



Collegedunia NCERT Solutions

Step-by-step coloured PDF solutions for the 2026-27 NCERT (Latest Edition), Class 12th Biology,
Chapter 3: Reproductive Health.

Chapter 3: Reproductive Health

About this Chapter

This chapter explains what **reproductive health** means and why a society needs it: people with normally functioning reproductive organs, free from sexually transmitted infections, and able to take informed decisions about having children. You will study **contraceptive methods** (natural, barrier, IUD, oral pill, injectable, surgical), **Medical Termination of Pregnancy (MTP)**, sexually transmitted infections, and the **Assisted Reproductive Technologies (ART)** that help infertile couples have children. By the end you can explain every exercise answer in full sentences, the way the CBSE board expects.

Topics covered: Reproductive health & its significance • Population explosion & birth control • Contraceptive methods • Medical Termination of Pregnancy • Sexually transmitted infections • Infertility & ART

Quick Formula Sheet

Reproductive health (WHO):

Total well-being in all aspects of reproduction, i.e. physical, emotional, behavioural and social.

Contraceptive categories:

Natural • Barrier • IUDs • Oral pills • Injectables/implants • Surgical (vasectomy/tubectomy)

ART methods:

IVF-ET, ZIFT, IUT, GIFT, ICSI, AI (IUI)

Also see for this chapter: [Revision Notes](#) | [Formula Sheet](#) | [Exemplar Solutions](#)

NCERT Exercise Solutions

Q 3.1 What do you think is the significance of reproductive health in a society?

SOLUTION

Concept used. Reproductive health is defined by the World Health Organization (WHO) as total well-being in all aspects of reproduction, that is the physical, emotional, behavioural and social dimensions. A reproductively healthy society is one whose people have normally functioning reproductive organs and normal behaviour and interactions among one another in all reproduction related matters. This question asks us to list, in points, why such health matters at the level of a whole society, not just one person.

Step 1. Healthier individuals. People with physically and functionally normal reproductive organs are free from reproductive disorders, sexually transmitted infections (STIs) and reproductive tract infections. A society of such individuals is a healthier society overall.

Step 2. Controlled, planned population. Awareness about contraception lets couples decide *when* and *how many* children to have. This checks the uncontrolled growth of population, which otherwise strains food, housing, education and jobs.

Step 3. Removal of myths and social evils. Sex education and reproductive-health awareness remove misconceptions about sex-related topics, and discourage harmful practices like sex determination, female foeticide and illegal abortions.

Step 4. Better maternal and child care. Awareness about post-natal care of the mother and child, breast-feeding and immunisation lowers maternal mortality, infant mortality and the number of unwanted pregnancies.

Step 5. Help for infertile couples. A reproductively aware society uses infertility clinics and Assisted Reproductive Technologies (ART) to help childless couples, reducing the emotional and social stigma attached to infertility.

📌 Memory hook

Group the points as the “four pillars”: healthy individuals, planned population, no social evils, and care for mother/child plus the infertile. The board awards a mark per distinct, well-explained point.

Final Answer: Reproductive health makes a society physically and mentally healthier, keeps population growth in check, removes myths and social evils such as sex determination, improves maternal and child care, and supports infertile couples through ART.

♥ Links to the wider chapter

Every later topic in this chapter, contraception, MTP, STIs and infertility, is just one of these significance points worked out in detail. Keep this list in mind as the chapter’s spine.

EXPERT'S SOLUTION : Ananya Iyer, M.Sc Zoology, Banaras Hindu University

Strategic angle. A “significance” question is best answered by moving from the individual outward to the whole society, one widening circle at a time. That ordering also makes the answer easy for an examiner to tick.

Step 1. Circle 1: the person. Normal reproductive organs and freedom from STIs mean each citizen is healthy and confident about reproduction related decisions.

Step 2. Circle 2: the couple/family. Knowledge of birth control lets a family plan its size, so children get adequate food, schooling and care, and infertile couples get medical help.

Step 3. Circle 3: society. Awareness programmes (counselling, sex education, media campaigns) check population explosion, end female foeticide and illegal abortions, and lower maternal and infant mortality rates.

Step 4. Tie it together. A society scores high on reproductive health only when all three circles, person, family and the larger community, are simultaneously well.

Why this matters. Reproductive health is a yardstick of how developed and humane a society is, which is why India was among the first countries to launch a national reproductive-health programme (originally “family planning”, 1951).

Final Answer: From the individual to the family to society as a whole, reproductive health ensures healthy people, planned families, population control, an end to social evils, and support for the infertile, making it central to a developed society.

Q 3.2 Suggest the aspects of reproductive health which need to be given special attention in the present scenario.

SOLUTION

Concept used. Reproductive health has many aspects, but in the *present scenario* (current Indian situation) some need urgent, focused action. “Aspect needing special attention” means a problem area where awareness, services or law must be strengthened. We list each aspect and say briefly why it is urgent.

Step 1. Counselling and sex education in schools. Providing right information to adolescents removes myths and misconceptions about sex-related topics and prevents unprotected, risky behaviour.

Step 2. Awareness of population growth and birth control. Educating people about available contraceptive options and the consequences of an exploding

population is essential to slow population growth.

- Step 3. Care of pregnant mothers, the mother and child after delivery.** Awareness about pre-natal and post-natal care of the mother, plus breast-feeding and immunisation of the child, lowers maternal and infant mortality.
- Step 4. Awareness of sex-related problems and STIs.** Knowledge about STIs, infertility, menstrual problems and their treatment helps people seek timely medical help instead of hiding the problem due to social stigma.
- Step 5. Discouraging sex determination and female foeticide.** Strict implementation of the ban on amniocentesis for sex determination is needed to stop female foeticide and improve the sex ratio.

✗ Read the question

This is not the same as Q1. Q1 asks *why* reproductive health matters; Q2 asks *which specific aspects need attention now*. Answer with action areas, not general benefits.

Final Answer: Special attention is needed for: school sex education and counselling, awareness of population growth and contraception, pre-natal and post-natal care of mother and child, awareness of STIs and other sex-related problems, and strict action against sex determination and female foeticide.

EXPERT'S SOLUTION : Rohit Verma, M.Sc Biotechnology, AIIMS Delhi

Strategic angle. The reliable way to make sure no major area is missed is to sort the aspects by *who* the action targets, the adolescent, the couple of reproductive age, the mother and infant, and society together with its laws. Each target group has one dominant problem in the present scenario, so naming the group automatically pulls out the right action and the reason it is urgent.

- Step 1. Adolescents, the information problem.** Provide sex education and counselling in schools so that myths and misconceptions about reproduction, adolescence and contraception are replaced with correct facts and safe behaviour. This is urgent because STI incidence is highest in the 15–24 age group.
- Step 2. Couples of reproductive age, the planning problem.** Spread awareness of the full range of contraceptive options and of the dangers of a population explosion, so couples plan family size and spacing instead of having unplanned children.
- Step 3. Mothers and infants, the survival problem.** Promote safe pregnancy, institutional delivery, pre-natal and post-natal care, breast-feeding and immunisation, which directly lowers maternal mortality (MMR) and infant mortality (IMR).

Step 4. Society and law, the abuse problem. Take aggressive action against illegal abortions, the misuse of amniocentesis for sex determination and female foeticide, and improve access to infertility clinics so childless couples get help without stigma.

Why this matters. These four target groups map almost exactly onto the focus areas of India's "Reproductive and Child Health (RCH)" programmes, so structuring the answer this way doubles as accurate current-affairs context that strengthens the board response.

Final Answer: Group the priority aspects as adolescent sex education, couple-level contraception awareness, mother and child care, and strict legal action against female foeticide and illegal abortion.

Q 3.3 Is sex education necessary in schools? Why?

SOLUTION

Concept used. Sex education means giving young students correct, scientific information about reproductive organs, adolescence and its changes, safe and hygienic sexual practices, STIs, and myths/misconceptions about sex. The question asks for a clear yes, supported by reasons.

Step 1. Yes, it is necessary. Adolescents are naturally curious about sexual matters; without proper guidance they rely on wrong sources and develop misconceptions.

Step 2. Removes myths and misconceptions. Correct information about reproductive organs and adolescence prevents fear, guilt and false beliefs about sex.

Step 3. Promotes safe and hygienic practices. Students learn about menstrual hygiene, safe sexual practices and the proper use of contraceptives.

Step 4. Prevents STIs and unwanted pregnancy. Knowledge of how STIs/AIDS spread and how unwanted pregnancy occurs lets young people protect themselves.

Step 5. Discourages social evils. Awareness helps young people reject practices such as sex abuse and sex-related crimes, and grow into responsible, reproductively healthy adults.

Final Answer: Yes. Sex education in schools is necessary because it replaces myths with correct information, teaches safe and hygienic practices, prevents STIs and unwanted pregnancies, and helps students grow into reproductively healthy, responsible adults.

Answer shape

For a “Is X necessary? Why?” question, always begin with a one-word stand (“Yes.”) then give 3 to 4 crisp reasons. Examiners look for the explicit position before the justification.

EXPERT’S SOLUTION : Aarav Nair, Ph.D Molecular Biology, NCBS Bangalore

Strategic angle. The most persuasive way to argue “necessary” is to frame the answer around the *cost of not* teaching sex education and then show how each cost is removed once it is taught. Pairing the harm with its remedy makes every reason land harder than a flat list of benefits, and it directly answers the “Why?” part of the question.

Step 1. Without it, the information gap. Adolescents are naturally curious about sexual matters. Left without guidance they pick up information from unreliable peers, rumour and media, which breeds myths, fear, guilt and risky behaviour.

Step 2. With it, the gap is closed. School sex education gives the correct science of reproductive organs and the changes of adolescence, so the myths and the fear they cause simply disappear.

Step 3. Protective effect on health. Factual knowledge of how STIs and AIDS spread, and how unwanted pregnancy occurs, plus the proper use of contraceptives, directly lowers infection and unwanted-pregnancy rates in the 15–24 age group, which the chapter identifies as the most vulnerable.

Step 4. Protective effect on behaviour. Informed young people are less likely to be victims of, or to commit, sex-related abuse, and they grow into responsible, reproductively healthy adults.

Step 5. Conclusion. Each harm of the information gap maps onto a benefit of teaching it, so sex education in schools is clearly necessary.

Why this matters. The chapter explicitly notes STI incidence is highest in the 15–24 age group, the school-going age. That single fact is why an *early, school-based* intervention, rather than a later or informal one, is the most effective.

Final Answer: Yes, sex education is necessary: it pre-empts the myths, risky behaviour, STIs and unwanted pregnancies that follow when young people are left to learn from unreliable sources.

Q 3.4 Do you think that reproductive health in our country has improved in the past 50 years? If yes, mention some such areas of improvement.

SOLUTION

Concept used. India launched family-planning programmes as early as 1951 (later broadened into reproductive and child health programmes). The question asks for a *yes*, then a list of concrete areas where measurable improvement has occurred.

- Step 1. Yes, reproductive health has improved markedly.** Government and non-government programmes, better awareness and better medical facilities together produced clear gains.
- Step 2. Better awareness.** Use of audio-visual and print media, plus school education, has spread awareness about reproduction and contraception among the masses.
- Step 3. Marriageable age and small-family norm.** Statutory marriageable ages (18 for females, 21 for males) and incentives for small families have been adopted.
- Step 4. Better medical facilities.** Improved health-care support has lowered maternal and infant mortality rates and the number of STI cases, and increased detection and cure of reproductive disorders.
- Step 5. Wider contraceptive choice and ART.** A large range of contraceptive options is now available, and assisted reproductive technologies (test-tube baby, etc.) help many infertile couples have children.
- Step 6. Better detection of pregnancy-related problems.** Amniocentesis, ultrasound and other techniques allow early detection of disorders (their misuse for sex determination is, however, banned).

Key dates

Family-planning programme: 1951. Statutory marriageable age: 18 yr (female), 21 yr (male). These specific facts strengthen the answer.

Final Answer: Yes. Improvements include greater public awareness, a statutory marriageable age and small-family norm, better maternal and child health-care lowering mortality, a wide choice of contraceptives, assisted reproductive technologies for the infertile, and better detection of pregnancy-related problems.

EXPERT'S SOLUTION : Priya Reddy, M.Sc Microbiology, JNU

Strategic angle. The word “improved” must be *proved*, not merely asserted. The strongest answer pairs every area of action with the measurable outcome it produced, because a stated outcome (mortality down, infection down, more assisted births) convinces an examiner far more than a vague claim that “things got better”. So present each gain as a cause linked to its effect.

Step 1. Awareness → behaviour change. Sustained mass-media and school

campaigns raised contraceptive use and delayed the average age of marriage (helped by the statutory ages of 18 years for females and 21 years for males), so fewer and better-spaced pregnancies occur.

Step 2. Health infrastructure → lower mortality. More clinics, trained staff and better health-care support cut the maternal mortality rate (MMR) and infant mortality rate (IMR), and improved early detection of STIs and reproductive disorders.

Step 3. Technology → more births to the infertile. Assisted reproductive technologies (IVF-ET, ZIFT, IUT, GIFT, ICSI) gave previously childless couples children, a measurable gain that did not exist 50 years ago.

Step 4. Policy → controlled population growth. The small-family norm, incentives and a legal marriageable age together slowed the *rate* of population increase even as absolute numbers rose.

Step 5. Diagnostics → earlier detection. Amniocentesis and ultrasound allow early detection of pregnancy-related disorders (with their misuse for sex determination separately banned), improving outcomes for mother and foetus.

Why this matters. “Improvement” is rightly judged by *outcomes*, mortality rates, infection rates, fertility-assistance rates, not by the mere existence of programmes. Tying each cause to its effect is what makes this the mature, full-mark answer rather than a list of schemes.

Final Answer: Yes, with clear gains in awareness, lower maternal and infant mortality, better STI detection, wide contraceptive choice, ART for the infertile, and policy-driven control of population growth.

Q 3.5 What are the suggested reasons for population explosion?

SOLUTION

Concept used. Population explosion is a sudden, steep rise in population size. It happens when the *birth rate stays high* while the *death rate falls sharply*, so the net growth rate becomes large. The question asks for the suggested causes behind India’s rapid population rise.

Step 1. Rapid decline in death rate. Better medical facilities, control of epidemics and improved health-care have sharply lowered the death rate (MMR and IMR).

Step 2. Decline in maternal mortality rate (MMR). Safer pregnancy and delivery care mean more mothers survive repeated child-bearing.

Step 3. Decline in infant mortality rate (IMR). More children now survive infancy, so

the surviving population grows.

Step 4. Increase in the number of people in reproducible age. A large fraction of the population is young and in the reproductive age group, so the number of potential parents is large.

Step 5. Net result. A high birth rate persisting alongside a falling death rate gives a steeply rising population, i.e. the population explosion.

📌 One-line cause

Population explosion in one sentence: *death rate (MMR + IMR) fell fast, but birth rate did not, and a large young population keeps reproducing.*

Final Answer: Population explosion is caused mainly by a rapid fall in the death rate, falls in maternal mortality rate (MMR) and infant mortality rate (IMR), and a large proportion of people in the reproducible age group, while the birth rate has not fallen correspondingly.

♥ Why birth control follows

Because the explosion is driven by an unchanged high birth rate, the remedy emphasised in this chapter is birth control, contraception and a small-family norm, rather than anything to do with the death rate.

EXPERT'S SOLUTION : Karan Joshi, M.Sc Botany, Delhi University

Strategic angle. Population explosion is best explained, not as a list, but through the demographic balance equation:

$$\text{net population growth} = \text{birth rate} - \text{death rate.}$$

A population explodes only when this difference becomes large. So every listed reason must act on *one side* of this equation, either pulling the death rate down or holding the birth rate up. Sorting the causes onto the two sides shows the answer is complete and explains why only one remedy is acceptable.

Step 1. The death-rate side collapses. Better medical facilities, control of epidemics and improved health-care sharply lower the general death rate. Two specific components also fall: the maternal mortality rate (MMR), so more mothers survive repeated child-bearing, and the infant mortality rate (IMR), so more children survive infancy.

Step 2. The birth-rate side stays high. Lack of awareness about contraception, social customs favouring large families, and a population in which a large fraction is young keep the birth rate from falling correspondingly.

Step 3. The imbalance produces the explosion. With the death rate down and the birth rate still high, the difference (net growth) becomes large, so the population rises steeply, the explosion.

Step 4. A compounding factor. A big cohort already in the reproductive age group means that even a moderate per-couple birth rate adds a huge *absolute* number of births each year, amplifying the imbalance.

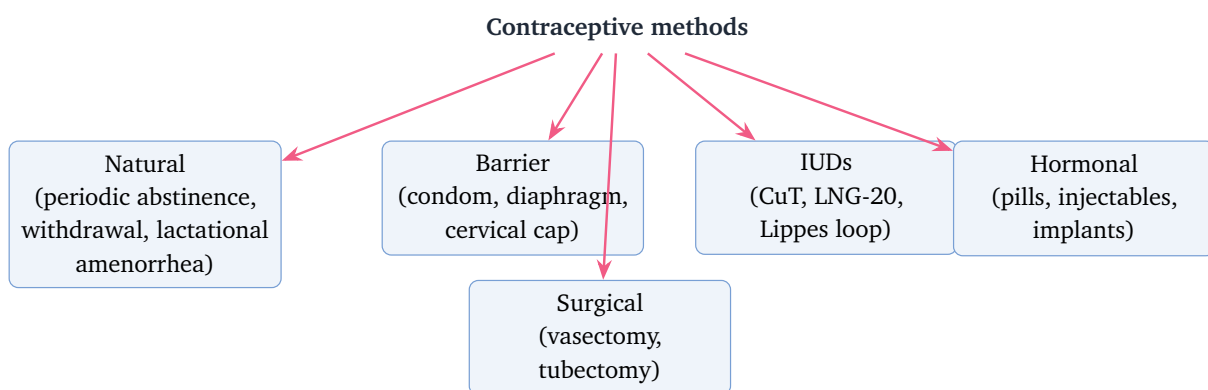
Why this matters. Seeing the cause as an *imbalance* between two rates immediately explains the remedy: since deliberately raising the death rate is unthinkable, the only acceptable lever is lowering the birth rate through contraception and a small-family norm, exactly what the rest of this chapter develops.

Final Answer: A sharply fallen death rate (including MMR and IMR) combined with a still-high birth rate and a large reproductive-age population produces the population explosion.

Q 3.6 Is the use of contraceptives justified? Give reasons.

SOLUTION

Concept used. **Contraceptives** are methods or devices, natural, barrier, intra-uterine, hormonal (pills, injectables, implants), or surgical, used to prevent unwanted pregnancy. “Justified” asks whether their use is reasonable and defensible; we answer yes and give the reasons, while noting they are not a routine health requirement.



Step 1. Yes, the use of contraceptives is justified. They serve clear, beneficial purposes for the individual, the family and society.

Step 2. Prevents unwanted pregnancy. Contraceptives let couples avoid pregnancy due to casual intercourse, rape or contraceptive failure (emergency contraception).

- Step 3. Spacing and limiting children.** They allow couples to delay or space children, giving each child adequate care and protecting the mother's health from too-frequent child-bearing.
- Step 4. Checks population explosion.** Widespread use plays a significant role in controlling the uncontrolled growth of population.
- Step 5. Protection from STIs.** Barrier methods, especially condoms, also protect the user from contracting STIs and AIDS.
- Step 6. Important caution.** Contraceptives are not a regular requirement for maintaining reproductive health; they are used against a natural reproductive event. They should be chosen in consultation with a qualified doctor because of possible side effects (nausea, abdominal pain, irregular bleeding, etc.).

Final Answer: Yes, contraceptive use is justified because it prevents unwanted pregnancy, allows spacing and limiting of children, helps check population explosion, and (barrier methods) protects against STIs, provided the method is chosen with medical advice and its side effects are kept in mind.

✗ State the caution too

A full-mark answer must add that contraceptives are *not* a routine health need and may have side effects. Omitting this caution is the most common reason students lose the last mark here.

EXPERT'S SOLUTION : Vivaan Bhat, Ph.D Molecular Biology, NCBS Bangalore

Strategic angle. A “justify” question is answered best by building the case at three widening levels, the individual, the family and society, and then deliberately adding the single balancing caution. An answer is strongest when it not only argues the claim but also acknowledges the precise limit of the claim, because that is the nuance the NCERT text itself stresses.

- Step 1. Individual level.** Contraceptives protect the health of the individual. They prevent unwanted or too-frequent pregnancy, which protects the mother's body from the strain of repeated child-bearing. Barrier methods, especially condoms, additionally shield the user from contracting STIs and AIDS, so there is a direct health benefit beyond just avoiding pregnancy.
- Step 2. Family level.** They let a couple decide when and how many children to have. Spacing and limiting children means each child, and the mother, gets adequate food, care, education and resources, and emergency contraception covers casual intercourse, rape or a contraceptive failure.

Step 3. Societal level. The widespread use of contraceptives has a significant role in checking the uncontrolled growth of population, which eases pressure on a country's food, housing, schooling and employment.

Step 4. The balancing caution. Contraceptives are practised *against* a natural reproductive event (conception), are not a regular requirement for maintaining reproductive health, and may have side effects such as nausea, abdominal pain, irregular bleeding or, rarely, breast cancer. So they must be selected and used in consultation with a qualified doctor, not adopted casually as a routine measure.

Why this matters. The mature scientific position is not a blanket “yes” but “yes, with informed, medically-guided use”. An examiner reserves the final mark for the student who states this limit explicitly instead of stopping at the benefits, which is why the caution is written as a full step here rather than a footnote.

Final Answer: Justified on individual, family and societal grounds, with the caveat that contraceptives are used against a natural process, may cause side effects, and should be selected with a doctor's guidance.

[Download the Full Reproductive Health Revision Notes →](#)

Q 3.7 Removal of gonads cannot be considered as a contraceptive option. Why?

SOLUTION

Concept used. **Gonads** are the primary sex organs: the *testes* in males and the *ovaries* in females. They have two jobs: (1) producing **gametes** (sperms / ova) and (2) secreting **sex hormones** (testosterone; estrogen and progesterone) that control secondary sexual characters and normal reproductive function. A **contraceptive** only blocks fertilisation; it must not destroy the body's normal reproductive physiology. We compare these requirements.

Step 1. What removal of gonads does. Removing the testes or ovaries permanently stops the production of *both* gametes *and* sex hormones.

Step 2. What a contraceptive should do. A contraceptive should only prevent pregnancy, while keeping the person's reproductive system and hormone balance normal and the effect ideally reversible.

Step 3. Loss of sex hormones is harmful. Without sex hormones the person loses secondary sexual characters and normal sexual and reproductive function, causing serious physiological and behavioural disturbances.

Step 4. It is irreversible. Removal of gonads is permanent and cannot be reversed, whereas a good contraceptive option leaves the choice of having children open.

Step 5. Conclusion. Because it abolishes hormone secretion, causes major side effects and is irreversible, removal of gonads is a mutilating surgery, not a contraceptive method.

Two jobs of a gonad

Gonad = gamete factory + hormone gland. A contraceptive must spare the hormone-gland role; gonad removal does not, so it fails the definition.

Final Answer: Removal of gonads is not a contraceptive option because it permanently stops not only gamete production but also sex-hormone secretion, destroying secondary sexual characters and normal reproductive function, and is irreversible, whereas a contraceptive must prevent only pregnancy without harming normal physiology.

EXPERT'S SOLUTION : Aditi Kapoor, M.Sc Zoology, Banaras Hindu University

Structural observation. The cleanest way to answer this is to test the proposal against the very *definition* of a contraceptive. A contraceptive must satisfy two conditions at once: it must be *pregnancy-blocking and physiology-preserving* (ideally also reversible). Run gonad removal through both conditions and see exactly where it breaks.

Step 1. State the two conditions. Condition 1: the method must prevent conception. Condition 2: it must leave the person's reproductive physiology, especially hormone-driven secondary sexual characters and normal function, intact. A good method is also reversible so the couple can later choose to have children.

Step 2. Condition 1 (conception). Removing the testes or ovaries stops the production of sperms or ova, so no gametes are available for fertilisation. Condition 1 is satisfied, the "prevent conception" box is ticked.

Step 3. Condition 2 (physiology). The same organs are also endocrine glands. The testes secrete testosterone; the ovaries secrete estrogen and progesterone. Removing them abolishes these hormones, so secondary sexual characters and normal sexual/reproductive function are lost, causing serious physiological and behavioural disturbance. Condition 2 *fails*.

Step 4. Reversibility check. The organs are physically removed and cannot regrow, so the procedure is permanent. Unlike pills or IUDs (reversible) or even vasectomy/tubectomy (which spare the hormone glands), there is no way back.

Step 5. Verdict. A method that fails the physiology-preserving condition and is

irreversible is not contraception at all; it is castration, a mutilating surgery.

Why this matters. This question really tests whether you can separate *contraception* (blocking a gamete or its transport while keeping hormones intact) from *castration* (destroying the whole organ, hormones included), a distinction examiners and NEET papers ask in many disguises.

Final Answer: Tested against the definition, gonad removal passes the “prevent conception” condition but fails the “preserve-physiology” condition (it abolishes sex hormones and secondary sexual characters) and is irreversible, so it is castration, not a contraceptive.

Q 3.8 Amniocentesis for sex determination is banned in our country. Is this ban necessary? Comment.

SOLUTION

Concept used. **Amniocentesis** is a foetal sex-determination and disorder-detection test. A sample of **amniotic fluid** surrounding the foetus is taken; the foetal cells and dissolved substances in it are analysed to detect chromosomal abnormalities and genetic disorders. The same test also reveals the foetus’s sex, and that is where the misuse arises.

- Step 1. Yes, the ban is necessary.** The ban is on using amniocentesis *for sex determination*, not on its legitimate medical use.
- Step 2. The misuse.** When the test reveals a female foetus, it is often followed by illegal Medical Termination of Pregnancy (MTP), i.e. **female foeticide**.
- Step 3. Why the misuse is dangerous.** Female foeticide is unethical, illegal, and dangerous both for the young mother (illegal abortions by unqualified quacks cause maternal mortality and morbidity) and for society (it skews the sex ratio).
- Step 4. Legitimate use is still allowed.** For detecting genetic disorders and chromosomal abnormalities in the foetus, amniocentesis remains a valuable diagnostic tool; the law bans only its abuse for sex determination.
- Step 5. Conclusion.** The ban is fully justified: it curbs female foeticide and protects the mother, while still permitting the test’s genuine medical purpose.

♥ Law in this chapter

This links to the chapter’s note that misuse of amniocentesis for sex determination, followed by MTP of female foetuses, is “totally against what is legal”, which is why the statutory ban exists.

Final Answer: Yes, the ban is necessary. Amniocentesis is meant to detect genetic and chromosomal disorders, but its misuse for sex determination leads to illegal female foeticide, which is unethical, harms the mother and skews the sex ratio. Banning only the sex-determination misuse, while allowing the genuine diagnostic use, is fully justified.

✗ Do not over-ban

Students often write that “amniocentesis is banned”. Wrong, only its use *for sex determination* is banned; its use for detecting genetic disorders is legal. State this distinction explicitly.

EXPERT’S SOLUTION : Siddharth Rao, Ph.D Molecular Biology, NCBS Bangalore

Strategic angle. The trap in this question is to argue “ban amniocentesis” or “do not ban amniocentesis” as if the test had a single use. It does not. The mature answer splits the technique into its *intended* role and its *abused* role, judges the ban separately against each, and shows the law bans only the abuse. That separation is the heart of a full-mark answer.

Step 1. Intended role. Amniocentesis samples the amniotic fluid around the foetus and analyses foetal cells to detect chromosomal abnormalities and genetic disorders early in pregnancy. This is a genuinely beneficial diagnostic use that helps parents and doctors plan care.

Step 2. Abused role. The same analysis also reveals the foetus’s sex. When the foetus is found to be female it is frequently followed by an illegal MTP, i.e. female foeticide, which is unethical, illegal, dangerous to the young mother (illegal abortions cause maternal mortality and morbidity) and harmful to society (it skews the sex ratio).

Step 3. Judge the ban against each role. A ban aimed *only* at the abused role (sex determination) stops female foeticide while leaving the diagnostic role untouched, so society keeps the benefit and loses only the harm.

Step 4. Verdict. Because the ban is targeted, it is necessary (female foeticide must be stopped), proportionate (it does not sacrifice genuine diagnosis) and therefore fully justified.

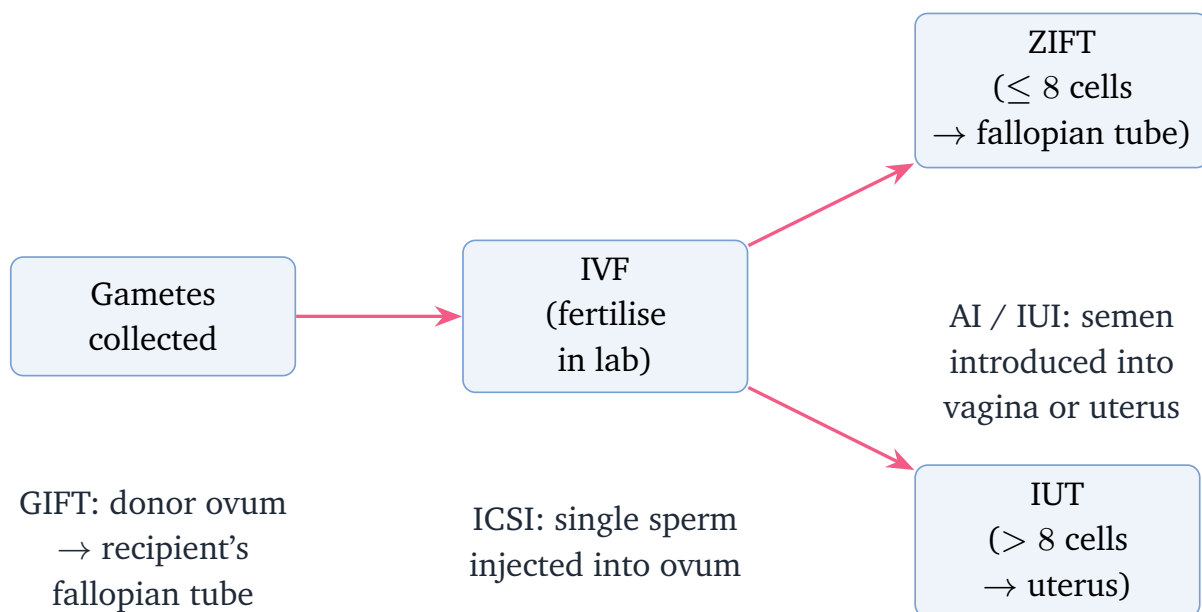
Why this matters. The deeper lesson is that a technology is ethically neutral; the law should restrict the harmful *application*, not ban the tool itself. This “restrict the abuse, keep the use” principle recurs across biology-and-society questions (gene testing, organ transplantation, biotechnology).

Final Answer: The ban on amniocentesis for sex determination is necessary and justified: it prevents illegal female foeticide while still allowing the test's legitimate role in detecting genetic disorders.

Q 3.9 Suggest some methods to assist infertile couples to have children.

SOLUTION

Concept used. **Infertility** is the inability of a couple to produce children despite unprotected sexual cohabitation. When the cause cannot be corrected medically, couples are helped by **Assisted Reproductive Technologies (ART)**, special techniques that bring the gametes together or place the embryo in the reproductive tract artificially. The question asks us to name and briefly describe these methods.



- Step 1. In vitro fertilisation with embryo transfer (IVF-ET), the “test-tube baby” programme.** Ova from the wife/donor and sperms from the husband/donor are collected and induced to form a zygote in the laboratory under simulated conditions.
- Step 2. Zygote intra-fallopian transfer (ZIFT).** The zygote or early embryo (up to 8 blastomeres) is transferred into the fallopian tube.
- Step 3. Intra-uterine transfer (IUT).** An embryo with more than 8 blastomeres is transferred into the uterus to complete further development.
- Step 4. Gamete intra-fallopian transfer (GIFT).** An ovum collected from a donor is transferred into the fallopian tube of a female who cannot produce an ovum

but can provide a suitable environment for fertilisation and development.

Step 5. Intra-cytoplasmic sperm injection (ICSI). A single sperm is directly injected into the ovum in the laboratory to form an embryo.

Step 6. Artificial insemination (AI) / intra-uterine insemination (IUI). Used when the male has very low sperm count or low motility: semen from the husband/donor is artificially introduced into the vagina or into the uterus (IUI) of the female.

Step 7. Adoption. Couples may also be counselled to adopt a child legally, an equally valid way to have children.

Final Answer: Infertile couples can be assisted by ART: IVF-ET (test-tube baby), ZIFT (zygote/early embryo to fallopian tube), IUT (>8-celled embryo to uterus), GIFT (donor ovum to fallopian tube), ICSI (single sperm injected into ovum), and AI/IUI (artificial insemination); legal adoption is another option.

Remember the cut-off

The 8-cell rule decides ZIFT vs IUT: ≤ 8 blastomeres go to the *fallopian tube* (ZIFT); > 8 blastomeres go to the *uterus* (IUT). This exact number is frequently asked.

EXPERT'S SOLUTION : Meera Desai, M.Sc Biotechnology, AIIMS Delhi

Picture-first. The half-dozen ART acronyms become confusing only when they are rote-listed. Track a single gamete instead and ask two questions of every method: *where is fertilisation done?* (inside the body or in the lab) and *where is the product placed?* (fallopian tube or uterus). Every ART method is just one particular answer to those two questions, so once you fix the two axes, each acronym slots into a unique cell.

Step 1. Fertilise in the lab, place an early product in the tube, IVF then ZIFT. In in-vitro fertilisation (IVF) the collected ovum and sperm are fused outside the body under simulated conditions (the “test-tube baby” programme). If the resulting zygote or embryo has up to 8 blastomeres it is placed into the fallopian tube; this transfer is called zygote intra-fallopian transfer (ZIFT).

Step 2. Fertilise in the lab, place a later product in the uterus, IVF then IUT. If the lab-grown embryo has more than 8 blastomeres it is instead placed into the uterus; this is intra-uterine transfer (IUT). The 8-cell line is the single rule that splits ZIFT from IUT.

Step 3. Move a gamete, fertilise inside the body, GIFT and AI/IUI. In gamete intra-fallopian transfer (GIFT) a donor ovum is transferred into the fallopian tube of a woman who cannot make an ovum but can support fertilisation and

development. In artificial insemination (AI) / intra-uterine insemination (IUI), semen from the husband or a donor is introduced into the vagina or directly into the uterus, used when the male has very low sperm count or poor motility.

Step 4. Force fertilisation with one sperm, ICSI. In intra-cytoplasmic sperm injection (ICSI) a single sperm is injected directly into the ovum in the lab to form an embryo, the method of choice for severe male infertility.

Step 5. The non-technological route, adoption. When no technique works, couples are counselled to adopt a child legally, an equally valid way to have children.

Why this matters. Organising ART by “site of fertilisation + site of transfer” converts six look-alike acronyms into a small 2×2 grid, so under exam pressure you reconstruct them by logic instead of recalling a memorised list.

Final Answer: Classify the assistance methods on two axes, where fertilisation happens and where the product is placed: IVF-ET, ZIFT (≤ 8 cells to tube) and IUT (> 8 cells to uterus) for lab fertilisation; GIFT and AI/IUI for in-body fertilisation; ICSI for a single injected sperm; plus legal adoption.

[Download the Full Reproductive Health Formula Sheet →](#)

Q 3.10 What are the measures one has to take to prevent from contracting STDs?

SOLUTION

Concept used. **Sexually transmitted diseases (STDs)** or sexually transmitted infections (STIs) are infections transmitted mainly through sexual intercourse, e.g. gonorrhoea, syphilis, genital herpes, chlamydia, hepatitis-B and HIV/AIDS. Some also spread through infected needles, blood transfusion or from an infected mother to the foetus. Prevention therefore targets these routes of transmission. The NCERT text gives three core principles, which we list and expand.

Step 1. Avoid sex with unknown or multiple partners. Restricting sexual contact to a single, known, uninfected partner removes the main route of transmission.

Step 2. Always use condoms during coitus. The barrier of a condom prevents the exchange of body fluids and so protects against STIs and AIDS.

Step 3. Consult a doctor early in case of doubt. In case of any doubt or symptom, go to a qualified doctor for early detection and get complete treatment if diagnosed with an infection.

Step 4. Avoid sharing needles and ensure safe blood. Since hepatitis-B and HIV also spread through shared injection needles, surgical instruments and unscreened blood, use only sterile needles and screened blood.

Step 5. Avoid mother-to-foetus transmission. An infected mother should take medical advice, as some STIs can pass to the foetus.

The NCERT trio

The three principles printed in the textbook, no unknown/multiple partners, always use condoms, early doctor consultation, are the must-write core of this answer; the other two points are bonus.

Final Answer: Prevent STDs by: avoiding sex with unknown or multiple partners, always using condoms during coitus, consulting a qualified doctor early for detection and complete treatment, not sharing needles or using unscreened blood, and preventing mother-to-foetus transmission through timely medical care.

EXPERT'S SOLUTION : *Yash Banerjee, M.Sc Microbiology, JNU*

Strategic angle. An STI can only enter the body by a fixed set of routes. If we list every route and seal each one, the prevention list must be complete. So instead of memorising measures, we first name the routes, then attach the right barrier to each. There are three transmission routes named in the chapter, plus one catch-all behaviour that backstops them all.

Step 1. Identify the routes. The chapter states STIs spread (1) through sexual intercourse, (2) through shared injection needles, surgical instruments and unscreened blood transfusion, and (3) from an infected mother to the foetus.

Step 2. Seal the sexual route. Restrict coitus to a single, known, uninfected partner and always use a condom. The condom is a physical barrier that stops the exchange of semen and body fluids, so it blocks STIs and AIDS at the same time.

Step 3. Seal the blood/needle route. Never share injection needles, insist on sterilised surgical instruments, and accept only properly screened blood for transfusion. This closes the route used by hepatitis-B and HIV.

Step 4. Seal the mother-to-foetus route. An infected pregnant woman must stay under medical supervision so that transmission to the foetus can be minimised.

Step 5. Add the catch-all behaviour. At the first doubt or symptom (itching, discharge, slight pain, swelling), go to a qualified doctor for early detection and complete treatment. Because most STIs are completely curable if caught early, this single habit backstops every route.

Why this matters. STI incidence is highest in the 15–24 age group, exactly the student’s own age band. Understanding prevention as “one barrier per route” rather than a memorised list means the answer can never be incomplete, and it carries directly into real-life decisions.

Final Answer: Name the three transmission routes (sexual, blood/needle, mother-to-foetus) and seal each: one known partner plus condoms (sexual), sterile needles and screened blood (blood), medical care of infected mothers (vertical), with early doctor consultation as the catch-all because most STIs are curable if detected early.

Q3.11 State True/False with explanation:

- (a) Abortions could happen spontaneously too. (True/False)
- (b) Infertility is defined as the inability to produce a viable offspring and is always due to abnormalities/defects in the female partner. (True/False)
- (c) Complete lactation could help as a natural method of contraception. (True/False)
- (d) Creating awareness about sex related aspects is an effective method to improve reproductive health of the people. (True/False)

SOLUTION

Concept used. Each part tests one definition from the chapter: spontaneous abortion (natural miscarriage), the true definition of infertility, the lactational amenorrhea method, and the role of awareness in reproductive health. We state True/False and justify each from the chapter.

Step 1. (a) Abortions could happen spontaneously too. True. Besides induced abortion (MTP), an abortion can occur on its own due to internal factors such as genetic/developmental incompatibility of the embryo; this is called spontaneous abortion or miscarriage.

Step 2. (b) Infertility ... is always due to defects in the female partner. False. Infertility is the inability to produce children despite unprotected cohabitation, but the defect can lie in the male, the female, or both. In India the female is often wrongly blamed; more often than not the problem lies in the male partner. So “always ... female” is false.

Step 3. (c) Complete lactation could help as a natural method of contraception. True. During intense and complete breast-feeding (lactational amenorrhea), ovulation and the menstrual cycle do not occur, so the chances of conception are almost nil. It is effective only up to about six months after parturition, but the statement itself is true.

Step 4. (d) Creating awareness about sex-related aspects is an effective method to improve reproductive health. True. Awareness (through sex education and media) removes myths and misconceptions, promotes safe practices and helps people seek timely care, so it genuinely improves reproductive health.

Final Answer: (a) True (b) False (c) True (d) True, with explanations as above.

✗ Justify, do not just label

This is a “state True/False *with explanation*” question. Writing only “(a) T (b) F (c) T (d) T” earns almost no marks; the one-line reason after each label carries the marks.

EXPERT'S SOLUTION : Tara Pillai, M.Sc Zoology, Banaras Hindu University

Quick reading. In a four-part true/false question the fast, reliable technique is to scan each sentence for an *absolute word*, “always”, “never”, “only”, “all”. Such words make a sentence false unless the claim is genuinely without exception. Here three of the four statements are plain textbook facts; the single trap is (b), where “always . . . female” is the absolute word that breaks an otherwise reasonable sentence. We still justify every part, because the marks are in the explanation, not the label.

Step 1. (a) True. Abortion has two kinds: induced (the medical termination of pregnancy, MTP) and spontaneous (a natural miscarriage caused by internal factors such as embryo incompatibility). Because the spontaneous kind really exists, the statement “abortions could happen spontaneously too” is *True*.

Step 2. (b) False. The defining clause “always . . . due to defects in the female partner” is the absolute trap. Infertility is the inability to produce children despite unprotected cohabitation, and its cause may lie in the male, the female, or both; in fact the chapter notes the problem “more often than not” lies with the male. So the absolute claim is *False*.

Step 3. (c) True. During complete, intense lactation (lactational amenorrhea) ovulation and the menstrual cycle do not occur, so the chance of conception is almost nil. It is a recognised natural contraceptive method, hence *True*; the only caveat is that it works only up to about six months after parturition.

Step 4. (d) True. Creating awareness about sex-related aspects removes myths and misconceptions, promotes safe practices and encourages timely medical care; the chapter explicitly lists awareness as an effective improvement measure, so the statement is *True*.

Why this matters. The “absolute-word” heuristic (“always”, “never”, “only”, “all”

usually signal False) solves the bulk of biology true/false questions in seconds, freeing time for the explanation that actually earns the marks.

Final Answer: (a) True; (b) False (cause may be male, female or both); (c) True (within ~6 months); (d) True.

Q 3.12 Correct the following statements:

- (a) Surgical methods of contraception prevent gamete formation.
- (b) All sexually transmitted diseases are completely curable.
- (c) Oral pills are very popular contraceptives among the rural women.
- (d) In E. T. techniques, embryos are always transferred into the uterus.

SOLUTION

Concept used. Each statement contains one factual error from the chapter. “Correct the statement” means rewrite it so it is scientifically accurate, changing only the wrong part. We identify the error, then give the corrected sentence.

Step 1. (a) Error: “prevent gamete formation”. Surgical methods

(vasectomy/tubectomy) block the *transport* of gametes, not their formation; the gonads still make gametes.

Corrected: *Surgical methods of contraception prevent the transport of gametes (they block gamete transport during intercourse).*

Step 2. (b) Error: “All ... completely curable”. Except for hepatitis-B, genital herpes and HIV, other STIs are curable if detected early and treated properly; AIDS is not curable.

Corrected: *Most sexually transmitted diseases are completely curable if detected early and treated properly, but hepatitis-B, genital herpes and HIV/AIDS are not completely curable.*

Step 3. (c) Error: “rural women”. Oral pills require regular daily use and awareness; they are popular among *urban* women.

Corrected: *Oral pills are very popular contraceptives among urban women.*

Step 4. (d) Error: “always ... uterus”. In embryo transfer the site depends on the embryo’s stage: embryos with up to 8 blastomeres go into the fallopian tube (ZIFT); only embryos with more than 8 blastomeres go into the uterus (IUT).

Corrected: *In E. T. techniques, embryos with up to 8 blastomeres are transferred into the fallopian tube (ZIFT), while embryos with more than 8 blastomeres are transferred into the uterus (IUT).*

Final Answer: (a) Surgical methods prevent gamete *transport*, not formation. (b) Most STIs are curable if detected early; hepatitis-B, genital herpes and HIV/AIDS are not. (c) Oral pills are popular among *urban* women. (d) Embryos ≤ 8 blastomeres go to the fallopian tube (ZIFT); > 8 blastomeres go to the uterus (IUT).

♥ Pattern of the errors

Notice three of the four errors are over-generalisations (“all”, “always”, “prevent formation”). NCERT loves testing whether you know the precise limit of a statement, the exact skill rewarded here.

EXPERT'S SOLUTION : Ishaan Chatterjee, Ph.D Molecular Biology, NCBS Bangalore

Structural observation. A “correct the statement” question is not asking you to rewrite the sentence; it is asking you to find the *one* word or phrase that is factually wrong and replace it with the precise fact, leaving everything else untouched. Three of the four errors here are over-generalisations (“prevent formation”, “all . . . curable”, “always . . . uterus”), the fourth is a wrong word (“rural”). Locate the broken token first, then patch it.

Step 1. (a) Broken token: “formation”. After vasectomy or tubectomy the gonads still make sperms/ova normally; only the *passage* of gametes (vas deferens / fallopian tube) is blocked. Replace “formation” with “transport”: surgical methods prevent the transport of gametes, not their formation.

Step 2. (b) Broken token: “All . . . completely curable”. Most STIs are curable if detected early and treated properly, but hepatitis-B, genital herpes and HIV/AIDS are not completely curable. Replace “All” with “Most” and add the named exceptions.

Step 3. (c) Broken token: “rural”. Oral pills must be taken on a strict daily schedule, which needs awareness and routine more common among urban women. Replace “rural” with “urban”.

Step 4. (d) Broken token: “always . . . uterus”. In embryo transfer the site is stage-dependent: an embryo with up to 8 blastomeres goes into the fallopian tube (ZIFT), while an embryo with more than 8 blastomeres goes into the uterus (IUT). Replace the absolute “always . . . uterus” with this stage-dependent rule.

Why this matters. “Correct the statement” questions test *precision*, not the volume of what you know. The technique examiners reward is changing the minimum number of words while making the science exactly right, exactly the discipline shown above.

Final Answer: (a) transport, not formation; (b) most, not all, curable (HIV/AIDS, hepatitis-B, genital herpes excepted); (c) urban, not rural; (d) \leq 8-cell embryo \rightarrow fallopian tube, $>$ 8-cell embryo \rightarrow uterus.

Key Takeaways

- Reproductive health (WHO) is total well-being in all aspects of reproduction, physical, emotional, behavioural and social, and matters for individuals, families and society alike.
- Population explosion is driven by a sharply fallen death rate (and lower MMR, IMR) alongside a still-high birth rate, so contraception, not the death rate, is the lever for control.
- Contraceptive methods, natural, barrier, IUDs, oral pills, injectables/implants and surgical (vasectomy/tubectomy), are chosen with medical advice; they are used against a natural event and are not a routine health need.
- MTP is legal in India under strict conditions; amniocentesis is allowed for genetic-disorder detection but banned for sex determination to stop female foeticide.
- Most STIs are curable if detected early; hepatitis-B, genital herpes and HIV/AIDS are not. Prevent STIs by single known partner, condoms and early medical consultation.
- Infertility may be male, female or both; ART, IVF-ET, ZIFT (\leq 8-cell to fallopian tube), IUT ($>$ 8-cell to uterus), GIFT, ICSI, AI/IUI, and legal adoption help such couples.

Related Collegedunia Resources

Same chapter — other resources:

- [Revision Notes](#)
- [Formula Sheet](#)
- [NCERT Book PDF](#)
- [Exemplar Book PDF](#)
- [Exemplar Solutions](#)
- [Handwritten Notes](#)

Continue learning:

- [Ch 11: Organisms and Populations](#)
- [Ch 13: Biodiversity and Conservation](#)
- [Class 12 Biology — All Chapters](#)

End of NCERT Exercise Solutions