3 CHAPTER

Reproductive Health

Level - 1 CORE SUBJECTIVE QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQs) (1 Mark)

1. Option (C) is correct
Explanation: The fertile window for periodic abstinence is typically from day 10 to 17 of the menstrual cycle, when ovulation occurs. To avoid pregnancy, couples should refrain from intercourse during this time.
2. Option (C) is correct
Explanation: The correct matching pair is :
   (a) Birth control pills prevent ovulation by regulating hormones.
   (b) Condoms act as a barrier, blocking sperm from entering the cervix.
   (c) Vasectomy is the surgical procedure in where a small piece of vas deferens is cut and tied to block the passage of sperm. So, semen contains no sperm.
   (d) The Copper T is a intrauterine device (IUD) that primarily prevents fertilisation and can also prevent implantation of a fertilisation egg.
3. Option (A) is correct
Explanation: Lippes lop is an inter uterine device (IUD) that works by phagocytosis of sperms in the uterus.
Multiload 375 is an IUD that makes the cervix hostile to sperms.
Subcutaneous Norplant is hormonal implant that causes thickening of cervical mucus, preventing sperm entry. Saheli is a non-steroidal oral contraceptive pill that inhibits ovulation.
4. Option (B) is correct
Explanation: Amniocentesis is a pre-natal diagnostic technique used to detect genetic disorders and chromosomal abnormalities in a foetus. It involves collecting a small sample of amniotic fluid, which contains foetal cells, for genetic testing. This procedure can help identify conditions such as Down syndrome, cystic fibrosis, and other inherited disorders.
5. Option (C) is correct
Explanation: During a vasectomy, the vas deferens, which is point Q, (the tube that transports sperm from the testes to the urethra) is severed and sealed to prevent sperm from entering the ejaculate.
6. Option (D) is correct
Explanation: In the test tube baby program, which is a form of *in vitro* fertilisation (IVF), fertilisation occurs outside the body. After the formation of the zygote in the lab, it is then transferred into the fallopian tube of the mother through the Zygote Intra Fallopian Transfer (ZIFT) technique. This ensures that the zygote can implant naturally in the uterus for further development.

ASSERTION-REASON QUESTIONS (1 Mark)

1. Option (A) is correct
Explanation: The statutory ban on amniocentesis for sex determination is aimed at curbing the increasing incidence of female foeticide. This practice was banned in India to prevent the misuse of the procedure for determining the sex of the fetus, leading to selective abortions. It involves taking a sample of amniotic fluid, which contains fetal cells, to analyse the chromosomes for genetic disorders. However, it has been misused for determining the sex of the fetus.
2. Option (B) is correct
Explanation: Periodic abstinence indeed involves couples avoiding coitus during the fertile period, typically from day 10 to 17 of the menstrual cycle, to prevent pregnancy. This method has limited effectiveness because menstrual cycles can vary in length and regularity.
3. Option (B) is correct
Explanation: Determining the sex of an unborn child followed by MTP (medical termination of pregnancy) is an illegal practice, as it is banned in India to prevent female foeticide. Amniocentesis is a procedure used to test for genetic disorders in a fetus. However, it has been misused for determining the sex of the fetus, leading to its regulation under the law. Both assertion and reason are true but the reason does not correctly explain the assertion as to why is determination of sex of unborn child is an illegal practice.
4. Option (C) is correct
Explanation: Cervical caps and vaults are barrier methods of contraception used by females. They work by physically blocking sperm from entering the uterus.

VERY SHORT ANSWER TYPE QUESTIONS (2 Marks)

1. Ova from wife or female donor and sperm from husband or male donor are collected, induced to form a zygote under simulated conditions in the laboratory (*in vitro*) (outside body) , Zygote or embryo are transferred into the female body for development.
   It is also known as test tuby baby programme – because initial process is carried out in the laboratory.
2. Two copper releasing intra uterine devices (IUDS) are Copper - T (Cu-T) and Multiload 375.
   The reasons that make these contraceptives effective are:
   (1) Copper ions released by these contraceptives are toxic to sperms thereby suppressing sperms motility and reducing their fertilisation capacity.
   (2) These contraceptives creates a hostile environment in the uterus, preventing implantation of a fertilised egg.
3. (i) Intensely lactating mothers generally do not conceive because of a natural contraceptive mechanism, lactational amenorrhea. During intense breast-feeding, the hormone prolactin is secreted in large amounts, suppressing the release of Gonadotropin- Releasing Hormone (GnRH) from the hypothalamus. Reduced GnRH levels leads to decreased secretion of Follicle-Stimulation Hormone and Luteinizing Hormone, preventing the maturation and release of an ovum or no ovulation. Since ovulation does not occur, fertilisation and conception do not take place.
   (ii) Our government has intentionally imposed strict restrictions of MTP as majority of MTPs are performed illegally by quack. Unsafe and unregulated abortions can lead to serious health complications.
4. Progesterone, Progestogen – Estrogen combination are the important components of oral contraceptives.
   'Saheli' is a non-steroidal preparation, 'once a week' pill with very few side effects, high contraceptive value, easily available, cheaper in cost. This is why it is considered a preferred contraceptive by woman.
5. Progestogen alone or in combinations with estrogen inhibit ovulation and implantation / alter the quality of cervical mucus to prevent or retard the entry of sperm. Their effective periods are much longer than contraceptive pills.

SHORT ANSWER TYPE QUESTIONS (3 Marks)

1. • **IUI (Intra uterine insemination)**
   The semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus of the female
   • **IUT (Intra uterine transfer)**
   The embryo with more than 8 blastomeres is introduced into the uterus of the female.
2. **(i)** In vitro fertilisation (IVF) is so named because it takes place in a laboratory dish. The sperm and egg are combined in a petri dish for fertilisation, and the resulting zygote is then implanted into the woman's uterus.
   Importance: IVF allows couples facing infertility issues, to conceive and enjoy parenthood.
   (ii) Differences are:

GIFT	ZIFT
(1) Transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce one but can provide suitable environment for fertilisation.	(1) Transfer of zygote or early embryos (with upto 8 blastomeres) into the fallopian tube.
(2) The fertilisation occurs naturally inside the body.	(2) The fertilisation occurs outside the body (in vitro).

3. Pills contain progestogens or progestogen – estrogen combination.
   They inhibit ovulation, and implantation as well as, alter the quality of cervical mucus to prevent or retard the entry of sperms.
   Pills have to be taken daily for a period of 21 days starting within first five days of menstrual cycle.
   After a gap of 7 days it has to be repeated in the same pattern till the female desires to prevent conception.
4. **(i)** (1) ZIFT: Zygote intrafallopian transfer.
   (2) ICSI: Intracytoplasmic sperm injection.
   (3) IUT: Intra uterine transfer.
   (4) GIFT: Gamete intrafallopian transfer.
   (ii) GIFT
   GIFT allows the eggs to fertilise and develop in the fallopian tube/ IVF places a directly fertilised egg (zygote) into the uterus/ in vivo fertilisation is involved in GIFT.
5. **(i)** Gamete Intra Fallopian Transfer, transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce an ovum but can provide suitable environment for fertilization and further development / It has no role in test tube baby programme.
   (ii) Zygote Intra Fallopian Transfer, zygote or early embryo up to 8 blastomeres transferred into fallopian tube.
   (iii) Intra Uterine Insemination, semen collected either from husband or a healthy donor is artificially introduced either into vagina or uterus of the female / It has no role in test tube baby programme.
6. Vasectomy
   A small part of the vas deferens is cut / removed, tied-up to block sperm transport

LONG ANSWER TYPE QUESTIONS (5 Marks)

1. (i)
- Sperm count decreases, spermatogenesis is impaired;
- Spermatids do not get nourishment to develop into spermatozoa thus spermiogenesis will be affected;
- Leydig cells synthesise and secrete androgen hormones (like testosterone) so secretion of androgens will be affected.

(ii) Spermiation

(iii) Artificial insemination (AI) technique. In this technique, the semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus (IUI – intra –uterine insemination) of the female.

OR

Intra cytoplasmic sperm injection (ICSI) is another specialised procedure to form an embryo in the laboratory in which a sperm is directly injected into the ovum.

(iv) The zygote or early embryos (with upto 8 blastomeres) could be transferred into the fallopian tube (ZIFT–zygote intra fallopian transfer); embryos with more than 8 blastomeres, into the uterus (IUT – intra uterine transfer), to complete its further development.

2. (i) (1) Hormonal imbalance
(2) Blockage in reproductive tract.

(ii) In vitro fertilisation (IVF) - Fertilisation occurs outside the body (in almost similar conditions as that in the body) followed by embryo transfer (ET). In this method ova from the wife or donor (female) and sperms from the husband or donor (male) are collected and are induced to form zygote under simulated conditions in the laboratory.

ZIFT (zygote intra fallopian transfer)-The zygote or early embryos (with upto 8 blastomeres) is then transferred into the fallopian tube to complete its further development.

In IUT (intra uterine transfer), embryos with more than 8 blastomeres are transferred into the uterus to complete its further development.

3. (i) **(1)** Educating them about safe and hygienic sexual practices and sexually transmitted diseases.

(2) Educating people in marriageable age group about the birth control measures pre natal and post natal care of the mother and significance of breast feeding.

(3) Sex education should be provided to the school going children so as to discourage myths and misconceptions about sex related aspects.

(4) A legal ban on the checking of the gender of the foetus.

(5) Create awareness about sex abuse and drawbacks of population explosion.

(6) Proper infrastructure and professional facilities to attain reproductive health standards (Any four points)

(ii) **(1)** 'A' – X, 'B' – P

(2) 'A' – Vasectomy, a small part of vas deferens is removed or tied up.
'B'- Tubectomy, small part of fallopian tube is removed or tied up.

4. (i) Administration of progestogens or progestogen estrogen combinations or IUDs within 72 hours of coitus.

(ii) Progestogens alone or in combination with estrogen inhibit implantation as well as alter the quality of cervical mucus to prevent the entry of sperms.
IUDs increase the phagocytosis of sperms within the uterus, suppress sperm motility and fertilising capacity of sperms.

(iii) No, STDs can be prevented by use of condoms.

(iv) Gonads are endocrine glands and thus, cannot be removed from the body.

5. (i) **(1)** Inability to produce a normal egg– **GIFT (Gamete Intra Fallopian Transfer):** This technique involves the transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce one.

(2) Low Count of Sperm - **ICSI (Intra Cytoplasmic Sperm Injection):** In this technique, sperm is directly injected into the ovum; in the laboratory.

(3) Blocked Fallopian tube - **ET (Embryo Transfer):** It involves transferring blastocyst into the uterus and this is called Intra-Uterine Transfer (IUT).

(ii) MTPs are essential in certain cases where continuation of pregnancy could be harmful or even fatal either to mother or to the foetus both.
It is also permissible in cases of rapes.

6. (i) 15-24 years

(ii) (1) Chronic pain and discomfort in various body organs

(2) Infertility in some STDs

(3) Lower immunity levels and increased risk of other infections

(4) Higher risk of transmitting the diseases to others.

(iii) Condoms
They act as a barrier preventing the mixing of body fluids.

(iv) (1) Oral Contraceptive Pills

(2) Vasectomy or Tubectomy

(3) IUDs

Level - 2 ADVANCED COMPETENCY FOCUSED QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQs) (1 Mark)

1. Option (D) is correct
   Explanation: Amniocentesis is primarily used to detect genetic and chromosomal disorders in a developing fetus, such as Down syndrome, cystic fibrosis, and other inherited conditions.
2. Option (B) is correct
   Explanation: Copper-T isa non-hormonal intrauterine device (IUD), reversible, and highly effective for long-term contraception without hormonal side effects.
3. Option (A) is correct
   Explanation: Multiload-375 is a non-hormonal IUD. It release copper ions that inhibit sperm motility and fertilisation. It can cause heavier or prolonged menstrual bleeding.
4. Option (B) is correct
   Explanation: Tubectomy is a permanent method for women. It involves cutting and tying the fallopian tubes and prevents the egg from meeting the sperm. It is most appropriate for a 35-year-old woman wanting no future pregnancies.
5. Option (C) is correct
   Explanation: Gonorrhoea is the only one among the options not caused by a virus, it is caused by a bacterium.
6. Option (A) is correct
   Explanation: Since the woman has blocked fallopian tubes, ZIFT is the best option among the listed Assisted Reproductive Technologies (ARTs), as fertilisation occurs outside the body and a zygote is directly placed into the fallopian tube

ASSERTION-REASON QUESTIONS (1 Mark)

1. Option (A) is correct
   Explanation: Periodic abstinence is a natural method of birth control in which couples avoid intercourse during the fertile period, typically from day 10 to 17 of the menstrual cycle, to prevent pregnancy. Ovulation generally occurs around the middle of the menstrual cycle (usually around day 14 in a typical 28-day cycle), marking the time when a woman is most fertile.
2. Option (A) is correct
   Explanation: Assertion is true. Condoms are one of the most effective barrier methods of contraception. They prevent sperm from entering the female reproductive tract and also act as a protective shield against STIs like HIV, gonorrhoea, and syphilis.
   Reason is also true. Condoms are made of latex or similar materials and work by physically blocking the passage of semen and infectious agents during intercourse.
3. Option (C) is correct
   Explanation: Assertion is true. In vasectomy, a part of the vas deferens (the duct that carries sperm from the testes to the urethra) is surgically removed or blocked to prevent the release of sperm during ejaculation.
   Reason is false. Vasectomy does not prevent the formation of sperms in the testes. Spermatogenesis (sperm production) continues normally in the testes, but sperms cannot be transported or released, as the path is blocked.
4. Option (C) is correct
   Explanation: Assertion is true. Oral contraceptive pills are made of synthetic hormones (estrogen and progesterone). They prevent ovulation by disrupting the hormonal cycle, particularly the LH surge required for ovulation.
   Reason is false. These pills do not maintain high levels of LH and FSH. Instead, they suppress the secretion of LH (Luteinizing Hormone) and FSH (Follicle-Stimulating Hormone) from the pituitary gland through negative feedback. Without the LH surge, ovulation does not occur.
5. Option (A) is correct
   Explanation: Assertion is true. Intrauterine Devices (IUDs) such as Copper-T promote the phagocytosis of sperms by the uterus, thereby preventing fertilisation.
   Reason is also true. Copper ions released by Copper-T suppress sperm motility and reduce the fertilising capacity, making it difficult for sperms to reach and fertilise the ovum.

VERY SHORT ANSWER TYPE QUESTIONS (2 Marks)

1. (i) If pregnancy is continued, it would threaten the mental, emotional, and physical well-being of the pregnant woman.
   (ii) There is possibility that the infant would suffer from physical or mental abnormalities as to be seriously handicapped. The pregnancy is unwanted by the pregnant woman.
2. **Method:** Condoms
   Working: Act as a barrier between sperms and ovum.
   Method: Sterilisation/surgical method/vasectomy.
   Working: Blocks the transport of sperm to the urethra.
3. Barrier methods, like condoms, are considered safer because they:
   (1) Prevent pregnancy by blocking the entry of sperm into the uterus.
   (2) Protect against STIs by acting as a physical barrier that prevents the exchange of infectious body fluids during sexual intercourse.
4. Missing oral contraceptive pills for two consecutive days can lower hormone levels, potentially allowing ovulation to occur, which increases the risk of pregnancy.

Precaution: She should take the missed pills as soon as remembered, continue the rest as scheduled, and use an additional contraceptive method (e.g., condoms) for the next 7 days to prevent unintended pregnancy.

5. Vasectomy involves surgically cutting and tying the vas deferens, which prevents the transport of sperm from the testes to the urethra during ejaculation.

   It does not affect testosterone production, as the testes remain intact and continue producing hormones, so secondary sexual characteristics and libido remain unaffected.

6. The suitable Assisted Reproductive Technology (ART) is Zygote Intra-Fallopian Transfer (ZIFT) or more commonly, In Vitro Fertilisation (IVF) followed by embryo transfer.

   Justification: Since the fallopian tubes are blocked, fertilisation cannot occur naturally inside the female body. IVF allows fertilisation to happen outside the body, and the resulting embryo is then implanted directly into the uterus, bypassing the fallopian tubes.

7. I would recommend the use of condoms (male or female) as the contraceptive method.

   Reason: Condoms act as a physical barrier, preventing the exchange of bodily fluids during sexual contact. This significantly reduces the risk of HIV transmission as well as other sexually transmitted infections (STIs), while also preventing unwanted pregnancy.

8. MTP (Medical Termination of Pregnancy) is considered safe only under medical supervision because improper or unsupervised abortion can lead to severe complications like excessive bleeding, infection, or even death.
   It is allowed only within the first 20 weeks because, beyond this period, the procedure becomes riskier for the mother and the foetus may be viable, making the process ethically and medically more complex.

9. Copper-T is an intrauterine device (IUD) that releases copper ions, which:
   (i) Increase phagocytosis of sperms,
   (ii) Inhibit sperm motility and fertilising capacity,
   (iii) Prevent implantation by causing mild inflammation of the endometrium.
   The reported changes in menstrual cycle (like heavier or prolonged bleeding) occur because Copper-T can irritate the uterine lining, affecting normal endometrial shedding.

SHORT ANSWER TYPE QUESTIONS (3 Marks)

1. **(i)**

Intra uterine Transfer (IUT)	(Intrauterine Insemination (IUI))
The fertilisation is in vitro, i.e., outside the body, in the laboratory.	The fertilisation is in-vivo, i.e., inside

   (ii) The statement is FALSE. In artificial insemination, only semen is transferred to the female reproductive tract. The ovum is not extracted.
   (iii)
   - The donor can produce ovum/cannot conceive/cannot support full term of pregnancy.
   - The receiver can support fertilisation/support pregnancy/cannot produce Ovum.

2. **(i)**
   - ovulation
   - implantation
   - entry of sperm through the cervix

   (ii) After 21st day when the patients stop taking the pills, menstruation occurs.
   (iii) **(A)**
   - No
   - Hepatitis-B is a sexually transmitted disease. Oral pills do not prevent the transmission of STDs.

   (B) Condom

3. **(i)** Basic steps involved in IVF (In Vitro Fertilisation):
   (1) Hormonal stimulation is used to induce the development of multiple eggs in the female.
   (2) Egg retrieval is performed to collect mature eggs from the ovaries.
   (3) Sperm collection is done from the male partner.
   (4) Fertilisation of the eggs and sperms takes place in a laboratory (in vitro).
   (5) The resulting zygote is cultured to the 8-cell or blastocyst stage.
   (6) A healthy embryo is transferred into the woman's uterus for implantation.

   (ii) IVF may be preferred over natural conception when:
   (1) There are blocked fallopian tubes, low sperm count/motility, or ovulation disorders.
   (2) It helps bypass physical or physiological barriers to fertilisation or embryo transport, increasing the chance of conception.

4. **(i)** Lifestyle and hormonal factors influencing irregular menstrual cycles are:
   (1) **Hormonal Imbalance:** Imbalances in estrogen and progesterone can disrupt the menstrual cycle.
   (2) **Stress and Anxiety:** Emotional stress affects the hypothalamus, altering hormone levels.
   (3) **Poor Nutrition or Extreme Dieting:** Lack of essential nutrients affects hormonal regulation.
   (4) **Obesity or Underweight Conditions:** Body fat influences estrogen production, impacting cycle regularity.
   (5) **Lack of Physical Activity or Over-exercising:** Both extremes can disrupt normal hormonal balance.

   (ii) Two measures to maintain reproductive health in adolescent girls are:
   (1) Maintain a balanced diet rich in iron, calcium, and vitamins to support hormonal health.

(2) Regular physical activity and stress management through yoga or counselling to regulate hormonal cycles.

5. **(i)** Importance of spacing between pregnancies for maternal and child health:
   (1) Maternal Health: Adequate spacing allows the mother's body to recover physically and nutritionally, reducing the risk of anemia, complications during childbirth, and maternal mortality.
   (2) Child Health: It ensures better care, nutrition, and attention for the previous child, reducing risks of low birth weight, preterm birth, and infant mortality for the next child.

   (ii) Two temporary contraceptive methods that help in spacing are:
   (1) Intrauterine Devices (IUDs) – e.g., Copper-T, which prevents pregnancy for several years and is reversible.
   (2) Oral Contraceptive Pills (OCPs) – Taken daily to inhibit ovulation and prevent pregnancy.

6. **(i)** Vasectomy is a minor surgical procedure in which a small section of the vas deferens (the tube that carries sperm from the testicles to the urethra) is cut and sealed or tied on both sides. This prevents sperm from mixing with semen during ejaculation.

   (ii) No, vasectomy does not interfere with hormonal balance or sexual drive.

   Justification: The testosterone levels and the function of testes remain unchanged, so sexual desire, erection, and ejaculation stay normal.Only sperm is absent from the semen; the volume and appearance of semen remain largely the same.

7. **(i)** Condoms act as a physical barrier, preventing the entry of sperm into the female reproductive tract, thus avoiding fertilisation. They also block the exchange of bodily fluids, thereby preventing the transmission of sexually transmitted infections (STIs) like HIV, gonorrhoea, and syphilis.

   (ii) Two advantages of promoting condom use in public health programmes are:
   (1) No side effects: Condoms are safe and do not cause hormonal imbalances or physiological complications.
   (2) Easy accessibility and affordability: They are inexpensive, easily available, and do not require medical supervision for use, making them ideal for mass awareness and public health distribution.

8. **(i)** Oral contraceptive pills contain synthetic hormones — estrogen and progesterone — which inhibit ovulation by suppressing the secretion of Follicle Stimulating Hormone (FSH) and Luteinising Hormone (LH) from the pituitary gland. This prevents the development and release of an ovum. Additionally, they alter the cervical mucus to hinder sperm entry and make the endometrium unsuitable for implantation.

   (ii) Advantage: Highly effective and reversible method of contraception when taken regularly.

   Limitation: Must be taken daily; missing doses can reduce effectiveness and may lead to hormonal side effects like nausea or mood changes.

CASE BASED QUESTIONS (4 Mark)

1. **(i)** Option (C) is correct
   Explanation: Figure 'R' is showing complete blockage of Fallopian tubes and figure S' is showing tubectomy which is a surgical method of contraception in females. When both the Fallopian tubes are blocked or cut and tied, there will be, no transport of gametes and thus no fertilisation.

   (ii) Option (C) is correct
   Explanation: Surgical methods of contraception, known as sterilisation, are permanent procedures designed to prevent pregnancy by blocking gamete transport. A vasectomy, performed on males, cuts the vas deferens to prevent sperm from entering the ejaculate, while a tubectomy (or tubal ligation), performed on females, blocks the fallopian tubes to stop eggs from reaching the uterus. These methods are highly effective but typically have low reversibility.

   (iii) Option (B) is correct
   Explanation: Surgical methods of contraception, such as vasectomy and tubectomy, primarily prevent the transport of gametes rather than their formation. In vasectomy, sperm production continues, but sperm cannot travel through the vas deferens to mix with semen. Similarly, in tubectomy, eggs can still be produced but cannot reach the uterus.

   (iv) Option (A) is correct
   Explanation: The major drawback of surgical methods for birth control, such as vasectomy and tubectomy, is that they are generally poorly reversible.

2. **(i)** Amniocentesis - It involves taking a sample of the amniotic fluid and testing it for genetic abnormalities.

   (ii) Medical Termination of Pregnancy (MTP)

   (iii) (a) Yes, it is currently safe
   This option should be considered before the completion of the first trimester, as it might be riskier after this period.

   OR

   (b) MTP is illegal in cases involving determining the gender of the unborn child and female foeticide.

LONG ANSWER TYPE QUESTIONS (5 Marks)

1. (i) Infertility is the inability of a couple to conceive after one year of regular unprotected sexual intercourse.

Two common causes in males:

(1) Low sperm count or poor sperm motility.

(2) Blockage in the vas deferens or hormonal imbalances.

Two common causes in females:

(1) Blocked fallopian tubes.

(2) Ovulation disorders or hormonal imbalances (e.g., PCOS).

(ii) Principle: IVF is based on the principle of fertilising an ovum outside the body in a controlled laboratory environment and then transferring the resulting embryo into the woman's uterus for further development.

Steps involved:

(1) Ovarian stimulation: The female is given hormonal injections to induce the maturation of multiple ova.

(2) Egg retrieval: Mature ova are collected from the ovaries using a minor surgical procedure.

(3) Sperm collection: A semen sample is obtained from the male and healthy sperms are separated.

(4) In vitro fertilisation: The collected eggs and sperms are combined in a laboratory dish for fertilisation.

(5) Embryo culture: The zygote is allowed to divide and form a 6–8 cell stage embryo in the lab.

(6) Embryo transfer:– One or more healthy embryos are transferred into the uterus to achieve implantation and pregnancy.

IVF helps overcome infertility, especially when natural fertilisation is not possible due to conditions like blocked fallopian tubes or low sperm motility.

2. (i) Importance of promoting awareness about contraceptive methods among youth:

(1) Promotes responsible sexual behaviour and prevents unintended pregnancies.

(2) Reduces the risk of sexually transmitted infections (STIs), including HIV.

(3) Encourages informed decision-making about reproductive health and family planning.

(4) Helps prevent unsafe abortions and their associated health risks.

(5) Empowers adolescents to make safe and respectful choices in relationships.

(ii) Three contraceptive methods (temporary and permanent):

(1) Condoms (Temporary, Barrier Method):

Mode of action: Prevent sperm from entering the female reproductive tract.

Advantages: Prevent both pregnancy and STIs; easy to use; no side effects.

(2) Intrauterine Device (IUD): e.g., Copper-T (Temporary, Intrauterine method):

Mode of action: Copper ions released inhibit sperm motility and fertilisation; may also prevent implantation.

Advantages: Long-term protection (up to 10 years), reversible, does not affect hormonal balance.

(3) Tubectomy (Permanent, Surgical method for females):

Mode of action: Fallopian tubes are cut and tied to prevent the meeting of sperm and ovum.

Advantages: Permanent solution for those who have completed their families; highly effective.

3. (i) Reproductive health is a state of complete physical, mental, and social well-being in all matters relating to the reproductive system at all stages of life.

Significance:

(1) Ensures safe and responsible sexual behaviour.

(2) Reduces maternal and infant mortality.

(3) Prevents sexually transmitted infections (STIs) and unwanted pregnancies.

(4) Promotes family planning and healthy childbirth practices.

(ii) The measures to improve reproductive health in rural areas are:

(1) Health Education Campaigns: Organise awareness programmes about hygiene, contraception, STIs, and maternal care.

(2) Accessible Health Facilities: Set up primary health centres and mobile clinics for free or subsidised services.

(3) Training Health Workers and ASHAs: Train local workers to guide and counsel villagers about reproductive issues.

(4) Distribution of Contraceptives and Sanitary Products: Provide free or low-cost condoms, IUDs, oral pills, and sanitary napkins.

(iii) Role of Contraceptives in Reproductive Health and Population Control:

(1) Promote family planning by allowing couples to space or limit childbirth.

(2) Prevent unwanted pregnancies and unsafe abortions.

(3) Reduce spread of STIs when barrier methods like condoms are used.

(4) Help control population growth, which eases the burden on resources and healthcare.

4. (i) Genetic counseling is a process where individuals or couples are advised about the risks, nature, consequences, and management of genetic disorders.

(1) It helps prospective parents understand:

(2) The likelihood of passing on genetic conditions,

(3) Available testing options, and

(4) Possible preventive measures or treatments.

(ii) Amniocentesis is a prenatal diagnostic technique where a small amount of amniotic fluid is withdrawn from the uterus using a syringe under ultrasound guidance. The fluid contains fetal cells, which are tested to detect:

(1) Chromosomal abnormalities (e.g., Down syndrome),

(2) Genetic disorders (e.g., thalassemia, sickle cell anemia),

(3) Metabolic defects, and

(4) Neural tube defects. It is usually performed between the 15th and 20th week of pregnancy.

(iii) Amniocentesis is banned for sex determination under the PCPNDT Act (Pre-Conception and Pre-Natal Diagnostic Techniques Act), 1994, because it was misused to identify the sex of the fetus, leading to female foeticide and a decline in female child ratio. Ethically, every child has a right to life regardless of gender. Sex-selective abortions reflect gender bias and violate human rights. The ban promotes gender equality and protects unborn girls from discrimination before birth.

Thus, using amniocentesis only for legitimate medical reasons preserves its value in prenatal care while preventing unethical practices.