PUDUKKOTTAI

QUARTERLY EXAMINATION - 2022 | Exam No.

Time: 3-00 Hrs. **XII - ZOOLOGY** Marks : 70

PART - I

Note: *i) Answer all the questions.*

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer. *(15x1=15)*

1. The mode of reproduction in bacteria is by
   a) formation of gametes b) endospore formation
   c) conjugation d) zoospore formation
2. The mature sperms are stored in the
   a) seminiferous tubulas b) vas deferens
   c) epididymis d) seminal vesicle
3. Mammalian egg is
   a) mesolecithal and non cleidoic b) microlecitnal and non cleidoic
   c) alecitnal and non cleidoic d) alecithal and cleidoic
4. Which one of the following is secreted abundantly by corpus luteum?
   a) oestrogen b) progesterone
   c) hyaluroxidase d) luteinizing hormone
5. Which one of the following sexually transmited disease is transmited by bacteria
   a) genital herpes b) hepatitis-B
   c) candidiasis d) gonorrhoea
6. Which one of the following phenotypes is not possible in the progeny of the parental genotypic combination $I^AI^O \times I^AI^B$?
   a) AB b) O c) A d) B
7. Co-dominant blood group is
   a) A b) AB c) B d) O
8. A mRNA molecule is produced by
   a) replication b) transcription
   c) duplication d) translation
9. An operon is a
   a) protein that suppresses gene expression
   b) protein that accelerates gene expression
   c) cluster of structural genes with related function
   d) gene that switched other genes on or off
10. The golden age of reptiles was
    a) mesozoic era b) cenozoic era
    c) paleozoic era d) proterozoic era
11. Who proposed the Germplasm theory?
    a) Darwin b) August Weismann
    c) Lamark d) Alfred Wallace
12. The Athlete's food disease in human is caused by
    a) bacteria b) fungi c) virus d) protozoan
13. Paratope is an
    a) antibody binding site on variable regions
    b) antibody binding site on heavy regions
    c) antigen binding site on variable regions

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14. Which one of the following pair is correctly matched for the product produced by them
    a) Acetobacterium aceti - antibiotic
    b) methanobacterium - lactic acid
    c) penicilium notatum - acetic acid
    d) sacchro saccharomyces cerevisiae - ethonal
15. Darwin's finches are an excellent example of
    a) connecting links b) seasonal migration
    c) adaptive radiation d) parasitism

PART - II

Note: Answer any six of the following. Question No.24 is compulsory. ***(6x2=12)***

16. Which type of reproduction is effective ? Why?
17. What is inhibin? State its function.
18. Differentiate foeticide and infanticide.
19. Write some of the symptoms of Down's Syndrome.
20. Name the anticodons required to recognise the following codons.
    a) CGA b) UAU
21. What are vestigial organs? Give example.
22. Define - Haematopoiesis.
23. Explain Mayer Rokitansky.
24. Explain - Why it is not possible to produce vaccine against common cold.

PART - III

Note: Answer any six of the following. Question No.33 is compulsory. ***(6x3=18)***

25. Draw and labeled sketch of Human Sperm.
26. Mention the importance of the position of the testes in humans.
27. What is Regeneration? Mention its kinds.
28. What is colostrum? Writes its significances.
29. What is amniocentesis? Why a statutory ban is imposed on this technique?
30. Differentiate between - GIFT, ZIFT
31. What is Criss-Cross inheritance?
32. Differentiate - Leading strand and lagging strand.
33. Mention the main objections to Darwinism.

PART - IV

Note. Answer all the questions. ***(5x5=25)***

34. (a) What is parthenogenesis? Explain its types.

    (OR)

    (b) Explain spermatogenesis - Oogenesis with suitable diagram.
35. (a) How is sex determined in human beings.

    (OR)

    (b) Write about the applications of DNA finger printing.
36. (a) Explain in detail about Autosomal aneuploidy and Allosomal abnormalities in human beings.

    (OR)

    (b) Draw and explain - Immunoglobulin.
37. (a) List the common withdrawl symptoms of drugs and alcohol abuse.

    (OR)

    (b) Give short notes.
    a) Pasteur effect b) Brewer's Yeast c) Bio remediation
38. (a) Explain the Urey-Miller's experiment on origin of life.

    (OR)

    (b) Write any 5 causes of infertility.

HIGHER SECONDARY SECOND YEAR – QUARTERLY EXAMINATION SEPTEMBER - 2022

PUDUKKOTTAI DISTRICT.

TENTATIVE SCORING KEY

(DISCLAIMER – This key is meant for students reference only and not for evaluation purpose)

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SUBJECT: ZOOLOGY **CLASS: 12**

Q.NO	PART-I		15 x 1 = 15
1	C	Conjugation	1
2	C	Epididymis	1
3	C	Alecithal and non cleidoic	1
4	B	Progesterone	1
5	D	Gonorrhoea	1
6	B	O	1
7	B	AB	1
8	B	Transcription	1
9	C	Cluster of genes with related functions	1
10	A	Mesozoic era	1
11	B	August weismann	1
12	B	Fungi	1
13	C	Antigen binding site on variable region	1
14	D	*Saccharomyces cerevisiae* – Ethanol	1
15	C	Adaptive radiation	1

PART-II 6 x 2 = 12

Answer any six of the following questions. Q.NO : 24 is compulsory

16

Which type of reproduction is effective? Why.

1. Sexual reproduction --- **1 Mark**
2. It introduces variations in organisms, which are essential for adaptation and evolution of their own kind. --- **1 Mark**

17

Inhibin:

1. Sertoli cells secrete **inhibin**, a hormone. --- **1 Mark**
2. It is involved in the negative feedback control of sperm production. --- **1 Mark**

18

Female foeticide and infanticide

1. **Female foeticide:** 'aborting the female in the mother's womb'. --- **1 Mark**
2. Female **infanticide:** 'killing the female child after her birth'. --- **1 Mark**

19

Symptoms of Down's Syndrome: **Any four 4 x ½ = 2**

1. It is characterized by severe mental retardation,
2. defective development of the central nervous system,
3. increased separation between the eyes,
4. flattened nose,
5. ears are malformed,
6. mouth is constantly open and
7. Tongue protrudes.

20

Anticodon:

1. CGA – GCU --- **1 Mark**
2. UAU – ATA --- **1 Mark**

21

Vestigial organs:

1. Structures that are of no use to the possessor, --- **½ Mark**
2. Not necessary for their existence. --- **½ Mark**
3. vermiform appendix, include coccyx, wisdom teeth, ear muscles, body hair, mammae in male, nictitating membrane of the eye, etc., **(Any one example)** --- **½ Mark**

22

Haematopoiesis:

1. The process of production of blood cells in the bone marrow. --- **2 Mark**

23

Mayer-Rokitansky syndrome:

2. All women are born with ovaries, --- **1 Mark**
3. but some do not have functional uterus. --- **1 Mark**

24

Difficult to prepare vaccine for common cold:

1. Common cold caused by 150 Strains of Rhino virus
2. RNA genome keep changing due to mutation

PART-III

Answer any six questions - question no – 33. is compulsory **6 x 3 = 18**

25

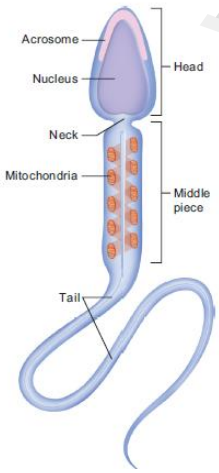


Diagram – 2 Mark

Parts – 1 Mark

26	**Importance of the position of testes:** 1. The scrotum is a sac of skin that hangs outside the abdominal cavity. **--- ½ Mark** 2. Since viable sperms cannot be produced at normal body temperature. **--- ½ Mark** 3. The scrotum is placed outside the abdominal cavity to provide a temperature 2-3^{o}C lower than the normal internal body temperature. **--- 1 Mark** 4. Thus, the scrotum acts as a **thermoregulator** for spermatogenesis. **--- 1 Mark**
27	**Regeneration:** 1. Regeneration is regrowth in the injured region. **--- ½ Mark** 2. Two types, **morphallaxis** and **epimorphosis**. **--- ½ Mark** 3. Morphallaxis: The whole body grows from a small fragment. e.g. *Hydra* and *Planaria*. **--- ½ Mark** 4. **Epimorphosis:** The replacement of lost body parts. **--- ½ Mark** 5. It is of two types, namely **reparative** and **restorative** regeneration. 6. Reparative regeneration: only certain damaged tissue can be regenerated, **--- ½ Mark** 7. Restorative: Regeneration severed body parts can develop. e.g. star fish, tail of wall lizard **--- ½ Mark**
28	**Colostrum:** 1. The mammary glands secrete a yellowish fluid called **colostrum** during the initial few days after parturition. **--- 1 Mark** 2. It has less lactose than milk and almost no fat, but it contains more proteins, vitamin A and minerals. **--- ½ Mark** 3. Colostrum is also rich in **IgA** antibodies. This helps to protect the infant's digestive tract against bacterial infection. **--- ½ Mark** 4. Breast milk is the ideal food for infants as it contains all the constituents in suitable concentration and is easily digestible. **--- ½ Mark** 5. It is fully sufficient till about 6 months of age and all infants must be breast fed by the mother to ensure the growth of a healthy baby. **--- ½ Mark**
29	Amniocentesis 1. Amniocentesis is a prenatal technique used to detect any chromosomal abnormalities in the foetus. **-- 1 ½ Mark** 2. It is being often misused to determine the sex of the foetus. **--- ½ Mark** 3. There may be a chance of female foeticide. **--- ½ Mark** 4. Hence, a statutory ban on amniocentesis is imposed. **--- ½ Mark**
30	**Zygote intra-fallopian transfer (ZIFT)** **-- 1 ½ Mark** 1. As in IVF, the zygote upto 8 blastomere stage is transferred to the fallopian tube by laparoscopy. 2. The zygote continues its natural divisions and migrates towards the uterus where it gets implanted. **Gamete intra-fallopian transfer (GIFT)** **-- 1 ½ Mark** **1.** Transfer of an ovum collected from a donor into the fallopian tube. **2.** In this the eggs are collected from the ovaries and placed with the sperms in one of the fallopian tubes. **3.** The zygote travels toward the uterus and gets implanted in the inner lining of the uterus.
31	criss-cross pattern of inheritance: **1.** A trait is inherited from the male parent to his grandson through carrier daughter. **-- 2 Mark** **2.** Ex:Hemophilia and Colour blind ness **--- ½ + ½ Mark**
32	**leading strand and lagging strand** **1.** During replication of DNA, in one strand (template strand with polarity 3' 5') the replication is continuous and is known as the **leading strand.** **-- 1 ½ Mark** **2.** In the other strand (coding strand with polarity 5' 3') replication is discontinuous, known as the **lagging strand.** **-- 1 ½ Mark**

33

Objections of Darwinism: **Any three: 3 x 1 = 3**

1. Darwin failed to explain the mechanism of variation.
2. Darwinism explains the survival of the fittest but not the arrival of the fittest.
3. He focused on small fluctuating variations that are mostly non-heritable.
4. He did not distinguish between somatic and germinal variations.
5. He could not explain the occurrence of vestigial organs, over specialization of some organs like large tusks in extinct mammoths, oversized antlers in the extinct Irish deer, etc.,

Part – IV – Answer all the Questions: **5 x 5 = 25**

34 .A

Parthenogenesis. **--- ½ Mark**

- Development of an egg into a complete individual without fertilization.
- It was first discovered by Charles Bonnet in 1745.

Types of partheneogenesis: **--- ½ Mark**

- Natural Parthenogenesis and artificial Parthenogenesis.
- In certain animals, parthenogenesis occurs regularly, constantly and naturally in their life cycle and is known as natural parthenogenesis.

Natural parthenogenesis may be of two types:

- Complete and incomplete.

Complete parthenogenesis: **--- ½ Mark**

- It is the only form of reproduction in certain animals.
- There is no biparental sexual reproduction.
- These are no male organisms and so, such individuals are represented by female only.

Incomplete parthenogenesis **--- ½ Mark**

- It is found in some animals in which both sexual reproduction and parthenogenesis occurs.
- E.g. In honeybees;
- fertilized eggs (zygotes) develop into queen and workers, **--- ½ Mark**
- Unfertilized eggs develop into drones (male).

Paedogenetic parthenogenesis: **--- ½ Mark**

- Paedogenesis. The larvae produce a new generation of larvae by parthenogenesis.
- It occurs in the sporocysts and Redia larvae of liver fluke. **--- ½ Mark**
- It is also seen in the larvae of some insects. E.g. Gall fly. **--- ½ Mark**

Artificial parthenogenesis: **--- ½ Mark**

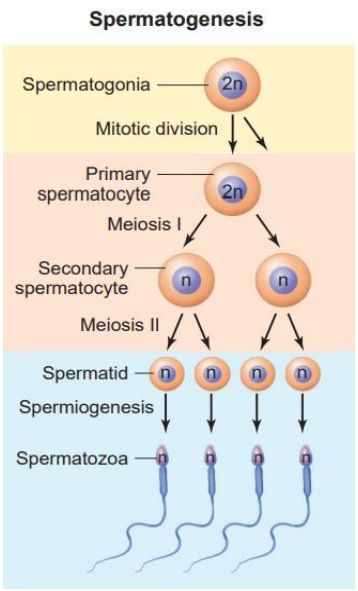
- The unfertilized egg (ovum) is induced to develop into a complete individual by physical or chemical stimuli.
- E.g. Annelid and sea urchin eggs. **--- ½ Mark**

OR

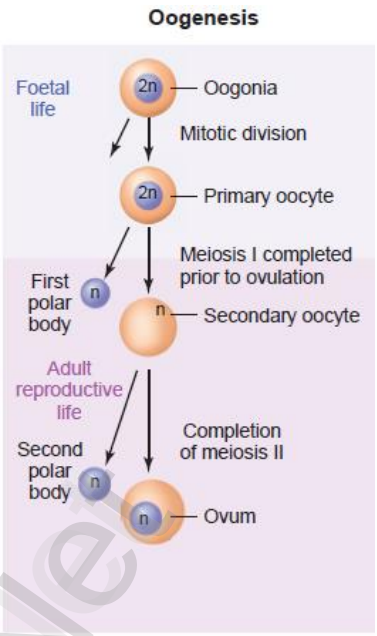
34. B

Spermatogenesis:

1. Spermatogenesis is the sequence of events in the seminiferous tubules of the testes that produce the male gametes, the sperms.
2. In the first stage of spermatogenesis, the spermatogonia migrate among sertoli cells towards the central lumen of the seminiferous tubule and become modified and enlarged to form primary spermatocytes which are diploid with 23 pairs i.e., 46 chromosomes.
3. Some of the primary spermatocytes undergo first meiotic division to form two secondary spermatocytes which are haploid with 23 chromosomes each.
4. The secondary spermatocytes undergo second meiotic division to produce four haploid spermatids.
5. **Spermiogenesis**: The spermatids are transformed into mature **spermatozoa (sperms).**
6. **spermiation**: Sperms are finally released into the cavity of seminiferous tubules.



Oogenesis:



1. Oogenesis: Development of the female gamete or ovum or egg in the ovaries.
2. The oogonial cells start dividing and enter into Prophase I of meiotic division I to form the **primary oocytes** which are temporarily arrested at this stage.
3. The primary oocytes then get surrounded by a single layer of granulosa cells to form the primordial or **primary follicles.**
4. The primary follicle gets surrounded by many layers of granulosa cells and a new theca layer to form the **secondary follicle**.
5. A fluid filled space, the antrum develops in the follicle and gets transformed into a **tertiary follicle**.
6. At this time, the primary oocyte within the tertiary follicle grows in size and completes its first meiotic division and forms the **secondary oocyte**.
7. It is an unequal division resulting in the formation of a large haploid secondary oocyte and a first polar body. The first polar body disintegrates.
8. During fertilisation, the secondary oocyte undergoes second meiotic division and produces a large cell, the **ovum** and a second polar body. The second polar body also degenerates.
9. The tertiary follicle eventually becomes a mature follicle or **Graafian follicle**. If fertilisation does not take place, second meiotic division is never completed and the egg disintegrates.
10. At the end of gametogenesis in females, each primary oocyte gives rise to only one haploid ovum.

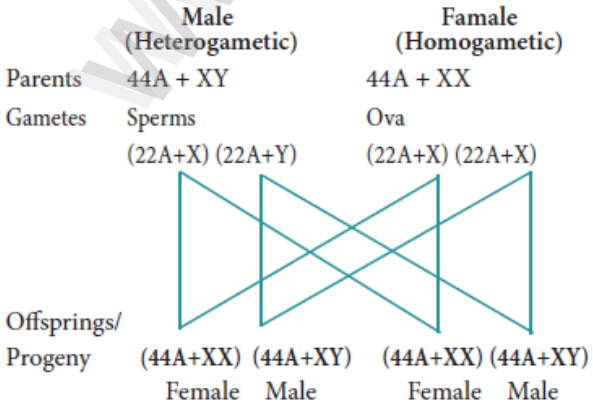
- **Spermatogenesis – 1 ½ - Mark**
- **Diagram - 1 - Mark**
- **Oogenesis – 1 ½ - Mark**
- **Diagram – ½ - Mark**

35. A

Sex determintion in human beings: **6 x ½ = 3**

1. Genes determining sex in human beings are located on two sex chromosomes, called allosomes.
2. In mammals, sex determination is associated with chromosomal differences between the two sexes, typically XX females and XY males.
3. 23 pairs of human chromosomes include 22 pairs of autosomes (44A) and one pair of sex chromosomes (XX or XY).
4. Females are homogametic producing only one type of gametes (egg), each containing one X chromosome
5. The males are heterogametic producing two types of sperms with X and Y chromosomes.
6. An independently evolved XX: XY system of sex chromosomes also exist in *Drosophila.*

Diagram – 2 Mark



OR

35. B

Application of DNA finger printing :

1. **Forensic analysis** - It can be used in the identification of a person involved in criminal activities, for settling paternity or maternity disputes, and in determining relationships for immigration purposes. **--- 2 Mark**
2. **Pedigree analysis** – inheritance pattern of genes through generations and for detecting inherited diseases. **--- 1 Mark**
3. **Conservation of wild life** – protection of endangered species. By maintaining DNA records for identification of tissues of the dead endangered organisms. **--- 1 Mark**
4. **Anthropological studies**–It is useful in determining the origin and migration of human populations and genetic diversities. **--- 1 Mark**

36. A

Autosomal abnormalities:

	Trisomy – 13	Trisomy – 21
1	✓ Patau's Syndrome **- ½ Mark**	✓ Downs's syndrome - **- ½ Mark**
2	✓ Meiotic non disjunction causes this chromosomal abnormality. - **- ½ Mark**	✓ Caused by abnormal cell division during the development of the sperm cell or the egg cell. - **- ½ Mark**
3	✓ Characterized by multiple and severe body malformations and profound mental deficiency.	✓ Ears are malformed, mouth is constantly open and the tongue protrudes
	Symptoms - - ½ Mark	**Symptoms - - ½ Mark**
4	✓ Small head with small eyes	✓ Increased separation between the eyes
5	✓ Cleft palate	✓ Flattened nose.
6	✓ Malformation of the brain and internal organs.	✓ Defective development of the central nervous system,

Allosomal abnormalities:

	XXY Males	XO Females
1	**Klinefelter's syndrome - - ½ Mark**	**Turner's Syndrome - - ½ Mark**
2	✓ This genetic disorder is due to the presence of an additional copy of the X chromosome.	✓ This genetic disorder is due to the loss of X chromosome
3	✓ Persons with this syndrome have 47 chromosomes (44AA+XXY). - **- ½ Mark**	✓ Persons with this syndrome have 45 chromosomes (44 autosomes and one X chromosome) (44AA+XO). - **- ½ Mark**
	Symptoms	**Symptoms**
4	✓ Sterile males, tall, obese, with long limbs, high pitched voice	✓ Sterile females, Low stature, webbed neck
5	✓ Under developed genitalia	✓ Under developed breast, rudimentary gonads
6	✓ Have feeble breast (gynaecomastia) development	✓ lack of menstrual cycle during puberty

OR

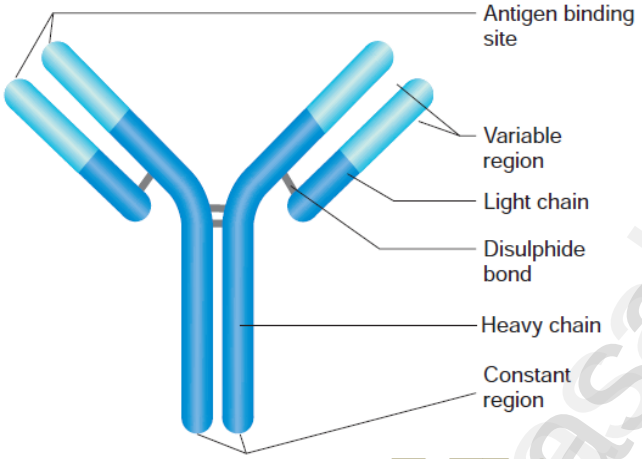
36. B

Structure of immunoglobulin:

1. In the 1950s, experiments by Porter and Edelman revealed the basic structure of the immunoglobulin.
2. An antibody molecule is Y shaped structure that comprises of four polypeptide chains, two identical light chains.
3. (L) of molecular weight 25,000 Da (approximately 214 amino acids) and two identical heavy chains (H) of molecular weight 50,000 Da (approximately 450 amino acids).
4. The polypeptide chains are linked together by di-sulphide (S-S) bonds.
5. One light chain is attached to each heavy chain and two heavy chains are attached to

eachother to form a Y shaped structure.

6. Hence, an antibody is represented by H2 L2.
7. The heavy chains have a flexible hinge region at their approximate middles.
8. Each chain (L and H) has two terminals. They are C - terminal (Carboxyl) and amino or N-terminal.
9. Each chain (L and H) has two regions. They have variable (V) region at one end and a much larger constant (C) region at the other end.
10. Antibodies responding to different antigens have very different (V) regions but their (C) regions are the same in all antibodies.
11. In each arm of the monomer antibody, the (V) regions of the heavy and light chains combines to form an antigen – binding site shaped to 'fit' a specific antigenic determinant.
12. Consequently each antibody monomer has two such antigen – binding regions.
13. The (C) regions that form the stem of the antibody monomer determine the antibody class and serve common functions in all antibodies. **Any eight points: 6 x ½ = 3**
14. **Diagram and parts.** **1 mark + 1 mark.**



37.A

The withdrawal symptoms: **10 x ½ = 10**

1. Mild tremors to convulsions,
2. severe agitation and fits,
3. depressed mood,
4. anxiety,
5. nervousness,
6. restlessness,
7. irritability,
8. insomnia,
9. dryness of throat, etc,
10. Depending on the type of drug abuse.

OR

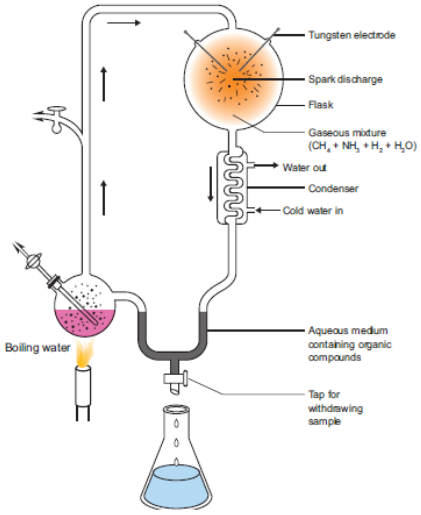
37.B

1. The Pasteur effect is the inhibiting effect of oxygen on the fermentation process. **--- 1 Mark**
2. *Saccharomyces cerevisiae* commonly called brewer's yeast. **--- ½ Mark**
3. It is used for fermenting malted cereals and fruit juices to produce various alcoholic beverages. **--- ½ Mark**
4. The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation. **--- 1 Mark**
5. Bioremediation is less expensive and more sustainable than other remediations available. **--- ½ Mark**
6. ***In situ*** bioremediation: Treatment of contaminated soil or water in the site. **--- ½ Mark**
7. ***Ex situ*** bioremediation: Treatment of contaminated soil or water that is removed from the site and treated. **--- ½ Mark**

38.A

Experimental approach to the origin of life

1. **Urey and Miller (1953)**, paved way for understanding the possible synthesis of organic compounds that led to the appearance of living organisms.
2. In their experiment, a mixture of gases was allowed to circulate over electric discharge from an tungsten electrode.
3. A small flask was kept boiling and the steam emanating from it was made to mix with the mixture of gases (ammonia, methane and hydrogen) in the large chamber that was connected to the boiling water.
4. The steam condensed to form water which ran down the 'U' tube.
5. Experiment was conducted continuously for a week and the liquid was analysed.
6. Glycine, alanine, beta alanine and aspartic acid were identified.
7. Later in similar experiments, formation of all types of amino acids, and nitrogen bases were noticed.



7 x ½ = 3 ½
Diagram – 1 ½

OR

38.B

The causes for infertility:

1. Tumours formed in the pituitary or reproductive organs,
2. inherited mutations of genes responsible for the biosynthesis of sex hormones,
3. malformation of the cervix or fallopian tubes
4. Inadequate nutrition before adulthood.
5. Long-term stress damages many aspects of health especially the menstrual cycle.
6. Ingestion of toxins (heavy metal cadmium), heavy use of alcohol, tobacco and marijuana, injuries to the gonads and aging also cause infertility.

Other causes of infertility:

1. Pelvic inflammatory disease (PID), uterine fibroids and endometriosis are the most common causes of infertility in women.
2. Low body fat or anorexia in women. i.e. a psychiatric eating disorder characterised by the fear of gaining weight.
3. Undescended testes and swollen veins (varicocoele) in scrotum.
4. Tight clothing in men may raise the temperature in the scrotum and affect sperm production.
5. Under developed ovaries or testes.
6. Female may develop antibodies against her partner's sperm.
7. Males may develop an autoimmune response to their own sperm.

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