

Fertilisation and Implantation – MCQs with Explanations

1. Release of semen into the vagina during coitus is called:

- (a) Implantation
- (b) Insemination
- (c) Fertilisation
- (d) Ovulation

Answer: (b) Insemination

Explanation: Insemination is the deposition of semen into the female reproductive tract during sexual intercourse. Fertilisation occurs later when sperm fuses with the ovum.

2. Fertilisation in humans normally occurs in the:

- (a) Uterus
- (b) Cervix
- (c) Ampullary region of fallopian tube
- (d) Ovary

Answer: (c) Ampullary region of fallopian tube

Explanation: Fertilisation usually takes place at the ampullary-isthmic junction of the fallopian tube where the sperm meets the secondary oocyte.

3. Fertilisation is the fusion of:

- (a) Two sperms
- (b) Ovum and uterus
- (c) Male and female gametes
- (d) Blastocyst and uterus

Answer: (c) Male and female gametes

Explanation: Fertilisation is the fusion of a sperm (male gamete) and an ovum (female gamete) to form a zygote.

4. The layer surrounding ovum that prevents entry of additional sperms is:

- (a) Endometrium
- (b) Trophoblast
- (c) Zona pellucida
- (d) Acrosome

Answer: (c) Zona pellucida

Explanation: After one sperm enters the ovum, the zona pellucida undergoes changes that prevent polyspermy (entry of more sperms).

5. Acrosome contains:

- (a) Hormones
- (b) Enzymes
- (c) Lipids
- (d) RNA only

Answer: (b) Enzymes

Explanation: The acrosome contains hydrolytic enzymes such as hyaluronidase and acrosin that help sperm penetrate the egg coverings.

6. Acrosomal enzymes help sperm to:

- (a) Divide rapidly
- (b) Produce ATP
- (c) Penetrate ovum
- (d) Form blastocyst

Answer: (c) Penetrate ovum

Explanation: Acrosomal enzymes digest the protective layers around the ovum, allowing sperm entry.

7. Entry of sperm into secondary oocyte induces completion of:

- (a) Mitosis
- (b) Meiosis I
- (c) Meiosis II
- (d) Cytokinesis only

Answer: (c) Meiosis II

Explanation: The secondary oocyte is arrested in metaphase II. Sperm entry triggers completion of meiosis II.

8. Completion of meiosis II produces:

- (a) Two ova
- (b) Four sperms
- (c) Second polar body and ovum
- (d) Blastomeres

Answer: (c) Second polar body and ovum

Explanation: Completion of meiosis II results in one mature ovum and a second polar body.

9. The zygote formed after fertilisation is:

- (a) Haploid
- (b) Diploid
- (c) Triploid
- (d) Tetraploid

Answer: (b) Diploid

Explanation: Fusion of two haploid gametes ($n + n$) restores the diploid chromosome number ($2n$).

10. Number of chromosomes in human zygote is:

- (a) 23
- (b) 44
- (c) 46
- (d) 92

Answer: (c) 46

Explanation: Human sperm and ovum each contain 23 chromosomes. Their fusion forms a zygote with 46 chromosomes.

11. Human female produces ova carrying:

- (a) X chromosome only
- (b) Y chromosome only
- (c) Both X and Y
- (d) No sex chromosome

Answer: (a) X chromosome only

Explanation: Females have XX chromosomes, so every ovum carries only an X chromosome.

12. Human male produces sperms carrying:

- (a) X chromosome only
- (b) Y chromosome only
- (c) Either X or Y chromosome
- (d) No sex chromosome

Answer: (c) Either X or Y chromosome

Explanation: Males have XY chromosomes. Therefore, half the sperms carry X and the other half carry Y.

13. Which combination produces a male baby?

- (a) XX
- (b) XO
- (c) XY
- (d) YY

Answer: (c) XY

Explanation: A male child develops when an X-bearing ovum is fertilised by a Y-bearing sperm, producing XY.

14. Sex of the baby is determined by the:

- (a) Mother
- (b) Father
- (c) Ovary
- (d) Uterus

Answer: (b) Father

Explanation: The ovum always contributes X chromosome, while the sperm contributes either X or Y chromosome.

15. Repeated mitotic divisions of zygote are called:

- (a) Implantation
- (b) Cleavage
- (c) Gastrulation
- (d) Ovulation

Answer: (b) Cleavage

Explanation: The zygote undergoes rapid mitotic divisions called cleavage without significant increase in size.

16. Cells formed during cleavage are called:

- (a) Spermatids
- (b) Blastomeres

- (c) Oocytes
- (d) Trophoblasts

Answer: (b) Blastomeres

Explanation: Each cell produced during cleavage is known as a blastomere.

17. Embryo with 8–16 blastomeres is called:

- (a) Gastrula
- (b) Morula
- (c) Blastocyst
- (d) Zygote

Answer: (b) Morula

Explanation: The solid ball of 8–16 blastomeres resembles a mulberry and is called the morula.

18. Outer layer of blastocyst is called:

- (a) Endometrium
- (b) Inner cell mass
- (c) Trophoblast
- (d) Morula

Answer: (c) Trophoblast

Explanation: The trophoblast is the outer cell layer of the blastocyst and helps in implantation.

19. Inner cell mass of blastocyst develops into:

- (a) Placenta
- (b) Endometrium
- (c) Embryo
- (d) Cervix

Answer: (c) Embryo

Explanation: The inner cell mass differentiates to form the embryo, while the trophoblast contributes to the placenta.

20. Embedding of blastocyst into endometrium is called:

- (a) Ovulation
- (b) Cleavage
- (c) Implantation
- (d) Parturition

Answer: (c) Implantation

Explanation: Implantation is the attachment and embedding of the blastocyst into the uterine endometrium, usually about 6–7 days after fertilisation.

Fertilisation and Implantation – Short Question Answers

1. **What is insemination?**
Release of semen into the vagina during coitus.
2. **What is fertilisation?**
Fusion of male and female gametes to form a zygote.
3. **Where does fertilisation occur in humans?**
In the ampullary-isthmic junction of the fallopian tube.
4. **What is the acrosome?**
A cap-like structure on the sperm head containing enzymes.
5. **What is the function of acrosomal enzymes?**

They help the sperm penetrate the ovum.

6. **What is the zona pellucida?**

A glycoprotein layer surrounding the ovum.

7. **What is the function of the zona pellucida?**

It prevents entry of additional sperms after fertilisation.

8. **What happens when a sperm enters the secondary oocyte?**

Meiosis II is completed.

9. **What is formed after completion of meiosis II?**

An ovum and a second polar body.

10. **What is a zygote?**

The diploid cell formed after fertilisation.

11. **How many chromosomes are present in a human zygote?**

46 chromosomes.

12. **Why is the zygote diploid?**

Because it receives 23 chromosomes from each parent.

13. **Which chromosome is present in every human ovum?**

X chromosome.

14. **Which chromosomes may be present in human sperms?**

X or Y chromosome.

15. **Who determines the sex of the child?**

The father.

16. **What is cleavage?**

Rapid mitotic divisions of the zygote.

17. **What are blastomeres?**
Cells formed during cleavage.
18. **What is a morula?**
An embryo consisting of 8–16 blastomeres.
19. **What is a blastocyst?**
A stage of embryo having trophoblast and inner cell mass.
20. **What is the trophoblast?**
The outer layer of the blastocyst.
21. **What is the inner cell mass?**
A group of cells inside the blastocyst that forms the embryo.
22. **What is implantation?**
Embedding of the blastocyst into the endometrium.
23. **Where does implantation occur?**
In the endometrium of the uterus.
24. **What is the endometrium?**
The inner lining of the uterus.
25. **What is polyspermy?**
Entry of more than one sperm into an ovum.
26. **How is polyspermy prevented?**
By changes in the zona pellucida after sperm entry.
27. **What is the significance of cleavage?**
It increases the number of cells in the developing embryo.
28. **Which part of the blastocyst forms the embryo?**
The inner cell mass.

29. **Which part of the blastocyst helps in implantation?**

The trophoblast.

30. **How many days after fertilisation does implantation usually begin?**

About 6–7 days after fertilisation.