CHAPTER 4

Reproductive Health

4.1 Reproductive Health : Problems and Strategies

1. In context of amniocentesis, which of the following statements is incorrect?
   (a) It can be used for detection of Down's syndrome.
   (b) It can be used for detection of cleft palate.
   (c) It is usually done when a woman is between 14-16 weeks pregnant.
   (d) It is used for prenatal sex determination.
   (NEET-I 2016)

2. Which of the following cannot be detected in a developing fetus by amniocentesis?
   (a) Down's syndrome
   (b) Jaundice
   (c) Klinefelter's syndrome
   (d) Sex of the fetus *(NEET 2013)*

3. The permissible use of the technique amniocentesis is for
   (a) detecting sex of the unborn fetus
   (b) artificial insemination
   (c) transfer of embryo into the uterus of a surrogate mother
   (d) detecting any genetic abnormality. *(2010)*

4. Fetal sex can be determined by examining cells from the amniotic fluid by looking for
   (a) chiasmata (b) kinetochore
   (c) barr bodies (d) autosomes. *(1997)*

4.2 Population Stabilisation and Birth Control

5. Which of the following contraceptive methods involve a role of hormone ?
   (a) Pills, Emergency contraceptives, Barrier methods
   (b) Lactational amenorrhea, Pills, Emergency contraceptives
   (c) Barrier method, Lactational amenorrhea, Pills
   (d) CuT, Pills, Emergency contraceptive
   (NEET 2019)

6. Select the hormone-releasing Intra-Uterine Devices.
   (a) Lippes Loop, Multiload 375
   (b) Vaults, LNG-20
   (c) Multiload 375, Progestasert
   (d) Progestasert, LNG-20 *(NEET 2019)*

7. Which of the following is a correct statement?
   (a) IUDs once inserted need not be replaced.
   (b) IUDs are generally inserted by the user herself.
   (c) IUDs increase phagocytosis of sperms in the uterus.
   (d) IUDs suppress gametogenesis.
   (Odisha NEET 2019)

8. The contraceptive 'Saheli'
   (a) blocks estrogen receptors in the uterus, preventing eggs from getting implanted
   (b) increases the concentration of estrogen and prevents ovulation in females
   (c) is an IUD
   (d) is a post-coital contraceptive.
   (NEET 2018)

9. The function of copper ions in copper releasing IUDs is
   (a) they inhibit gametogenesis
   (b) they make uterus unsuitable for implantation
   (c) they inhibit ovulation
   (d) they suppress sperm motility and fertilising capacity of sperms. *(NEET 2017)*

10. Which of the following is hormone-releasing IUD?
    (a) LNG-20 (b) Multiload 375
    (c) Lippes Loop (d) Cu7
    (NEET-II 2016)

11. Which of the following is incorrect regarding vasectomy?
    (a) No sperm occurs in seminal fluid
    (b) No sperm occurs in epididymis
    (c) Vasa deferentia is cut and tied
    (d) Irreversible sterility *(NEET-II 2016)*

12. Which of the following approaches does not give the defined action of contraceptive?

(a)	Hormonal contraceptives	Prevent/retard entry of sperms, prevent ovulation and fertilisation
(b)	Vasectomy	Prevents spermatogenesis
(c)	Barrier methods	Prevent fertilisation
(d)	Intra uterine devices	Increase phagocytosis of sperms, suppress sperm motility and fertilising capacity of sperms

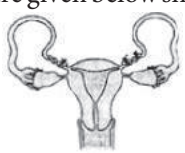
(NEET-I 2016)

13. Tubectomy is a method of sterilisation in which
(a) small part of the fallopian tube is removed or tied up
(b) ovaries are removed surgically
(c) small part of vas deferens is removed or tied up
(d) uterus is removed surgically. *(2014)*

14. Which of the following is a hormone releasing Intra Uterine Device (IUD)?
(a) Multiload 375 (b) LNG - 20
(c) Cervical cap (d) Vault *(2014)*

15. One of the following is not a method of contraception. Which one?
(a) Condoms
(b) Pills of a combination of oxytocin and vasopressin
(c) Lippes Loop
(d) Tubectomy *(Karnataka NEET 2013)*

16. What is the figure given below showing in particular?



(a) Ovarian cancer (b) Uterine cancer
(c) Tubectomy (d) Vasectomy *(2012)*

17. Which one of the following is the most widely accepted method of contraception in India at present?
(a) Cervical caps
(b) Tubectomy
(c) Diaphragms
(d) IUDs (Intra uterine devices) *(2011)*

18. Cu ions released from copper-releasing intra uterine devices (IUDs)
(a) make uterus unsuitable for implantation
(b) increase phagocytosis of sperms
(c) suppress sperm motility
(d) prevent ovulation. *(2010)*

19. Given below are four methods (A-D) and their modes of action (i-iv) in achieving contraception. Select their correct matching from the four options that follow.

Method	Mode of Action
A. The pill	(i) Prevents sperms reaching cervix
B. Condom	(ii) Prevents implantation
C. Vasectomy	(iii) Prevents ovulation
D. Copper T	(iv) Semen contains no sperms

(a) A – (iii), B – (iv), C – (i), D – (ii)
(b) A – (ii), B – (iii), C – (i), D – (iv)
(c) A – (iii), B – (i), C – (iv), D – (ii)
(d) A – (iv), B – (i), C – (ii), D – (iii) *(2008)*

20. What is the work of copper-T?
(a) To inhibit ovulation
(b) To inhibit fertilisation
(c) To inhibit implantation of blastocyst
(d) To inhibit gametogenesis *(2000)*

21. What is the work of progesterone which is present in oral contraceptive pills?
(a) To inhibit ovulation
(b) To check oogenesis
(c) To check entry of sperms into cervix and to make them inactive
(d) To check sexual behaviour *(2000)*

22. Tablets to prevent male contraception contain
(a) progesterone (b) LH
(c) FSH (d) both (b) and (c). *(1999)*

23. The most important component of the oral contraceptive pills is
(a) thyroxine (b) luteinising hormone
(c) progesterone (d) growth hormone. *(1998)*

24. The present population of the world is about
(a) 15 trillion (b) 6 billion
(c) 500 million (d) 100 million. *(1997)*

4.3 Medical Termination of Pregnancy (MTP)

25. One of the legal methods of birth control is
(a) by having coitus at the time of day break
(b) by a premature ejaculation during coitus
(c) abortion by taking an appropriate medicine
(d) by abstaining from coitus from day 10 to 17 of the menstrual cycle. *(NEET 2013)*

26. Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?
(a) Eight weeks (b) Twelve weeks
(c) Eighteen weeks (d) Six weeks *(2011)*

27. Consider the statements given below regarding contraception and answer as directed thereafter.
(1) Medical termination of pregnancy (MTP) during first trimester is generally safe.
(2) Generally chances of conception are nil until mother breast-feeds the infant upto two years.
(3) Intrauterine devices like copper-T are effective contraceptives.
(4) Contraception pills may be taken upto one week after coitus to prevent conception.
Which two of the above statements are correct?
(a) 1, 3 (b) 1, 2
(c) 2, 3 (d) 3, 4 *(2008)*

4.4 Sexually Transmitted Infections (STIs)

28. Select the option including all sexually transmitted diseases.
(a) Gonorrhoea, Syphilis, Genital herpes
(b) Gonorrhoea, Malaria, Genital herpes
(c) AIDS, Malaria, Filaria
(d) Cancer, AIDS, Syphilis *(NEET 2020)*

29. Which of the following sexually transmitted diseases is not completely curable?
(a) Chlamydiasis (b) Gonorrhoea
(c) Genital warts (d) Genital herpes
(NEET 2019)

30. Match the following sexually transmitted diseases (column I) with their causative agent (column II) and select the correct option.

Column I		Column II
A. Gonorrhoea	(i)	HIV
B. Syphilis	(ii)	*Neisseria*
C. Genital warts	(iii)	*Treponema*
D. AIDS	(iv)	Human papilloma virus

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

(NEET 2017)

31. Which of the following is not a sexually transmitted disease?
(a) Trichomoniasis
(b) Encephalitis
(c) Syphilis
(d) Acquired Immuno Deficiency Syndrome (AIDS)
(2015 Cancelled)

32. Which one of the following statements is correct regarding sexually transmitted diseases (STDs)?
(a) A person may contract syphilis by sharing milk with one already suffering from the disease.
(b) Haemophilia is one of the STDs.
(c) Genital herpes and sickle-cell anaemia are both STDs.
(d) The chances of a 5-years boy contracting a STD are very little.
(Karnataka NEET 2013)

33. Which one of the following does correctly match a sexually transmitted disease with its pathogen?
(a) Syphilis-*Treponema pallidum*
(b) Gonorrhoea-*Entamoeba histolytica*
(c) Urethritis-*Bacillus anthracis*
(d) Softsore-*Bacillus brevis* *(1994)*

4.5 Infertility

34. In which of the following techniques, the embryos are transferred to assist those females who cannot conceive?
(a) ZIFT and IUT (b) GIFT and ZIFT
(c) ICSI and ZIFT (d) GIFT and ICSI
(NEET 2020)

35. In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation?
(a) Gamete Intracytoplasmic Fallopian Transfer
(b) Artificial Insemination
(c) Intracytoplasmic sperm injection
(d) Intrauterine transfer *(NEET 2017)*

36. Embryo with more than 16 blastomeres formed due to *in vitro* fertilisation is transferred into
(a) uterus (b) fallopian tube
(c) fimbriae (d) cervix.
(NEET-II 2016)

37. A childless couple can be assisted to have a child through a technique called GIFT. The full form of this technique is
(a) Gamete Internal Fertilisation and Transfer
(b) Germ cell Internal Fallopian Transfer
(c) Gamete Inseminated Fallopian Transfer
(d) Gamete Intra Fallopian Transfer. *(2015)*

38. Assisted reproductive technology, IVF involves transfer of
(a) ovum into the fallopian tube
(b) zygote into the fallopian tube
(c) zygote into the uterus
(d) embryo with 16 blastomeres into the fallopian tube. *(2014)*

39. Artificial Insemination means
(a) artificial introduction of sperms of a healthy donor into the vagina
(b) introduction of sperms of a healthy donor directly into the ovary

(c) transfer of sperms of a healthy donor to a test tube containing ova
(d) transfer of sperms of husband to a test tube containing ova. *(NEET 2013)*

40. The stage transferred into the uterus after induced fertilisation of ovum in the laboratory is
(a) embryo at 4 blastomeres stage
(b) embryo at 2 blastomeres stage
(c) morula
(d) zygote. *(Karnataka NEET 2013)*

41. The test-tube baby programme employs which one of the following techniques?
(a) Intra Cytoplasmic Sperm Injection (ICSI)
(b) Intra Uterine Insemination (IUI)
(c) Gamete Intra Fallopian Transfer (GIFT)
(d) Zygote Intra Fallopian Transfer (ZIFT) *(2012)*

42. The technique called Gamete Intra Fallopian Transfer (GIFT) is recommended for those females
(a) who cannot produce an ovum
(b) who cannot retain the fetus inside uterus
(c) whose cervical canal is too narrow to allow passage for the sperms
(d) who cannot provide suitable environment for fertilisation. *(Mains 2011)*

43. *In vitro* fertilisation is a technique that involves transfer of which one of the following into the fallopian tube?
(a) Embryo only, upto 8 cell stage
(b) Either zygote or early embryo upto 8 cell stage
(c) Embryo of 32 cell stage
(d) Zygote only *(2010)*

44. Test tube baby means a baby born when
(a) it is developed in a test tube
(b) it is developed through tissue culture method
(c) the ovum is fertilised externally and thereafter implanted in the uterus
(d) it develops from a non-fertilised uterus. *(2003)*

45. The test tube baby means
(a) fertilisation and development both in uterus
(b) fertilisation in *vitro* and then transplantation in uterus
(c) a baby grown in test tube
(d) fertilised and developed embryo in test tube. *(1996)*

46. Which of the following statements is correct with reference to a test tube baby?
(a) Fertilisation of the egg is effected outside the body; the fertilised egg is then placed in the womb of the mother where the gestation is completed.
(b) Fertilisation of the egg is effected in the female genital tract. It is then taken out and grown in a large test tube.
(c) A prematurely born baby is reared in an incubator.
(d) Fertilisation of the egg and growth of the embryo are affected in a large test tube. *(1994)*

ANSWER KEY

1.	(b)	**2.**	(b)	**3.**	(d)	**4.**	(c)	**5.**	(b)	**6.**	(d)	**7.**	(c)	**8.**	(a)	**9.**	(d)	**10.**	(a)
11.	(b)	**12.**	(b)	**13.**	(a)	**14.**	(b)	**15.**	(b)	**16.**	(c)	**17.**	(d)	**18.**	(c)	**19.**	(c)	**20.**	(b,c)
21.	(a)	**22.**	(d)	**23.**	(c)	**24.**	(b)	**25.**	(c)	**26.**	(b)	**27.**	(a)	**28.**	(a)	**29.**	(d)	**30.**	(d)
31.	(b)	**32.**	(d)	**33.**	(a)	**34.**	(a)	**35.**	(b,c)	**36.**	(a)	**37.**	(d)	**38.**	(b)	**39.**	(a)	**40.**	(c)
41.	(d)	**42.**	(a)	**43.**	(b)	**44.**	(c)	**45.**	(b)	**46.**	(a)								

Hints & Explanations

1. (b) : Amniocentesis is fetal sex determination and disorder test based on the chromosomal pattern in the amniotic fluid surrounding the developing embryo. It can be used to determine the sex of the infant, to identify some abnormalities in the number of chromosomes and to detect certain biochemicals and enzymatic abnormalities. It is usually done when woman is 14-16 weeks pregnant. Cleft palate can be detected by ultrasound.

2. (b) : Amniocentesis is a fetal sex determination test in which amniotic fluid containing fetal cells which surrounds the developing embryo is extracted and cells are tested for chromosomal pattern to identify genetic

disorders, if any. Jaundice is not a chromosomal disorder thus cannot be tested by amniocentesis.

3. (d) : Amniocentesis is withdrawal of a sample of the fluid (amniotic fluid) surrounding a fetus in the uterus by piercing the amniotic sac through the abdominal wall, under direct ultrasound guidance. As the amniotic fluid contains cells from the fetus, cell cultures enable chromosome patterns to be studied so that prenatal diagnosis of chromosomal abnormalities can be made. Certain metabolic errors and other abnormalities, such as spina bifida, can also be diagnosed prenatally from analysis of the cells or of the fluid.
As this technique also helps in detection of sex of the unborn fetus, it has been banned in order to legally check increasing female feticides.

4. (c) : Barr body is a structure consisting of a condensed X chromosome that is found in non-dividing nuclei of female mammals. Amniotic fluid contains fetal skin cells, that are stained to determine the presence of sex chromatin (barr body). The presence of barr body indicates that the developing fetus is female with two X-chromosome.

5. (b) : Lactational amenorrhea method is based on the fact that ovulation and therefore the menstrual cycle do not occur during the period of intense lactation following parturition. This is because breast feeding disrupts the pattern of pulsatile release of GnRH from hypothalamus and hence reduction in gonadotropin releasing hormones. Pills are hormonal preparations (either progestogen or progestogen-estrogen combinations) in the form of tablets which are administrated orally by females. They inhibit ovulation, implantation as well as alter the quality of cervical mucus. Emergency contraceptives are pills that contain levonorgestrel, a type of progestin that helps to prevent pregnancy when taken in few days after sex.

6. (d) : Lippes Loop is non-medicated Intra Uterine Device (IUD) while Multiload 375 is copper releasing IUD. Vault is a barrier method of birth control. It is a hemispheric dome-like rubber or plastic cap with thick rim meant for fitting over the vaginal cervix.

7. (c)

8. (a) : 'Saheli' is a mini pill that contains a non-steroidal preparation called centchroman which is taken once in a week after an initial intake of twice a week dose for 3 months. It blocks estrogen receptors in the uterus hence alters uterine lining and prevents fertilised egg from being implanted.

9. (d) : Copper releasing IUDs (*i.e.*, CuT, LNG-20) are placed in the uterus of the females. They are efficient birth control methods. Copper ions released by them suppress motility and fertilising capacity of the sperms.

10. (a) : LNG-20 is the hormone releasing IUD, Multiload 375 and Cu7 are copper releasing IUDs and Lippes Loop is a non-medicated IUD.

11. (b) : Vasectomy is a surgical contraception method performed in males. In vasectomy, a small part of the vas deferens is removed or tied up through a small cut on the scrotum. This prevents sperm transport. Vasectomy has a poor reversibility. There is no effect on libido and erectile functioning. Seminal vesicles are one pair of sac like structures which join vasa deferentia to form ejaculatory duct. They secrete seminal fluid which contains fructose, prostaglandins and clotting protein, but no sperms. In a male who has undergone vasectomy, the ejaculatory duct will receive seminal fluid but due to cut in vasa deferentia sperms will not be transported from epididymis hence the semen will lack sperms.

12. (b) : Vasectomy is a sterilisation technique for the males in which a small part of the vas deferens is removed or tied up through a small cut on the scrotum to prevent passage of sperms. Spermatogenesis is the series of cell division in the testis that results in the production of spermatozoa or sperms.

13. (a) : Sterilisation provides a permanent and sure birth control. In females, it is called tubectomy. Tubectomy involves the blocking of the fallopian tubes. A small part of the fallopian tube is removed or tied up through a small incision in the abdomen or through vagina.

14. (b) : At present the most widely accepted method of contraception in India is IUDs. Intra uterine devices (IUDs) are plastic or metal objects which are inserted by doctors in the uterus through vagina. These are available as non-medicated IUDs (*i.e.*, Lippes Loop), copper releasing IUDs (CuT, Cu7, Multiload 375) and hormone releasing IUDs (progestasert, LNG-20). Vault cap is hemispheric dome like rubber or plastic cap with a thick rim which is meant for fitting over the vaginal vault over the cervix. Cervical cap is a reusable rubber cup that fits tightly over the cervix.

15. (b) : Oxytocin is a birth hormone and vasopressin (anti-diuretic hormone) reabsorbs water from the renal tubules to conserve water in the body. They have no role in contraception.

16. (c) : Tubectomy involves blocking of the fallopian tubes. The fallopian tubes are tied twice and cut between the knot. It prevents the sperms from reaching the ovum and thus prevents fertilisation. It is a permanent method of sterilisation.

17. (d) : *Refer to answer 14.*

18. (c) : Copper releasing IUDs (*i.e.*, CuT, LNG-20) are placed in the uterus of the females. They are efficient

birth control methods. Copper ions released by them suppress motility and fertilising capacity of the sperms.

19. (c)

20. (b, c) : Copper-T is an intrauterine device (IUD) used by women as a birth control. An IUD is a small device which is placed inside the uterus. The vertical and horizontal arms of the Copper - T contain copper which is slowly released into the uterine cavity. Copper stops sperm from making their way up through the uterus into the tubes, and it reduces the ability of sperm to fertilise the egg. It also prevents a fertilised egg (blastocyst) from successfully implanting in the lining of the uterus if fertilisation has occurred.

21. (a) : Pills also called contraceptive pills contain small doses of either progestogens or progestogen-estrogen combinations. They inhibit ovulation and implantation.

22. (d) : Male contraceptives work by interfering with sperm production or delivery, that means they inhibit the spermatogenesis as well as the function of male sex hormone testosterone.

LH and FSH (both called gonadotropic hormone are secreted from anterior pituitary) have specific functions in the testis. FSH stimulates male germ cells for spermatogenesis and LH stimulates accessory cells, called Leydig cells to produce sex steroids, especially testosterone. Thus, these two hormones (FSH and LH) prevent male contraception.

23. (c) : The most common type of pill is the so called "combined pill". It contains a combination of synthetic progestins (acting like progesterone) and estrogen. Combined pills inhibit ovulation by inhibiting the normal release of FSH and LH from the pituitary. They mimic the hormones produced by the corpus luteum, causing the uterine walls to thicken, as during normal menstrual cycle and suppressing the release of FSH and LH.

24. (b) : As this question appeared in 1997, so the population of world in mid 1997 was 5, 840, 324, 240 *i.e.*, approximately 6 billion.

25. (c) : Intentional or voluntary termination of pregnancy by taking an appropriate medicine before full term is called medical termination of pregnancy (MTP) or induced abortion. Nearly 45 to 50 million MTPs are performed in a year all over the world which account to 1/5th of the total number of conceived pregnancies in a year. MTP has a significant role in decreasing the population though it is not meant for that purpose. Government of India legalised MTP in 1971 with some strict conditions to avoid its misuse. Such restrictions are all the more important to check indiscriminate and illegal female foeticides.

26. (b) : Medical termination of pregnancy (MTP) or abortion is the termination of pregnancy before the fetus becomes viable. MTP is comparatively safe upto 12 weeks (the first trimester) of pregnancy. It becomes more risky after the first trimester period of pregnancy as the fetus becomes intimately associated with the maternal tissues.

27. (a) : Intrauterine devices like copper-T are effective contraceptives for birth control. It suppresses sperm motility and the fertilising capacity of the sperms. Medical termination of pregnancy or induced abortion is voluntary or intentional termination of pregnancy before full term of fetus. It is comparatively safe upto 12 weeks (the first trimester) of pregnancy.

28. (a) : Malaria, filaria and cancer are not sexually transmitted diseases (STDs).

29. (d) : Antibiotics like tetracycline, erythromycin and rifampicin are effective in chlamydiasis. Gonorrhoea can be treated by antibiotics such as erythromycin, ciprofloxacin, etc. For treating genital warts, cryosurgery is used for removing warts. Genital herpes is an incurable STD.

30. (d) **31. (b)**

32. (d) : Syphilis is caused by bacterium *Treponema pallidum*. It is a sexually transmitted disease (STD) which is transferred through sexual intercourse with infected person. Haemophilia is a X-linked genetic disorder of blood. It is not transmitted *via* any sexual practice. Genital herpes is an STD while sickle-cell anaemia is an autosomal hereditary disorder.

The chances of a 5 year boy contracting an STD are very little since he is unlikely to have sex at this age.

33. (a)

34. (a) : *In vitro* fertilisation, *i.e.*,fertilisation outside the body in almost similar conditions as that in the body, followed by embryo transfer (ET) method. In this method, ova from the wife or donor (female) and sperms from husband or donor (male) are collected and are induced to form zygote under simulated conditions in the laboratory. The zygote or early embryos (with upto 8 blastomeres) could then be transferred into the fallopian tube (ZIFT–Zygote Intra Fallopian Transfer) and embryos with more than 8 blastomeres, into the uterus (IUT – Intra Uterine Transfer), to complete its further development.

35. (b, c)

36. (a) : Embryo with more than 16 blastomeres formed due to *in-vitro* fertilisation is transferred into uterus (intra-uterine transfer, IUT).

37. (d) : Gamete Intra Fallopian Transfer (GIFT) is an assisted reproductive technology in which both the

sperm and unfertilised oocytes are transferred into the fallopian tubes. Fertilisation takes place *in vivo* (inside the body of the female).

38. (b) : Assisted reproductive technologies (ART) include a number of special techniques which assist infertile couples to have children. An important technique of ART is test tube baby programme. The baby produced by conceiving in a culture dish and nursing in the uterus is called a test tube baby. This method involves *in vitro* fertilisation (IVF), *i.e.*, fertilisation of male and female gamete outside the body in almost similar conditions as that in the body followed by embryo transfer (ET). Zygote or embryo upto 8 blastomeres is transferred into the fallopian tube (ZIFT - Zygote Intra Fallopian Transfer) and mature embryo with more than 8 blastomeres is transferred to uterus to complete its further development.

39. (a) : In Artificial Insemination technique, the semen of a healthy donor male is collected and is introduced artificially through a flexible polyethylene catheter into the vagina or into uterus called intra-uterine insemination (IUI). Best results are obtained when the motile sperm count is more than 10 million. The fertilising capacity of spermatozoa (sperms) is for 24- 48 hours. The procedure may be repeated 2-3 times over a period of 2 – 3 days.

40. (c) : Cleavage divisions produce a solid ball of cells called morula. It has 8–16 cells, occasionally 32 cells. It is transferred into uterus (IUT-Intra-uterine transfer) for further development.

41. (d) : *Refer to answer 38.*

42. (a) : Gamete Intra Fallopian Transfer (GIFT) is transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce ova but can provide proper environment for fertilisation and further development.

43. (b) : *Refer to answer 38.*

44. (c) : By *in vitro* fertilisation, the ovum is fertilised with sperm outside the body of a woman, providing the ovum with the same environmental conditions as it would have got inside the uterus. The zygote is grown inside a culture and when embryo is formed, it is then implanted into uterus where it develops into fetus and then into a child. This is called test tube baby.

45. (b) : *Refer to answer 38.*

46. (a)

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