a mutual association of fungal hyphae with the roots of higher plants.

- (a) Cyanobacteria (b) *Rhizobium*
(c) *Mycorrhiza* (d) *Nostoc*

Ans. Option (c) is correct.

Explanation:

Mycorrhiza is a mutual association of fungal hyphae with the roots of higher plants. In this association, fungus gets shelter and food from plant and in return, they provide absorbed water, dissolved organic debris from soil to the plant.

35. Which of the following statements is NOT true?
- (a) Apomixis is a form of asexual reproduction.
 - (b) Polyembryony is the development of more than one embryo in a seed.
 - (c) Fruits formed without fertilization are called parthenocarpic fruits.
 - (d) Perisperm represents the persistent endosperm.

Ans. Option (d) is correct.

Explanation:

It represents persistent remains of nucellus (of ovule) to the seed. It is the part of a seed.

36. Which of the following options is NOT a feature of the modern synthetic theory of Evolution?
- (a) Genetic variability
 - (b) Natural selection
 - (c) Use and disuse of organs
 - (d) Genetic basis of adaptation

Ans. Option (c) is correct.

Explanation:

Features of the Modern Synthetic Theory of Evolution are:

- (i) Genetic recombination (genetic variability)
- (ii) Mutation
- (iii) Genetic drift, gene flow
- (iv) Natural selection
- (v) Isolation

37. Match column I with column II and select the correct option from the choices given below:

Column I	Column II
(a) Gonorrhoea	(i) HIV
(b) Syphilis	(ii) <i>Neisseria</i>
(c) AIDS	(iii) <i>Treponema</i>
(d) Genital warts	(iv) Human Papilloma virus

- (a) A–(iv), B–(i), C–(iii), D–(ii)
- (b) A–(i), B–(ii), C–(iii), D (iv)
- (c) A–(ii), B–(iii), C–(i), D–(iv)
- (d) A–(iii), B–(ii), C–(iv), D–(i)

Ans. Option (c) is correct.

Explanation:

- (a) *Neisseria gonorrhoeae* is a bacteria.
- (b) The cause of Syphilis is a bacterium *Treponema pallidum*.

- (c) AIDS is caused by HIV virus.
- (d) Genital warts are sexually transmitted infection caused by the human papilloma virus.

38. Match column I with column II and select the correct option from the choices given below:

	Column I		Column II
	Organic acid		Microbial source
(a)	Citric acid	(i)	<i>Acetobacter</i>
(b)	Acetic acid	(ii)	<i>Clostridium</i>
(c)	Butyric acid	(iii)	<i>Aspergillus</i>

- (a) A–(ii), B–(i), C–(iii)
- (b) A–(ii), B–(iii), C–(i)
- (c) A–(iii), B–(ii), C–(i)
- (d) A–(iii), B–(i), C–(ii)

Ans. Option (d) is correct.

Explanation:

- Citric acid is obtained from *Aspergillus niger*.
- *Acetobacter*, is responsible for the production of acetic acid.
- *Clostridium*, helps in the production of butyric acid.

- *39. Which of the following animals does not have oestrous cycle?

- (a) Sheep
- (b) Tigers
- (c) Dogs
- (d) Apes

40. Choose the odd one among the following with reference to microbes as biofertilizers.

- (a) Lady bird beetles
- (b) *Azotobacter*
- (c) *Azospirillum*
- (d) *Rhizobium*

Ans. Option (a) is correct.

Explanation:

Lady bird beetles is a predator of aphids, so can be categorized under pest control, while rest are biofertilisers.

41. Assertion : In sickle cell anaemia, the codon GAG is replaced by GUG.

Reason : The gene for the above mutation occurs on the Y-chromosome.

- (a) Both assertion and reason are true, and reason is the correct explanation of the assertion.
- (b) Both assertion and reason are true, but reason is not the correct explanation of assertion.
- (c) Assertion is true but reason is false.
- (d) Both assertion and reason are false.

Ans. Option (c) is correct.

Explanation:

Sickle cell anaemia is caused by a point mutation in the β -globin of haemoglobin.

42. **Assertion :** Testes and ovaries are primary sex organs.

Reason : Facial hair, development of chest, deepening of voice are secondary sexual organs in the female.

- (a) Both assertion and reason are true, and reason is the correct explanation of the assertion.
- (b) Both assertion and reason are true, but reason is not the correct explanation of assertion.
- (c) Assertion is true but reason is false.
- (d) Both assertion and reason are false.

Ans. Option (c) is correct.

Explanation:

Testes and ovaries are primary sex organs in humans. The other organs, ducts and glands (i.e., Vagina, uterus, fallopian tubes, etc.) in the reproductive system of a female are considered as secondary sexual organs.

43. **Assertion :** The first cell of the suspensor towards the micropyle, in a dicot embryo becomes swollen to form the haustorium.

Reason : The haustorium absorbs food material for the developing embryo.

Ans. Option (c) is correct.

Explanation:

The first cell of the suspensor towards the micropylar end becomes swollen and function as haustorium. The function of the suspensor is to anchor the embryo to the embryo sac and push it deep into the endosperm, so that, the embryo lies in a nutritionally favourable environment.

44. **Assertion :** Nucleosome consists of a strand of DNA coiled around a core of histone proteins.

Reason : The histone proteins forming the core of nucleosome are of four major types, viz., H1, H2, H3 and H4.

Ans. Option (a) is correct.

Explanation:

A nucleosome is the basic repeating unit of eukaryotic chromatin. A single nucleosome comprises of about 150 base pairs of DNA, that are wrapped around a core of four types of histone proteins, viz., H1, H2, H3, and H4.

45. **Assertion :** Genome similarity and universal genetic code are example of molecular (genetic) evidences of evolution.

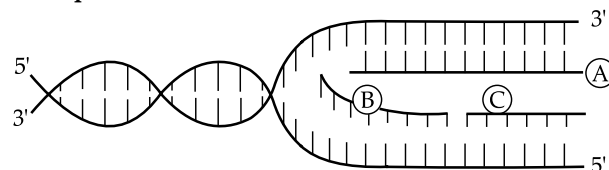
Reason : Molecular evidences are based on fossils found under the earth's strata.

Ans. Option (b) is correct.

Explanation:

Molecular (genetic) evidences of evolution shows that, all living organisms share fundamental molecules which are essential for life. They depict, how closely two species are related. Fossils, help in reconstructing the evolutionary histories of present-day species.

46. **Study the diagram given below and answer the questions that follow:**



- (i) **Identify the part labelled as 'A':**
 - (a) Leading strand
 - (b) Lagging strand
 - (c) DNA template
 - (d) RNA template
- (ii) **The enzyme which joins the small fragments of newly synthesized DNA on the 5' → 3' template strand is:**
 - (a) Helicase
 - (b) Topoisomerase
 - (c) DNA ligase
 - (d) RNA polymerase
- (iii) **The overall process of DNA replication is:**
 - (a) Continuous
 - (b) Lagging
 - (c) Discontinuous
 - (d) Semi-discontinuous
- (iv) **The alphabets 'B' and 'C' represent:**
 - (a) mRNA
 - (b) RNA primer
 - (c) Okazaki fragments
 - (d) Single strand binding protein
- (v) **The role of the enzyme DNA polymerase is to:**
 - (a) unwind DNA helix
 - (b) synthesis mRNA
 - (c) cause the polymerisation of the complementary daughter strand
 - (d) synthesis RNA primer

Ans. (i) Option (a) is correct.

Explanation:

The part labelled as 'A' is leading strand.

(ii) Option (c) is correct.

Explanation:

DNA ligase enzyme, helps in joining the small fragments of newly synthesized DNA on the 5'→3' template strand.

(iii) Option (d) is correct.

Explanation:

The overall process of DNA replication is considered as semi-discontinuous because replication occurs continuously on one strand and discontinuously on the other strand.

(iv) Option (c) is correct.

Explanation:

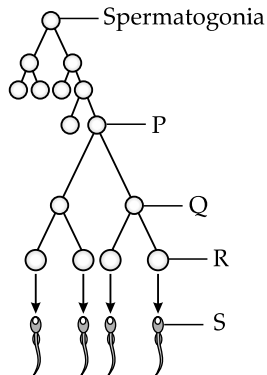
The alphabet 'B' and 'C' represents Okazaki fragments.

(v) Option (c) is correct.

Explanation:

The enzyme DNA polymerase is responsible for the process of DNA replication. Thus, it cause the polymerisation of the complementary daughter strand.

47. Study the diagram given below and answer the questions that follow:



(i) During the multiplication phase, the sperm mother cells divide mitotically and form:

- (a) Spermatogonia
- (b) Secondary spermatocytes
- (c) Spermatids
- (d) Spermatozoa

(ii) The role of gonadotropin releasing hormone is to stimulate the production of:

- (a) Progesterone
- (b) Inhibin
- (c) FSH and LH
- (d) Estrogen

(iii) Choose the correct labels for the structures marked 'P' and 'R' from the options given below:

- (a) P-primary spermatocytes, R-secondary spermatocytes
- (b) P-primary spermatocytes, R-spermatids
- (c) P-secondary spermatocytes, R-primary spermatocytes
- (d) P-spermatids, R-spermatozoa

(iv) The energy for the movement of the sperm tail comes from the:

- (a) Mitochondria
- (b) Acrosome
- (c) Centriole
- (d) Nucleus

(v) When does Spermatogenesis start in human beings?

- (a) At birth
- (b) At the onset of puberty
- (c) During embryonic development
- (d) Between 10-12 years

Ans. (i) Option (b) is correct.

Explanation:

During the multiplication phase, the sperm mother cells divide mitotically and form primary spermatocyte, which get transformed into secondary spermatocyte.

(ii) Option (c) is correct.

Explanation:

The role of gonadotropin releasing hormone is to stimulate the production of Luteinising hormone (LH) and Follicle stimulating hormone (FSH).

(iii) Option (b) is correct.

Explanation:

P is primary spermatocyte. The spermatogonia multiply mitotically and increase in number. Some of the spermatogonia are called primary spermatocyte, they periodically undergo meiosis. R is spermatid.

(iv) Option (a) is correct.

Explanation:

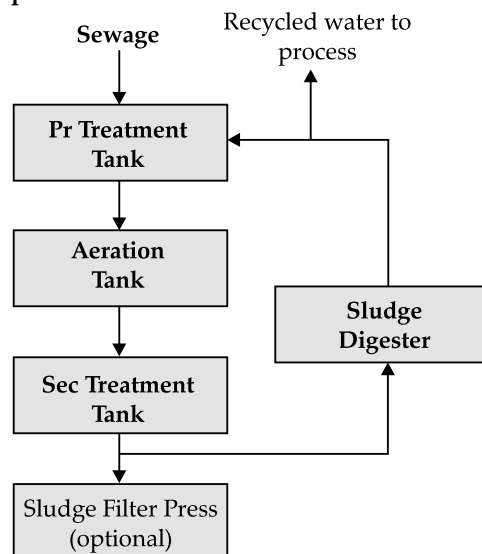
The middle piece of the sperm possess mitochondria, which produce energy for the movement of tail.

(v) Option (b) is correct.

Explanation:

Spermatogenesis start in human beings at the onset of puberty, when level of testosterone rises in human male.

48. Study the diagram given below and answer the questions that follow:



- (i) **Sewage is defined as:**
- Municipal solid waste
 - Municipal waste water
 - Non-biodegradable waste
 - Biodegradable plastic waste
- (ii) **The primary treatment of waste involves:**
- mechanical removal of grit
 - chlorination
 - addition of microbes
 - removal of harmful colours
- (iii) **As a part of secondary treatment, flocs are added. What are these flocs?**
- Masses of specific chemicals to treat the waste.
 - Pieces of spongy material to absorb the waste.
 - Masses of bacteria associated with fungal filaments.
 - Biodegradable masses trapped in mesh-like structures.
- (iv) **What is the effect of the process of sewage treatment on the value of the BOD?**
- Increases
 - Decreases
 - Remains unaffected
 - Becomes unstable
- (v) **A major part of the sludge is pumped into large sludge digester tanks where a mixture of gases is produced. The main component of this gaseous mixture is:**
- Carbon dioxide
 - Hydrogen
 - Hydrogen sulphide
 - Methane

Ans. (i) **Option (b) is correct.**

Explanation:

Sewage is a waste water material from domestic, industrial workplace. It contains 99% water, rest is solid material, ions and harmful bacteria.

(ii) **Option (a) is correct.**

Explanation:

The primary treatment involves removal of large matter from wastewater. Solids are allowed to settle and thus removed.

(iii) **Option (c) is correct.**

Explanation:

Flocs are the semi-decayed masses of bacteria surrounded by slime moulds.

(iv) **Option (a) is correct.**

Explanation:

When sewage is discharged into water body, the bacteria present in the water body start decomposing the organic matter present in sewage. Thus, large amount of dissolved oxygen is used up, which result in the increase of BOD.

(v) **Option (d) is correct.**

Explanation:

About 60-70% of methane gas is produced when the sludge is pumped into large sludge digester tanks.

49. **Read the passage given below and answer the questions that follow:**

World's first test-tube baby was born on 25th July 1978. Since then, IVF has become a common procedure worldwide; that has allowed more infertile couples to have their own genetic babies.

(i) **IVF is a type of:**

- Assisted reproductive technology
- Assistance reproduction technology
- Assisted reproduced technology
- Assistant reproductive tool

(ii) **The IVF technique involves which one of the following procedures?**

- Placing the sperms directly into the uterus.
- Introducing the sperms into the Fallopian tube.
- Fertilization of the ovum with sperms in a petri dish.
- Placing the sperms in the vagina.

(iii) **The technique of transfer of the embryo into the female reproductive system at the 8-celled stage is called:**

- ZIFT
- GIFT
- AI
- IUI

(iv) **One of the most common causes of infertility in females is:**

- Irregular or no ovulation
- Ejaculation defect
- Cryptorchidism
- Oligospermia

(v) Which of the following statements is NOT true with respect to MTP?

- (a) It is the premature termination of pregnancy
- (b) MTP is safe up to 12 weeks of pregnancy
- (c) It is done to terminate unwanted pregnancy
- (d) It does not need hospitalisation

Ans. (i) Option (a) is correct.

Explanation:

IVF (*In-Vitro* Fertilization) is a form of assisted reproductive technology (ART).

(ii) Option (c) is correct.

Explanation:

In IVF technique, fertilization of male and female gamete takes place outside the body in almost similar condition as that in the body, which is later followed by embryo transfer(ET).

(iii) Option (a) is correct.

Explanation:

ZIFT(Zygote Intra Fallopian Transfer) is a technique in which fertilization between oocyte and sperms takes place outside the body, i.e., In vitro. Early embryo with more than 8 blastomeres are transferred to the fallopian tube.

(iv) Option (a) is correct.

Explanation:

Abnormal menstrual cycle, irregular or no ovulation, obesity, structural problems (problems with the fallopian tubes, uterus or ovaries) etc., are some of the common causes of infertility in females.

(v) Option (d) is correct.

Explanation:

MTP (Medical termination of pregnancy), is a procedure of terminating pregnancy using medicines, or by surgical method. Thus, it requires hospitalization.

50. Read the passage given below and answer the questions that follow:

Analysis of the pattern of inheritance of a particular trait through several generations of a family is called Pedigree analysis. A graphic representation of the same is called a pedigree chart. It may be used to guess the probability of a child inheriting the trait under study. Pedigree chart is drawn by using a standard set of symbols.

(i) The symbols of parents are represented by:

- (a) A symbol of a square and a circle joined by a horizontal line.
- (b) A symbol of two circles joined by a horizontal line.
- (c) A symbol of two squares joined by a horizontal line.

(d) A symbol of a square and a circle joined by a vertical line.

(ii) A trait which rarely appears in a family's pedigree chart across four consecutive generations is considered as a:

- (a) Dominant trait
- (b) Recessive trait
- (c) Sex-linked trait
- (d) Homozygous trait

(iii) In a pedigree chart, if a trait shows criss-cross pattern of inheritance, then it is:

- (a) An autosomal dominant trait
- (b) An autosomal recessive trait
- (c) An X-linked dominant trait
- (d) An X-linked recessive trait

(iv) The traits that do not skip generations and are expressed in the next generation in both the sexes equally are said to be:

- (a) Autosomal dominant
- (b) Autosomal recessive
- (c) Sex-linked dominant
- (d) Sex-linked recessive

(v) Phenylketonuria is an example of:

- (a) Autosomal dominant trait
- (b) Autosomal recessive trait
- (c) Sex-linked recessive trait
- (d) Sex-linked dominant trait

Ans. (i) Option (a) is correct.

Explanation:

Square stands for male and circle represents female. A symbol of a square and a circle joined by a horizontal line show their marriage.

(ii) Option (b) is correct.

Explanation:

Any recessive trait can skip generations.

(iii) Option (d) is correct.

Explanation:

In a pedigree chart, criss-cross inheritance is also known as skip generation inheritance i.e., the character is inherited to the second generation through the carrier of first generation.

(iv) Option (a) is correct.

Explanation:

Autosomal dominant traits cannot skip generations, as they require the inheritance of one dominant allele to express the phenotype of the disorder.

(v) Option (b) is correct.

Explanation:

Phenylketonuria (PKU) is an autosomal recessive metabolic genetic disorder.