DEEWAN PUBLIC SCHOOL , MEERUT ROAD (HAPUR)

CLASS - 12th

BIOLOGY

S.N.	TERM	CHAPTER NUMBER	PAGE	CHAPTER NAME
1	I	CHAPTER-2	4-9	SEXUAL REPRODUCTION IN FLOWERING PLANTS
2		CHAPTER-3	10-21	HUMAN REPRODUCTION
3		CHAPTER-4	22-31	REPRODUCTIVE HEALTH
4		CHAPTER-5	32-40	PRINCIPLE OF INHERITANCE AND VARIATION
5		CHAPTER-6	41-49	MOLECULAR BASIS OF INHERITANCE

CHAPTER-2: SEXUAL REPRODUCTION IN FLOWERING PLANTS

Multiple Choice Questions

1. Perisperm is-

(a) Degenerate secondary nucleus (b) Remnant of nucleus
(b) Peripheral part of endosperm (d) Degenerate synergids

2. Which of the following fruit is a case of parthenogenesis?

(a) Fruit without seeds after pollination
(b) Fruit with seeds afterpollination
(c) Fruit with viable seeds without fertilization
(d) Fruit with viable seeds after fertilization.

3. If an endosperm cell of an angiosperm has 24 chromosomes, the root cell of megaspore mother cell should have-

(a)8 (b)16 (c)4 (d)24

4. How many meiotic divisions are needed for forming 100 grains of wheat?

(a)100 (b)25 (c)50 (d)20

5. Aleurone layer is present in

(a) The peripheral part of scutellum (b) The peripheral part of coleoptile
(c) Cotyledons (d) The peripheral part of endosperm

6. Which is the most logical sequence with reference to life cycle of angiosperm?

(a) Pollination, fertilization, seed formation, germination
(b) Germination, endosperm formation, seed dispersal, double fertilization
(c) Cleavage, fertilization, grafting, fruit formation
(d) Maturation, mitosis, differentiation, fertilization.

7. Sporopollenin issecretedby

(a) Cytoplasm of the pollen (b) Cytoplasm of the pollen mother cell (c)Cytoplasm of the tapetum (d) Cytoplasm of the endothecium

8. Which one of these tissues is not produced from the embryonic mass of a dicotyledonous seeds?

(a) Roottip (b)Plumule (c)Hypocotyl (d) Cotyledons

9. Iftheflowering plant has 12 number of chromosomes in each of its meristematic cell, which of the following structures would have 6 chromosomes?

(a) Rootapex (b) Pollen and megaspore mother cells

(c) Microspore and functional megaspores (d) Secondary nucleus within the embryo.

10. The development of helobial endosperm is

(a) Just like that of cellular endosperm

(b) Exactly similar to that of nuclear endosperm

(c) Intermediate between the nuclear and cellular endosperm

(d) None of the above.

11. Embryo sac of an angiosperm is homologous to

(a) Megaspore (b) Female gametophyte

(c) Sporangium (d) None of above

12. Anthesis is-

(a) Dehiscence of anthers (b) Opening of floral bud (c) Entry of pollen tube into ovule (d) Emergence of anthers

13. Entry of pollen tube through micropyle is called

(a) Mesogamy (b) Pseudogamy (c) Chalazogamy (d) Porogamy.

14. The outermost and innermost wall layers of microsporangium in an anther are respectively

(a) Endothecium and tapetum (b) Epidermis and endodermis

(c) Epidermis and middle layer (d) Epidermis and tapetum.

15. In a fertilized embryo sac, the haploid, diploid and triploid structures are-

(a) Synergid, zygote and primary endosperm nucleus

(b) Synergid, antipodal and polar nuclei

(c) Antipodal, synergid and primary endosperm nucleus

(4) Synergid, polar nuclei and zygote

16. Milky water in green coconut is

(a) Free nuclear Liquid endosperm (b) Liquid female gametophyte

(c) Liquid nucleus (4) Liquid chalaza

17. A plant with both male and female flowers is

(a) Unisexual (b) Bisexual (C) Monoecious (d) Dioecious

18. Filiform apparatus occurs in

(a) Synergids (b) Antipodals

(c) Egg nucleus (d) Secondary nucleus.

19. A dicotyledonous plant bears flowers, but never produces fruits and seeds. The most probable cause for the above situation is

(a) plant is dioecious and bears only pistillate flowers

(b) plant is dioecious and bears both pistillate and staminate flowers

(C) plant is monoecious

(d) plant is dioecious and bears only staminate flowers

20. 256 microspores will form by the meiosis of-

(a) 512 microspore mother cells (b) 128 microspore mother cells

C) 64 microspore mother cells (d) 48 microspore mother cells

21. If a normal plant suddenly started reproducing parthenogenetically, the number of chromosomes of the second generation compared to the parent will be

(a) One-half (b) One fourth (c) Double (d) Same.

22. In a flower, if the megaspore mother cell forms megaspores without undergoing meiosis and if one of the megaspores develops into an embryo sac, its nuclei would be

(a) Haploid (b) Diploid

(C) A few haploid and a few diploid (d) With varying ploidy

23. In an embryo sac, the cells that degenerate after fertilization are:

(a) Synergids and primary endosperm cell (b) Synergids and antipodals

(c) Antipodals and primary endosperm cell (d) Egg and antipodals,

24. In the embryos of a typical dicot and a grass, true homologous structures are:

(a) Coleorhiza and coleoptile (b) Coleoptile and scutellum

(c) Cotyledons and scutellum (d) Hypocotyl and radicle

25. While planning for an artificial hybridisation programme involving dioecious plants, which of the following step would NOT be relevant:

(a) Bagging of female flower (b) Dusting of pollen on stigma

(c) Emasculation (d) Collection of pollen.

26. Choose the correct statement from the following

(a) Cleistogamous flowers always exhibit autogamy

(b) Chasmogamous flowers always exhibit geitonogamy

(c) Cleistogamous flowers exhibit both autogamy and geitonogamy

(d) Chasmogamous flowers never exhibit autogamy.

27. Autogamy can occur in a chasmogamous flower if

(a) pollen matures before maturity of ovule

(b) ovule matures before maturity of pollen

(c) both pollen and ovules mature simultaneously

(d) both anther and stigma are of equal lengths

28. A particular species of plant produces light, non-sticky pollen in large numbers and its stigmas are long and feathery. These modifications facilitate pollination by

(a) insects (b) water (c) wind (d) animals

29. From among the situations given below, choose the one that prevents both autogamy and geitonogamy

(a) Monoecious plant bearing unisexual flowers

(b) Dioecious plant bearing only male or female flowers

(c) Monoecious plant with bisexual flowers

(d) Dioecious plant with bisexual flowers.

30. Starting from the innermost part, the correct sequence of parts in an ovule is

(a) egg nucellus, embryo sac, integument (b) egg, embryo sac, nucellus, integument

(c) embryo sac, nucellus, integument, egg (d) egg, integument, embryo sac, nucellus

Assertion and Reasoning based Questions
(Question No. 31 to 40)

In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements mark the correct answer as:

(a) Both Assertion and Reason are true and the reason is the correct explanation of the Assertion.

(b) Both Assertion and Reason are true and the reason is not the correct explanation of the Assertion.

(c) Both Assertion and Reason are true and the reason is the correct explanation of the Assertion.

(d) Both Assertion and Reason are true and the reason is the correct explanation of the Assertion.

31. Assertion. Maize is an albuminous seed.
Reason. Its endosperm is completely absorbed by its growing embryo.

32. Assertion. The megaspore mother cells divide by meiotic division to produce four spores.
Reason. Megaspore Mother Cells (MMC) are diploid and megaspores are haploid.

33. Assertion. 7-called, 8 nucleate and monosporic embryo sac is Most common type of embryo sac in dicotyledonous plants. Reason. It was discovered first time in plant *Polygonium*.

34. Assertion. Female gametophyte in angiosperm is eight nucleate.
Reason. Double fertilization occurs in angiosperms

35. Assertion. Parthenogenesis is an apomixis where seeds are developed from unfertilized female gamete.
Reason. Parthenogenesis always occurs by the application of chemicals.

36. Assertion. Pollen grains in case of hydrophily are covered by mucilaginous/oily layer.
Reason. Mucilaginous is a viscous sticky substance that protects the pollen from water.

37. Assertion. Exine of pollen grain is comprised of sporopollenin which is resistant to high temperature, strong acid or alkali.
Reason. Sporopollenin is absent in the region of germ pore.

38. Assertion. In Ophrys one petal of the flower bears an uncanny resemblance to the female bee.
Reason. Two closely related species competing for the same resource can coexist simultaneously.

39. Assertion. Majority of insect-pollinated flowers are large, colourful, fragrant and rich in nectar.
Reason. Insects are attracted to flowers by colour, fragrance and or nectar.

40. Assertion. The continued self-pollination results in inbreeding depression.
Reason. The devise to present self-pollination is the production of bisexual flowers.

Case Based Questions

1. Read the following and answer questions given below from (i) to (v) 5

In major approaches of crop improvement programme as in crossing experiments, it is important to make sure that only the desired pollen grains are used for pollination and the stigma is protected from contamination from unwanted pollens. So, if the female parent bears bisexual flowers, removal of anthers from the flower bud before the anther dehisces is necessary (Emasculation). Emasculated flowers have to be covered with bags of suitable size to prevent contamination of their stigma with unwanted pollen-bagging. When the stigma of bagged flower attains receptivity, mature pollen grains collected from anthers of the male parent are dusted on the stigma and the flowers are re-bagged and the fruits are allowed to develop. f the female parent produces unisexual flowers, there is no need for emasculation.

(i) While planning for an artificial hybridisation involving dioecious plants, which of the following steps would not be relevant?

(a) Bagging of female flower
(b) Dusting of pollen on stigma
(c) Emasculation
(d) Collection of pollen

(ii) **Assertion-** If the female parent produces unisexual flowers, there is no need of emasculation
Reason- Emasculation is the removal of anthers from the flower bud before the anther dehisces.

(a) Both assertion and reason are true, and reason is the correct explanation of assertion.
(b) Both assertion and reason are true, but reason is not the correct explanation of the assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

(iii) Artificial hybridization denotes to

(a) production of seedless fruits
(b) evolve seeds without fertilization
(C) crop improvement programme
(d) occurrence of more than one embryo in a

(iv) The correct sequence to perform artificial hybridization is

(a) Bagging--)Emasculation --) Re-bagging --) Cross pollination
(b) Emasculation --)Bagging--)Cross pollination--) Re-bagging
(c) Cross pollination--) Emasculation--) Bagging --)Re-bagging
(d) Bagging--)Re-bagging--) Cross pollination--) Emasculation seed

(v) Bagging technique in artificial hybridization approach is done

(a) To prevent contamination of stigma with unwanted pollens
(b) After the anthers have been dehisced
(c) Only in monoecious plants
(d) To promote production of apomixis

2. Read the following and answer questions given below from (i) to (v)

Pollen grains are generally spherical shaped and each is surrounded by two layers–exine and intine. Exine is made up of sporopollenin which is resistant to high temperatures and strong acids and alkali. Sporopollenin remains absent at germ pores. Pollen grains are well preserved as fossils because of the presence of sporopollenin. The inner wall of pollen grain is intine. The pollen grains are mainly shed at 2-celled stage- vegetative cell and generative cell when they are matured. Pollen grains of many species cause severe allergies and bronchial afflictions, leading to chronic respiratory disorders. It is mentioned that *Parthenium* or carrot grass that came into India as contaminant with imported wheat, has become ubiquitous in occurrence and causes pollen allergy. However, pollen grains are rich in nutrients which are used pollen tablets as food supplements. In western countries, large number of pollen products in the form of tablets and syrups are available in the market which are claimed to increase the performance of athletes and race horses.

(i) **Assertion-** Sporopollinin is an oxidative polymer of carotenoids which helps in fossilization.
Reason- Sporopollinin is a tough substance that provides resistant to biological decomposition, high temperature and alkali.
(a) Both assertion and reason are true, and reason is the correct explanation of assertion.
(b) Both assertion and reason are true, but reason is not the correct explanation of the assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

(ii) **Which of the following statements is not appropriate for pollen grains**

(a) Pollen grains can be stored for years in liquid nitrogen and can be used in crop breeding programmes,
(b) Pollen grains are rich in nutrients and can be used as pollen tablets as food supplements
(c) Bee pollen are available in western countries in the form of tablets
(d) Pollen consumption has potential inhibitory action which results in decreased energy in athletes and race horses.

(iii) **Pollen allergy is common in many people during spring, summer and fall as plants release tiny pollen grains in tremendous quantity. Which of the following is not associated with pollen allergy?**

(a) Sneezing stuffy nose and watery, eyes
(b) Asthma bronchitis
(c) Cough, itchy nose, roof of mouth or throat
(d) Fever, diarrhoea and vomiting

(iv) **Which of the following set does not cause allergy?**

(a) *Ragweed parthenium*
(b) Sagebrush
(c) *Amaranthes* (pigweed)
(d) *Acacia.*

(v) **The function of germ pore in pollen grain is**

(a) Emergence of radicle
(b) Absorption of water for seed germination
(c) Initiation of pollen tube
(d) All of these

3. Read the following and answer questions given below from (i) to (V)

A flower of tomato plant following the process of sexual reproduction produces 240 viable seeds. The viable seeds are those which have the ability to remain alive and may develop into plants and reproduce themselves in the given appropriate conditions. This happens when one of the pollen grain

reaches to the stigma by any agency at 2-celled stage vegetative cell and generative cell. The generative cell divides mitotically and forms two male gametes which enters into ovule after passing through pollen tube and undergoes the process of double fertilization in the ovule. The ovule is a large parenchymatous body formed in the ovary by megasporogenesis. The megaspore mother cell in an ovule diploid structure which undergoes meiotic division and forms one functional megaspore. The megaspore undergoes three subsequent divisions and forms 8 nuclei arranging themselves in 3 groups. After fertilization, the ovule converts into the seed and whole ovary develops into a complete fruit.

i) The minimum number of pollen grains that must have been involved in the pollination of its pistil are.....

(a))60 (b)120 (c)180 (d) 240

(i) The minimum number of microspore mother cells must have undergone reductional division prior to dehiscence of anther are: (a)60 (b)90 (c)180 (d) 240

(iii) The male gametes that might have involved in this case are:

(a)120 (b)240 (c)360 (d) 480

(iv) The minimal number of ovules present in the ovary would be: (a)60 (b) 120 (c)180 (d) 240

(v) Megaspore mother cells involved in this process are

(a)120 (b)180 (c)240 (d) 360

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Chapter -2 Answer MCQs

1-b	**2-a**	**3-b**	**4-a**	**5-d**	**6-a**	**7-c**	**8-d**	**9-c**	**10-c**
11-b	**12-b**	**13-d**	**14-d**	**15-a**	**16-a**	**17-c**	**18-a**	**19-d**	**20-c**
21-d	**22-b**	**23-b**	**24-c**	**25-c**	**26-a**	**27-c**	**28-c**	**29-b**	**30-b**
Answer Assertion and Reasoning based Questions									
31-c	**32-d**	**33-c**	**34-b**	**35-c**	**36-a**	**37-b**	**38-c**	**39-a**	**40-c**
Answer Case Based Questions									
1	**i-c**	**ii-b**	**iii-c**	**iv-b**	**v-a**				
2	**i-a**	**ii-d**	**iii-d**	**iv-d**	**v-c**				
3	**i-d**	**ii-a**	**iii-d**	**iv-d**	**v-c**				

CHAPTER-3: HUMAN REPRODUCTION MCQ

Question 1. Ovulation in the human female normaly takes place during the menstrual cycle
(a) at the mind secretory phase
(b) just before the end of the secretory phase
(c) at the beginning of the proliferative phase
(d) at the end of the proliferative phase.

Question 2. After ovulation Graafian follicle regresses into
(a) corpus atresia (b) corpus callosum (c) corpus luteum (d) corpus albicans

Question 3. Immediately after ovulation, the mammalian egg is covered by a membrane known as
(a) chorion (b) zona pellucida (c) corona radiate (d) vitelline membrane

Question 4. Which one of the following events is correctly matched with the time period in a normal menstrual cycle ?
(a) Release of egg : 5 th day (b) Endometrium regenerates : 5 – 10 days
(c) Endometrium secretes nutrients for implantation: 11 – 18 days
(d) Rise in progesterone level : 1 — 15 days

Question 5. If mammalian ovum fails to get fertilised, which one of the following is unlikely ?
(a) Corpus luteum wil distintegrate. (b) Progesterone secretion rapidly declines
(c) Estrogen secretion increases. (d) Primary follicle starts developing

Question 6. A human female reaches menopause aroung the age of
(a) 50 years (b) 15 years (c) 70 years (d) 25 years.

Question 7. A reaction of granules content which harden the zona pellucida and ensures sure block to polyspermy is
(a) acrosomal reaction (b) cortical reaction (c) acrosin reaction (d) bindin reaction.

Question 8. Which part of the sperm plays an important role in penetrating the egg membrane?
(a) Allosome (b) Tail (c) Autosome (d) Acrosome

Question 9. In oocyte secondary maturation occurs in
(a) ovary (b) abdominal cavity (c) Fallopian tube (d) uterus

Question 10. Besides activating the egg another role of a sperm is to carry to egg
(a) RNA (b) mitochondria (c) DNA (d) ribosome:

Question 11. Preparation of sperm before penetration of ovum is
(a) spermiation (b) cortical reaction (c) spermiogenesis (d) capacitation.

Question 12 Spermiation is the process of the release of sperms from
(a) seminiferous (b) vasdeferens (c) epididymis (d) prostategland

Question 13. Mature Graafian follicle is generally present in the ovary of a healthy human female around
(a) 5-8 day of menstrual cycle (b) 11-17 day of menstrual cycle
(c) 18-23 day of menstrual cycle (d) 24-28 day of menstrual cycle.

Question 14. Acrosomal reaction of the sperm occurs due to
(a) its contact with zona pellucida of the ova
(b) reactions within the uterine environment of the female
(c) reactions within the epididymal environment of the male

(d) androgens produced in the uterus.

Question 15. Which one of the following is not a male accessory gland ?
(a) Seminal vesicle (b) Ampulla (c) Prostate (d) Bulbourethral gland

Question 16 Which among the following has 23 chromosomes ?
(a) Spermatogonia (b)Zygote (c) Secondary oocyte (d) Oogonia

Question 17. Which of the following hormones is not secreted by human placenta ?
a) hCG (b) Estrogens (c) Progesterone (d) LH

Question 18. The vas deferens receives duct from the seminal vesicle and opens into urethra as
(a)epididymis (b) ejaculatory duct (c) efferent ductile (d) ureter

Question 19. Urethral meatus refers to the-
(a) urinogenital duct (b) opening of vas deferens into urethra
(c)external opening of the urinogenital duct (d) muscles surrounding the urinogenial duct.

Question 20 Morula is a developmental stage
(a) between the zygote and blastocyst (b) between the blastocyst and gastrula
(c) after the implantation (d) between implantation and parturition.

Question 21. The membranous cover of the ovum at ovulation is
(a)coronaradiata (b)zonaradiate (c)zonapellucida (d) chorion.

Question 22. Identify the odd one from the following
(a) Labia minora (b) Fimbriae (c) Infundibulum (d) Isthmus

Question 23. Temperature of the scrotum which is necessary for the functioning of testis is always _____ around below body temperature.
(a)2°C (b)4°C (c)6°C (d) 8°C

Question 24. Which of the following is correct about mammalian testes?
(a) Graafian follicles, Sertoli cells, Leydig's cells
(b) Graafian follicles, Sertoli cells, Seminiferous tubules
(c) Sertoli cells, Seminiferous tubules, Leyding's cells
(d) Graafian follicle, leyding's cells, Seminiferous tubule

Question 25 The nutritive cells found in seminiferous tubules are
(a)Leydig's cells (b) atretic follicular cells (c)Sertoli cells (d) chromaffin cells.

Question 26 Sertoli cells are regulated by the pituitary hormone known as
(a)LH (b)FSH (c)GH (d) prolactin.

Question 27. The head of the epididymis at the head of the testis is called
(a) cauda epididymis b)vas deferens (c) caput epididymis (d) gubernaculum.

Question 28. Seminal plasma in humans is rich in
(a) fructose and calcium but has no enzymes (b) glucose and certain enzymes but has no calcium
(c) fructose and certain enzymes but poor in calcium (d) fructose, calcium and certain enzymes

Question 29 Prostate glands are located below
(a) gubernaculum (b) seminal vesicles (c) epididymis (d) bulbourethral glands

Question 30. The function of the secretion of prostate gland is to
(a) inhibit sperm activity (b) attract sperms c) stimulate sperm activity (d) none of these.

Question 31 Lower narrow end of uterus is called
(a)urethra (b)cervix (c) clitoris (d) vulva.

Question 32 Bartholin's glands are situated
(a) on the either side of vagina in humans (b) on either side of vas deferens in humans
(c) on either side of penis in humans (d) on either side of Fallopian tube in humans.

Question 33. In human adult females oxytocin
(a) stimulates pituitary to secrete vasopressin (b) causes strong uterine contractions during parturition
(c) is secreted by anterior pituitary (d) stimulates growth of mammary gland

Question 34. The third stage of parturition is called —after-birth‖. In this stage
(a) excessive bleedingoccurs
(b) fetusis bom and cervix and vagina contraction to normal condition happens
(c) fetus is bom and contraction of uterine wall prevents excessive bleeding
(d) placenta is expelled out.

Question 35. After birth, colostrum is released from mammary glands which is rich in
(a) fat and low in proteins (b) proteins and low in fat
(c) proteins, antibodies and low in fat (d) proteins, fat and low in antibodies.

Question 36. Spot the odd one out from the following structures with reference to the male reproductive system.
(a) Rate testis (b) Epididymis (c) Vasa efferentia (d) Isthmus

Question 37. Seminal plasma, the fluid part of semen, is contributed by
(i) seminal veside (ii) prostate (iii) urethra (iv) bulbourethral gland

a) (i) and (ii) (b) (i), (ii) and (iv) (c)(ii), (iii) and (iv) (d) (i) and (iv)

Question 38 In humans, at the end of the first meiotic division, the male germ cells differentiate into the
(a) spermatids (b) spermatogonia (c) primary spermatocytes (d) secondary spermatocytes.

Question 39. How many sperms are formed from a secondary spermatocyte? (a)4 (b)8 (c)2 (d) 1

Question 40. How many sperms are formed from 4 primary spermatocytes? (a)4 (b)1 (c)16 (d) 32

Question 41. In spermatogenesis, reduction division of chromosome occurs during conversion of
(a) spermatogonia toprimaryspermatocytes
(b) primary spermatocytes to secondaryspermatocytes
(c) secondary spermatocytesto spermatids
(d) spermatids to sperms

Question 42. Which of the following groups of cells in the male gonad, represent haploid cells ?
(a) Spermatogonial cells (b) Germinal epithelial cells
(c) Secondary spermatocytes (d) Primary spermatocytes

Question 43. The process of release of spermatozoa from Sertoli cells into cavity of the seminiferous tubules is called
(a) spermiogenesis (b) spermatogenesis (c) spermatocytogenesis (d) spermiation.

Question 44. The principal tail piece of human sperm shows the microtubular arrangement of (a)7+2 (b) 9+ 2 (c)11+2 (d) 13 +2

Question 45. Acrosome is a type of
(a) lysosome (b) flagellum (c) ribosome (d) basal body

Question 46. Which of the following contains the actual genetic part of a sperm ?
(a) Whole of it (b) Tail (c) Middle piece (d) Head

Question 47. The sperms undergo physiological maturation, acquiring increased motility and fertilizingcapacity in
(a) seminiferous tubules (b)vasaefferentia (c) epididymis (d)vagina.

Question 48. At what stage of life is oogenesis initiated in a human female ?
(a)Atpuberty (b)Duringmenarche (c) During menopause (d) During embryonic development

Question 49 1st polar body is formed at which stage of oogenesis ?
(a) 1st meiosis (b) 2nd mitosis (c) 1st mitosis (d) Differentiation

Question 50. Which one is released from the ovary ?
(a)Primaryoocyte (b) Secondary oocyte (c) Graafian follicle (d) Oogonium

Question 51. During oogenesis, each diploid cell produces
(a) four functional eggs (b) two functional eggs and two polar bodies
(c) one functional egg and three polar bodies (d) four functional polar bodies

Question 52. In oogenesis haploid egg is fertilised by sperm at which stage ?
(a)Primaryoocyte (b) Secondary oocyte (c)Oogonium (d) Ovum

Question 53. Layers of an ovum from outside to inside is
(a) corona radiata, zona pellucida and vitelline membrane
(b) zona pellucida, corona rodiata and vitelline membrane
(c) vitelline membrane, zona pellucida and corona radiata
(d) zona pellucida, vitelline membrane and corona radiata.

Question 54 Which part of ovary in mammals acts as an endocrine gland after ovulation ?
(a) Stroma (b) Germinal epithelium (c) Vitelline membrane (d) Graafian follicle

Question 55. The sex of the fetus will be decided at
(a) fertilisation by male gamete(b) implantation
(c) fertilisation by female gamete(d) the start of cleavage.

Question 56. What is true about cleavage in the fertilised egg in humans ?
(a) It starts while the egg is in Fallopian tube. (b) It starts when the egg reaches uterus.
(c) It is meroblastic (d) It is identical to the normal mitosis

Question 57. Cleavage differs from mitosis in lacking
(a) synthetic phase (b) growth phase (c) both (a) and (b) (d) none of these.

Question 58. The solid mass of 8-16 cells formed from zygote after successive mitotic divisions is called
(a)blastula (b)gastrula (c)morula (d) none of these.

Question 59. Implantation takes place after _____ of fertilisation.
(a)5days (b)6days (c)7days (d) 8days

Question 60. Structure connecting the fetus to placenta is
(a)umbilicalcord (b)amnion (c)yolksac (d) chorion.

Question 61. Which of the following hormones is not a secretory product of human placenta?
(a) Human chorionic gonadotropin (b)Prolactin (c) Estrogen (d) Progesterone

Question 62. Urine test during pregnancy determines the presence of
(a) human chorionic gonadotropin hormone (b) estrogen
(c)progesterone (d) luteinising hormone.

Question 63 In the event of pregnancy, the corpus luteum persists under the influence of
(a)LH (b)FSH (c)chorionic gonadotropin (d)progesterone.

Question 64 During the development of embryo, which of the following occurs first?
(a) Differentiation of organ (b)Differentiation of tissue
(c) Differentiation of organ system (d) Differentiation of cells

Question 65. The structures derived from ectoderm are
(i) pituitary gland (ii) cornea (iii) kidneys (iv) notochord
(a) (i) and (iii) (b) (ii) and (iii) (c) (i) and (ii) (d) (ii) and (iv).

Question 66. Gastrula is the embryonic stage in which
(a) cleavage occurs (b) blastocoel form (c) germinal layers form (d) villi form.

Question 67. In the development of the human body, the ectoderm is responsible for the formation of
(a) lens of the eye (b) nervous system (c) sweat glands (d) all of these.

Question 68. The first movements of the fetus and appearance of hair on its head are usually observed during which month of pregnancy?
(a) Fourth month (b) Fifth month (c) Sixth month (d) Third month

Question 69. The early stage human embryo distinctly possesses
(a)gills (b)gill slits (c) external ear (pinna) (d) eyebrows.

Question 70. Delivery of developed fetus is scientifically called
(a)parturition (b) oviposition (c)abortion (d) ovulation.

ANSWERS

QUESTIONS	ANSWERS	QUESTIONS	ANSWERS	QUESTIONS	ANSWERS
1	D	24	C	47	C
2	C	25	C	48	D
3	C	26	B	49	A
4	B	27	C	50	B
5	C	28	D	51	C
6	A	29	B	52	B
7	B	30	C	53	A
8	D	31	B	54	D
9	C	32	A	55	A
10	C	33	B	56	A
11	A	34	D	57	B
12	A	35	C	58	C
13	B	36	D	59	C
14	A	37	B	60	A
15	B	38	D	61	B
16	C	39	C	62	A
17	D	40	C	63	C
18	B	41	B	64	D
19	C	42	C	65	C
20	A	43	D	66	C
21	A	44	C	67	D
22	A	45	A	68	B
23	A	46	D	69	B
				70	A

CHAPTER 3 BIOLOGY (Assertion Reason)

Directions:

In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false

1. **Assertion:** In human male testes are extraabdominal and lie in scrotal sacs.
Reason: Scrotum acts as thermoregulator and keeps testicular temperature lower by 2°C for normalspermatogenesis.

2. **Assertion:** Testicular lobules are the compartments present in testes.
Reason: These lobules are involved in the process of fertilization.

3. **Assertion:** Interstitial cell is present in the region outside the seminiferous tubule called interstitial spaces.
Reason: Interstitial cells provide nutrition to the sertoli cells.

4. **Assertion:** The testes are situated outside the abdominal cavity within the scrotum.
Reason: Muscles in scrotum helps to maintain low temperature of testes, necessary for spermatogenesis.

5. **Assertion:** The bulbourethral gland is a male accessory gland.
Reason: Its secretion helps in the lubrication of the penis, thereby facilitating reproduction.

6. **Assertion:** Each seminiferous tubule is lined on its inside by three type of cells.
Reason: These cells are male germ cells, Sertoli cells and Leydig cells.

7. **Assertion:** In human male, there are perianal glands near the anus.
Reason: Perianal glands secretes sex-attractant pheromone which initiates sexual desire in human.

8. **Assertion:** Testes are located in the scrotum, outside the coelom.
Reason: A vaginal coelom partly surrounds the testes in the scrotum.

9. **Assertion:** Fimbriae are finger-like projections of the infundibulum part of oviduct which is closest to ovary.
Reason: They are important for collection of ovum after ovulation from ovary.

10. **Assertion:** Finger-like projections appear on the trophoblast called chorionic villi after implantation.
Reason: Chorionic villi are surrounded by the uterine tissue and maternal blood.

11. **Assertion:** Infundibulum is a funnel shaped part closer to ovary.
Reason: The edges of infundibulum helps in collection of the ovum after ovulation.

12. **Assertion:** The female external genitalia includes mons pubis, labia majora and labia minora.
Reason: The glandular tissue of each breast is divided into 5-10 mammary lobes.

13. **Assertion:** Vagina acts as copulation canal and fertilization canal.
Reason: Both insemination and fusion of gametes occur in the vagina of female.

14. **Assertion:** In the testis, spermatogenesis occurs in the seminiferous tubules and testosterone secretion takes place from the sertoli cells.
Reason: Testosterone brings growth and maturation of primany sex organs and also development of accessory sex characters.

15. **Assertion:** Spermatogenesis starts at the age of puberty.
Reason: There is a significant increase in level of gonadotropin releasing hormone at puberty.

16. **Assertion:** Human male ejaculates about 200 to 300 million sperms during coitus
Reason: Only few reach the isthmus ampullary junction for process of fertilisation.

17. **Assertion:** The sperm head contains a cap-like structure called acrosome.
Reason: Acrosome is filled with enzymes that help in fertilisation of the ovum.

18. **Assertion:** A drop in temperature does not affect spermatogenesis.
Reason: During temperature drop, the smooth muscles contract and bring the testes closer to the pelvic cavity.

19. **Assertion:** The human male ejaculates about 50-100 million sperms during a coitus.
Reason: For normal shape and size.

20. **Assertion:** The type B spermatogonia undergo mitosis to form primary spermatocyte. **Reason:** Primary spermatocyte completes the first meiotic division leading to secondary spermatocytes.

21. **Assertion:** The middle piece is called as power house of the sperm.
Reason: The numerous mitochondria coiling around axial filament produce energy for the movement of the tail.

22. **Assertion:** The regions outside the seminiferous tubules are called interstitial spaces, which contain Leydig cell.
Reason: Leydig cells synthesise and secrete testicular hormones called androgens.

23. **Assertion:** Primary spermatocytes of testes are haploid.
Reason: These are formed by meiosis-I in the spermatogonia.

24. **Assertion:** Stem cells possess the property of totipotency.
Reason: These cells can give rise to any type of cells.

25. **Assertion:** At puberty, human male develops secondary sexual characters.
Reason: At puberty, there is decreased secretion of testosterone in male.

26. **Assertion:** Head of sperm consists of acrosome and mitochondria.
Reason: Acrosome contains spiral row of mitochondria.

27. **Assertion:** In a Graafian follicle, the primary oocyte and the follicular cells may be regarded as sibling cells.
Reason: Both arise from the same parent cell the oogonium by mitotic division.

28. **Assertion:** The shape of the uterus is like an inverted pear
Reason: The inner glandular layer that lines the uterine cavity is called as myometrium.

29. **Assertion:** Fallopian funnel of oviduct has finger-like fimbriae.
Reason: Graafian follicle of ovary is with secondary oocyte hanging in cavity called antrum.

30. **Assertion:** Production of FSH increases, while that of LH decreases in the ovulation phase. **Reason:**
Due to decrease in the level of LH, ovulation (releasing of ova) takes place.

31. **Assertion:** Graafian follicle ruptures at the mid of menstrual cycle releasing the ovum. **Reason:** Both LH and FSH attain a peak level at the middle of cycle.

32. **Assertion:** Progesterone is required for maintenance of the endometrium.
Reason: Endometrium is essential for implanation of embryo.

33. **Assertion:** The endometrium undergoes cyclical changes during menstrual cycle.
Reason: The myometrium exhibits strong contractions during delivery of the baby.

34. **Assertion:** Menstrual phase is also called shedding tears of lost ovum.
Reason: In the menstrual phase, cast of endometrial lining along with ovum takes place due to reduced titre of oestrogen and progesterone.

35. **Assertion :** Penetration of sperm into ovum is a chemical process.
Reason : Acrosome of sperm secretes a lytic enzyme hyaluronidase which dissolves vitelline membrane of ovum.

36. **Assertion:** Size of breasts increases at puberty in human female.
Reason: Prolactin secretion starts at puberty.

37. **Assertion:** During fertilization only head of spermatozoa enters egg.
Reason: If several spermatozoa hit the egg at same time, all can enter the egg.

38. **Assertion:** Corpus luteum degenerates in the absence of fertilization.
Reason: Progesterone level decreases.

39. **Assertion:** Mammalian ova produces hyaluronidase.
Reason: The eggs of mammal are microlecithal and telolecithal.

40. **Assertion:** Ovum retains most of the contents of the primary oocyte and is much lartger than a spermatozoa.
Reason: Ovum requires energy to go about in search of a spermatozoa for fertilisation.

41. **Assertion:** Not al copulation leads to pregnancy.
Reason: Fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary isthmic junction.

42. **Assertion:** Implantation is the process of attachment of blastocyst on uterine endometrium.
Reason: Implantation is controlled by trophoblast and occurs by decidual cell reaction.

43. **Assertion:** Placenta is an endocrine gland.
Reason: It secretes many hormones essential for pregnancy.

44. **Assertion:** A woman passes out hCG in the urine during pregnancy.
Reason: The presence of hCG in urine is the basis for pregnancy test.

45. **Assertion:** Breast feeding during initial period of infant growth is recommended.
Reason: Colostrum contains several antibodies, essential to render immunity in newborns.

46. **Assertion:** During pregnancy, the levels of hormones like estrogens and progesterone are increased.
Reason: The increased production of these hormones is essential for foetal growth.

47. **Assertion:** Vigrous contraction of the uterus at the end of pregnancy causes expulsion. **Reason:** The stimulatory reflex between the uterine contraction and oxytocin results in weakening contractions.

48. **Assertion:** There is generally monospermy in most of animals.
Reason: Vitelline membrane of ovum checks polyspermy.

49. **Assertion:** Al Metatherian are placental mammals.
Reason: All placental mammals have menstrual cycle.

50. Assertion: Placenta in addition to connection with mother and foetus, is a ductless gland. **Reason:** Itreleases human gonadotropins

51. Assertion: Embryonic development proves inter-relationship and common ancestory of metazoans.
Reason: It involves similar sequence of five dynamic processes during development

52. Assertion: In morula stage, cells divide without increase in size.
Reason : Zona pellucida remains undivided till cleavage is complete.

53. Assertion: The embryo with 8 to 16 blastomeres is called a morula.
Reason: The morula continues to divide and transforms into trophoblast.

54. Assertion: Parturitionisinducedbyneuralsignalinmaternalpituitary.
Reason: At the end of gestation period, the maternal pituitary releases prolactin which causes uterinecontractions.

SOLUTION

1. (a) In human male, one pair testes are present in thin walled skin pouches caled scrotal sac (so are extraabdominal) hanging from lower abdominal wall between the legs. Scrotal sac act as thermoregulators and keeps the testicular temperature 2°C lower than body temperature for normal spermatogenesis, as high abdominal temperature kils the spermatogenic tissue.
2. (d)Testicularlobulesarethecompartmentspresentinthetestesthatarenotinvolvedintheprocessoffertilization as whole. Fusion of male and female gametes is called fertilization.
3. (c)Leydigcells,alsoknownasinterstitialcells,arefoundadjacenttotheseminiferoustubulesinthetesticle. They produce testosterone in the presence of luteinizing hormone (LH).
4. (a) The testes are situated outside the abdominal cavity within a pouch caled scrotum. The scrotum helpsin maintaining low temperature of the testes (2-2.5 °C) lower than the normal internal body temperature which is necessary for spermatogenesis.
5. (a) Bulbourethral gland, also called Cowper's Gland, either of two pea-shaped glands in the male arelocated beneath the prostate gland at the beginning of the internal portion of the penis. These areresponsible for adding fluids to semen during the process of ejaculation, thereby facilitating the processof reproduction.
6. (d) Each seminiferous tubule is lined on its inside by two types of cells called male germ cells (spermatogonia) and sertoli cells. The male germ cells undergo meiotic divisions finally leading to sperm formation, while sertoli cells provide nutrition to the germ cells. The regions outside the seminiferous tubules caled interstitial spaces, contain small blood vessels and interstitial cells or Leydig cells. Leydigcells synthesise and secrete testicular hormones caled androgens.
7. (d) Perianal gland are found in rabbit not in human beings. These are a pair of dark elongated scentglands lying behind the cowper's glands. These are sex attractant secreting glands. its smell serves as sexattractant for the female.
8. (c) Vaginal coelom partly surrounds the testes in scrotum in a wrong statement because vagina is the part of external genitalia (vulva) in the female reproductive system and scrotum is a sac like structure in which testes are suspended.
9. (b) The ends of the fallopian tubes close to the ovaries are covered with finger like projections caled fimbriae. Each of these fimbriae are covered with tiny hair like projections caled cilia. When an egg cell isreleasedfromthe ovary,itissweptintothefallopiantubebythecilia ofthefimbriae.
10. (b) After implantation, finger-like projections appear on the trophoblast caled chorionic villi which aresurroundedbytheuterinetissueandmaternalblood.Thechorionicvilliand uterine tissuebecomeinterdigitated with each other and jointly form a structural and functional unit between developingembryo (foetus) and maternal body caled placenta.
11. (b) In human females, each fallopian tube extends from the periphery of each ovary to the uterus, thepartclosertotheovaryisthefunnelshapedinfundibulum.Theedges ofthe infundibulumpossess finger-like projections caled fimbriae which help in collection of the ovum after ovulation.
12. (c) The female external genitalia include mons pubis, labia majora, labia minora, hymen and clitoris. Monspubisisacushionoffattytissuecoveredbyskinandpubichair.Thelabiamajora arefleshy patches of

tissue, which extend down the mons pubis and surrounds the vaginal opening. The labia minora arepaired folds of tissue under the labia majora. A functional mammary gland is characteristic of all female mammals. The mammary glands are paired structures (breasts) that contain glandular tissue and variableamount offat. Theglandulartissue of each breast is divided into 15-20 mammary lobes containing clusters of cells called alveoli.

13. (d) Vagina is the tubular female copulatory organ. Passageway for menstrual flow as well as birth canal.Vaginareceives semenfrom maleduringmating but fertilization (fusionof gametes) occurs in fallopian tube.
14. (d)In the testis,spermatogenesis occurs in the seminiferous tubules and testosteronesecretion takes place in the interstitial cells. Testosterone brings growth and maturation of secondary sex organs. It also brings about development of secondary sex characters.
15. (a) Spermatogenesis starts at the age of puberty due to significant increase in the Gonadotropin Releasing Hormone (GnRH).
16. (a)The male releases large number of sperms inside female reproductive tract to increase chances of fertilisation.
17. (b) Acrosome contains enzymes that help the sperm penetrate the ova during the fertilisation process.
18. (a) The normal temperature of the testes in the scrotum is about 2-2.5 °C lower than the internal body temperature. When the body is chilled, the smooth muscle contracts and brings the testes closer to the pelvic cavity. This movement towards the pelvic cavity allows the testes to absorb heat from the rest ofthe body so that the sperm cells do not become chilled and get optimum temperature forspermatogenesis.
19. (d)The human male ejaculates about 200 to 300 millions sperms during a coitus out of which, at least 60 percent sperms must have normal shape and size and atleast 40 percent of them must show vigorous motility for normal fertility.
20. (b)Type B spermatogonia undergo mitosis to produce diploid intermediate cells called primary spermatocytes. These cells further undergo first meiotic or reductional division to give rise to haploid secondary spermatocytes.
21. (a) The middle piece of human contains mitochondria coiled round the axial filament called mitochondrial spiral. They provide energy for the movement of the sperm. So it is caled as the 'powerhouse of the sperm'.
22. (b) Each testicular lobule contains one to three highly coiled seminiferous tubules in which sperms are produced. Each seminiferous tubule is lined on its inside by two types of cells called male germ cells (spermatogonia) and sertoli cells. The male germ cells undergo meiotic divisions finally leading to sperm formation, while sertoli cells provide nutrition to hte germ cells. The regions outside the seminiferous tubules called interstitial spaces, contain small blood vessels and interstitial cells or Leydig cells. These cells synthesise and secrete testicular hormones called androgens.
23. (d) Primary spermatocytes of testes are diploid and formed by mitotic division in the spermatogonium.
24. (a) Stem cells have the property to give rise to any type of cell/tissue.
25. (c) Puberty in human male is controlled by male sex hormone testosterone which is secreted byinterstitial orleydigcells oftestes.So,secondarysexual characters develop and at puberty, secretion of testosterone is increased.
26. (c)Head of a sperm has acrosome but the spiral row of mitochondria are present in the mid (connecting) piece of the sperm.
27. (a) Primary oocyte and follicle cells both arise from the Graafian follicle by mitosis cell division. Hence these are regarded as the sibling cells.
28. (c) The uterus is single and it is also called womb. The shape of the uterus is like an inverted pear. The wall of the uterus has three layers, external thin membranous perimetrium, middle thick layer of smooth myometrium and inner glandular layer of endometrium.
29. (b) Infundibulum is funnel shaped end of fallopian or oviduct. The funnel is called oviducal funnel or fallopian funnel. Its free 174 Assertion Reason Question Bank end bears a number of finger like processes called fimbriae, but graafian follicle of ovary is with secondary oocyte hanging in cavity, called antrum.
30. (c) In fertility phase/ovulation, production of FSH decrease, while that of LH increases. It causes ovulation. The ovum is drawn into fallopian tube. It is viable for two days when fertilisation can occur. Ovulation takes place between 10th-14th day. Two characteristics of the fertility phase that help in fertilisation are: (i) Uterine movement help in the spread of sperms in female reproductive tract. (ii) Ciliary movements in the epithelium of fallopian tubes for bringing in the ovum.

31. (a) Graafian follicle is formed due to increase in FSH and ruptures due to rise in level of LH during middle of menstrual cycle.
32. (b) Progesterone prepares the uterus for pregnancy. After ovulation occurs, the ovaries start to produce progesterone needed by the uterus. Progesterone causes the uterine lining or endometrium to thicken. This helps to prepare a supportive environment in the uterus for a fertilized egg.
33. (b) The wall of the uterus has three layers of tissue. The external thin membranous perimetrium, middle thick layer of smooth muscle, myometrium and inner glandular layer called endometrium that lines the uterine cavity. The endometrium undergoes cyclical changes during menstrual cycle while the myometrium exhibits strong contraction during the delivery of the baby.
34. (a) Menstrual phase is the phase of menstrual flow which continues for 3-5 days and involves discharge of blood along with casting off endometrial lining due to reduced titre of both estrogen and progesterone. Menstrual phase is also called funeral of unfertilized egg or shedding tears of lost ovum. First day of menstrual phase is also considered to be first day of menstrual cycle.
35. (a) Penetration of sperm is a chemical mechanism. In this, acrosome of sperm undergoes acrosomal reaction and releases certain sperm lysins, which dissolve the egg locally and make the path for the penetration of sperm lysins which are acidic proteins. These sperms lysins contain a lysing enzyme hyaluronidase which dissolves the hyaluronic acid polymers in the intercellular spaces which holds the granulosa cells of corona radiata together; corona penetrating enzyme and acrosin. Then it dissolves the zona pellucida. Only sperm nucleus and middle piece enters the ovum.
36. (b) In female breasts size increases after puberty under the stimulation of estrogen. Size of breasts is further increased during pregnancy and after childbirth under the stimulation of prolactin hormone.
37. (c) During fertilization, only one sperm head enters into ovum and remaining parts of body degenerates. If several spermatozoa hit the egg at same time, even then only one can get entry into egg because after entry of one sperm, the egg becomes impervious to other sperms.
38. (b) In female graafian follicle forms corpus luteum after ovulation. The cells of corpus luteum are called luteal cells. The cytoplasm of luteal cells have yellow granules caled lutein which secrete the hormone progesterone to maintain pregnancy if fertilization takes place. In the absence of fertilization, corpus luteum degenerates and forms corpus albicans and there is decrease in progesterone level as well.
39. (d) Hyaluronidase, a hydrolytic enzyme is an acrosomal content in mammalian sperm. It helps at the time of fertilization during the penetration of the sperm into the ovum. Based on the amount of yolk mammalian eggs are alecithal means egg without yolk. Microlecithal eggs contain very little yolk e.g. sea urchin, starfish. On the basis of distribution of yolk telolecithal eggs are those eggs in which the yolk, is concentrated towards the vegetal pole and cytoplasm and nucleus lie near the animal pole, e.g., birds and reptiles.
40. (c) Sperm needs energy to move about in female tract, so that fertilisation of ova takes place.
41. (a) All copulation do not lead to fertilisation as the synchronisation of sperm and ova reaching the fallopian tube is important.
42. (b) The process of attachment of the blastocyst (mammalian blastula) on the endometrium of uterus is called implantation.
43. (b) Placenta is an endocrine gland that is present only during pregnancy. It is responsible for production of various hormones like human Chorionic Gonadotropin (hCG), estrogen, progesterone, human placental lactogen (hPL).
44. (b) The chorionic cells secrete a hormone called human Chorionic Gonadotropin (hCG), which resembles and takes over the job of pituitary LH during pregnancy. hCG maintains the corpus luteum and stimulates it to secrete progesterone.
45. (a) Colostrum is rich in antibodies, which is essential for new born babies.
46. (b) During pregnancy, the levels of hormones like estrogen, progestrogens, cortisol, prolactin, thyroxine etc., are increased several folds in the maternal blood. Increased production of these hormones is essential for supporting the foetal growth, metabolic changes in the mother and maintenance of pregnancy.
47. (c) Vigorous contraction of the uterus at the end of pregnancy causes parturition. Parturition is induced by a complex neuroendocrine mechanism. The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex.
48. (b) Entrance of a single sperm into an oocyte is called monospermy generally found in most of animals. Cortical granules are extruded in the perivitelline space by exocytosis and some of these are attached along inner surface of vitelline membrane which now thickens and becomes impervious to any other sperm entry. It is now called fertilization membrane. It prevents polyspermy.

49. (b) Metatherians are pouched mammals or marsupials, whereas eutherians are placental mammals with well developed placenta.

50. (a) Placenta is a ductless endocrine gland which produces various hormones like human ChorionicGonadotropin (hCG), estrogen, progesterone, human placental lactogen (hPL).

51. (a) Embryonic development includes a definite series of phases which are fundamentally similar in all sexually reproducing organisms, and transform a one-celled zygote to a multicelular and fully formed developmental stage till hatching or birth. Such a remarkable similarity of embryonic development proves that all metazoans are interrelated and have common ancestory. Embryonic development involves five dynamic changes and identifiable processes which are - gametogenesis, fertilization, cleavage, gastrulation and organogenesis.

52. (a) Morula involves cleavage of cells till 32 cell stage is formed. It is still surrounded by zona pellucida.

53. (c) Cleavage starts as the zygote moves through the isthmus of the oviduct towards the uterus and forms 2, 4, 8, 16 daughter cells called blastomeres. The embryo with 8 to 16 blastomeres is called a morula. The morula continues to divide and transforms into blastocyst as it moves further into the uterus.

54. (d) The process of delivery of foetus (childbirth) is called parturition. Parturition is induced by a complex neuroendocrine mechanism. The signals for parturition originate from the fully developed foetus and the placenta which induces mild uterine contractions called foetal ejection reflex. This triggers release of oxytocin from the maternal pituitary. Oxytocin acts on the uterine muscles and causes stronger uterine contractions which in turn stimulate further secretion of oxytocin. The stimulatory reflex between the uterine contractions and oxytocin secretion continues resulting in stronger and stronger contractions. This leads to expulsion of the baby out of the uterus through the birth canal.

CASE STUDY BASED QUESTION

The average duration of human pregnancy is about 9 months which is called the gestation period. Vigorous contraction of the uterus at the end of pregnancy causes expulsion / delivery of the foetus. This process of delivery of the foetus (childbirth) is called parturition. Parturition is induced by a complex neuroendocrine mechanism. The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex. This triggers the release of oxytocin hormone from the maternal pituitary gland. Oxytocin acts on the uterine muscle and causes stronger uterine contractions, which in turn stimulates further secretion of oxytocin. The stimulatory reflex between the uterine contraction and oxytocin secretion continues resulting in stronger and stronger contractions. This leads to expulsion of the baby out of the uterus through the birth canal – parturition. Soon after the infant is delivered, the placenta is also expelled out of the uterus.

i. The birth of a baby is known as
   a. Micturition b. Parturition c. Child d. Oxytocin

ii. When a fully developed baby is not naturally delivered by the mother, it could be due to the–
   a. Non-secretion of Oxytocin b. Excess secretion of Oxytocin
   c. Wide birth canal d. None of the above.

iii. Soon after the infant is delivered, the placenta is also expelled out of the uterus, because
   a. The infant requires the placenta to be alive
   b. After the birth, there is no role for the placenta
   c. Placenta is a part of the infant
   d. None of the above

iv. Oxytocin is known as the child birth hormone as well as the:
   a. Urine regulating hormone b. Milk ejection hormone
   c. Milk producing hormone d. None of the above

v. **Assertion:** Release of oxytocin is essential for the child birth after he complete development of the foetus.

Reason: Premature release of Oxytocin leads to the birth of a pre-mature baby.

Answers: 7 .i. b. ii. a. iii. b. iv. b. v. b.

CHAPTER-4 REPRODUCTIVE HEALTH

ASSERTION REASONING QUESTIONS

These questions consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.

A) ***Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.***

B) ***Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.***

C) ***Assertion is true but the Reason is false.***

D) ***Both Assertion and Reason are false***

1. **Assertion:** Use of condom is a safeguard against AIDS and sexual diseases besides checking pregnancy.
   Reason: Condoms are physical barriers preventing body fluid of two partners to come in contact.

2. **Assertion**: Copper-T is an effective IUD commonly used by urban Indian women.
   Reason: Copper –T stops the transport of sperms till the ampullary isthmic junction.

3. **Assertion**: CDRI Lucknow has developed Mala-D which is non steroidal, once a week pill.
   Reason: Hormonal contraceptives help to balance the hormonal level in body for properfunctioning of gonads.

4. **Assertion**: ARTs are available for childless couples to have a baby but al cannot afford.
   Reason: These are very specialized, costly techniques performed by specialists and these facilities areavailable in some cities only.

5. **Assertion**: Copper –T is effective contraceptive used by women.
   Reason- Copper ions reduce the motility and fertilizing capacity of sperms, increase phagocytosis ofsperms inside the uterus, hence prevent conception.

ANSWERS-

1. A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
2. C) Assertion is true but the Reason is false.
3. D) Both Assertion and Reason are false
4. A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
5. B) Both Assertion and Reason are true and the Reason is not the correct explanation of the *Assertion.*

CASE BASED QUESTIONS

1. REPRODUCTIVE AND CHILD HEALTH CARE PROGRAMME-

India was the first country in the world to adopt an official population policy and launch official family planning programme way back in 1952 which remains the mainstay of family planning efforts. During its early years, the programme focused on the health rationale of family planning. Family planning as a strategy for population stabilization received attention only after 1971 population census. This strategyresulted in an increase in the proportion of couples effectively protected from 12.4 percent during 1971-72 to 46.5 percent during 1995- 96 but remained stagnant during 1995-96 through 2003-04 and decreased to 40.4 during 2010-11. After the launch of the National Rural Health Mission in 2005, the official family planning programme has been subsumed in the reproductive and child health component of the Mission. However, universal adoption of small family norm still remains a distant dream in India. During 2007-08, only about 54 percent of the currently married women aged 15—49 years or their

husbands were using a contraceptive method to regulate their fertility and the contraceptive prevalence rate appears to have stagnated after 2004. Moreover, contraceptive practice in India is known to be very heavily skewed towards terminal methods which mean that contraception in India is practiced primarily for birth limitation rather than birth planning.

Reproductive and Child Health Care programme is a comprehensive sector wide flagship programme, under the umbrella of the Government of India's (GoI) National Health Mission (NHM), to deliver the RCH targets for reduction of maternal and infant mortality and total fertility rates.

Components of RCH Programme: Women's health, safe motherhood (including safe management of unwanted pregnancy and abortion women's development. Child health (child survival and child development). Adolescent Health (sexuality development, adolescence education and vocational component)

What is the full form of RCH?

A) Reproductive and Child Health Care
B) Reproductive and Child Health programme
C) Reproductive and Child Health Care programme
D) Reproductive and Child Health

Mention which of the following is not a major task under RCH programmes?

A) Creating awareness about reproduction related aspects.
B) Providing facilities and support for building reproductively healthy society.
C) Sex determination of the unborn.
D) All the above.

RCH also aims to create awareness about problems due to uncontrolled population growth because-

A) It increases cases related to sexual abuse and sex related crimes.
B) It increases various social evils like poverty, unemployment.
C) It increases the rate of basic requirements like food, shelter and clothing.
D) All the above.

According to 2001 census report, the population growth was still around _____ percent at which our population could double in _____ years.

A) 17, 33 B) 18, 33 C) 17, 35 D) None of the above

Assertion: Human population now doubles every 35 years as against 200 years in 1600-1800.

Reason: Rapid increase is due to better health facilities and food resources.

A. Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B. Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C. Assertion is true but the Reason is false.
D. Both Assertion and Reason are false. (Answers- 1.1-D, 1.2-C, 1.3-D, 1.4-A, 1.5-A)

2. CONTRACEPTIVES-

Contraception is defined as the intentional prevention of conception through the use of various devices, sexual practices, chemicals, drugs, or surgical procedures. Thus, any device or act whose purpose is to prevent a woman from becoming pregnant can be considered as a contraceptive. The different types of contraception-

- Cap.
- Combined pill.
- Condoms.
- Contraceptive implant.
- Contraceptive injection.
- Contraceptive patch.
- Diaphragm.
- Female condoms.

- In India, over 139 million women and girls now use a modern method of contraception, it furthersaid. The report said 320 million women and girls in the world's 69 lowest-income countries nowhave access to family planning according to new figures released by Family Planning 2020(FP2020).

What are the different reasons due to which contraceptive are used?

A) To keep space between the children.
B) To delay or avoid pregnancy/ pregnancy related complications.
C) To avoid other problems like painful menstruations, skin problems, PCOD, etc.
D) All the above.

Which of the following is not a characteristic feature of an ideal contraceptive?

A) It should be cheap and easily available
B) It should interfere with sexual drive of user.
C) It should be effective with least side effects.
D) All the above.

Government through RCH has promoted smal families to overcome the problems associated withpopulation explosion in our country through various means. Which of the following options is not aneffort by the Government and RCH -

A) Statutory raising the marriageable age of female to 18 years and that of males to 21 years.
B) Media showing happy couple with many children.
C) Popularising slogans like HUM DO HUMARE DO and urban working couples are adoptingone child norm.
D) Incentives given by government to people with small families.

Which of the following is not used as a contraceptive by females?

A) TubectomyB) Female Condoms C) Implants D) Cervical caps

Assertion: Amniocentesis is often misused detect the sex of the unborn baby.

Reason: Amniocentesis is meant for determining the chromosomal/genetic disorders in the fetus, but isbeingusedtodeterminethesexofthefetussothatfemalefetus may beaborted.

A. BothAssertionandReasonaretrueandtheReasoniscorrectexplanationoftheAssertion.
B. BothAssertionandReasonaretruebuttheReasonisnotacorrectexplanationoftheAssertion.
C. Assertion is true but the Reason is false.
D. Both Assertion and Reason are false.

- (ANSWERS-2.1-D, 2.2-B, 2.3- B, 2.4-A, 2.5-A)

3. CONTRACEPTIVES-

A wide range of contraceptives are available today to avoid pregnancy. The major categories of contraceptives include natural/ traditional, barrier, IUDs, oral contraceptives, injectable,implants and surgical methods. The natural / traditional method includes periodic abstinence, withdrawal or coitus interruptus, lactational amenorrhoea. Barrier methods (usage of condoms, diaphragms, cervical caps and vaults), IUDs (Intra Uterine Devices), pills (oral contraceptives) and sterilization by surgical methods(tubectomyandvasectomy)allare includedintheartificialmethodsofcontraception.IUDsandpillsarethehormonal methods of contraception.

Which according to your knowledge of menstrual cycle are safe days for unprotected sex without havingfear of conception?

A) Between day 1 to day 10 of menstrual cycle and then between day 20-day 30 of menstrual cycle.

B) Between day 1 to day 9 of menstrual cycle and then between day 18 - day 30 of menstrual cycle.

C) Between day 1 to day 12 of menstrual cycle and then between day 20- day 30 of menstrual cycle.

D) None of the above.

In some females just after the child birth, during the breast feeding phase, there is a phase of the absence of menstruation. This fully prevents conception.

A) True B) False C) Not sure

Which is not the characteristic feature of Natural methods of contraception?

A) Very effective B) No chances of failure when used. C) None of the above D) Both A and B

Which of the following is not a characteristic feature of Diaphragms, cervical caps and vaults?

A) These are used by females
B) These are reusable
C) These block the entry of sperms through the cervix
D) These are effective only when used with spermicidal creams, jellies and foams.

Assertion: IUDs are an ideal and most widely used contraceptive for the females in India.

Reason: It gives freedom to males to take decision about delaying of pregnancy and/or space children for a period of 3-5 years.

A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B) Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C) Assertion is true but the Reason is false.
D) Both Assertion and Reason are false.

(ANSWERS- 3.1-B, 3.2- A, 3.3-D, 3.4-D, 3.5- C)

4. MEDICAL TERMINATION OF PREGNANCY (MTP)

Intentional or voluntary termination of pregnancy is called medical termination of pregnancy. Medical termination of pregnancy is also termed as induced abortion. MTPs are used to get rid of unwanted pregnancies and the pregnancies which could be harmful or fatal to the mother or to the foetus or both. MTPs are safe up to 12 weeks i.e. the first trimester of pregnancy. Government of India legalized MTP.

Nearly 45 to 50 million MTPs are performed in a year all over the world which accounts to 1/5th of the total number of conceived pregnancies in a year. Every day 13 women die in India due to unsafe abortion-related causes. Nearly 6.4 million pregnancies are terminated every year in India. Unsafe abortion, the third leading cause of maternal deaths in the country, contributes eight per cent of all such deaths annually.

Under which conditions it is not legal to perform MTP upto 12 weeks of pregnancy?

A) When the continuation of pregnancy is dangerous for the life of mother.
B) When continuation of pregnancy is dangerous for the life of father.
C) In case of pregnancy due to rape.
D) In case of chromosomal / genetic defect in foetus.

If MTP is performed after it is detected that the sex of the foetus is female, then it is known as-

A) Female foeticide B) Amniocentesis
C) Threatened abortion D) None of the above

MTP can imbalance-

A) Population in a country B) Sex ratio C) Birth rate D) IMR

In which year Government of India legalized MTP?

A) 1975 B) 1991 C) 1971 D) 1981

Assertion: MTP is not to be performed after first trimester.

Reason: In second trimester, the maternal and foetal tissues are intricately inter digited that MTP can lead to excessive blood loss and death of mother.

A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B) Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C) Assertion is true but the Reason is false.
D) Both Assertion and Reason are false.

(ANSWERS-4.1-B, 4.2-B, 4.3-B, 4.4- C, 4.5- A)

5. SEXUALLY TRANSMITTED DISEASES- STDs constitute a major public health problem for both developing and developed countries. The emergence of HIV infection has increased the importance of measures aimed at control of STDs. A proper understanding of the patterns of STDs prevailing in different geographic regions of a country is necessary for proper planning and implementation of STD control strategies. It is with this aim that the authors have reviewed the relevant published literature from India over the past 25 years.

To sum up, bacterial STDs like chancroid and gonorrhea are showing a declining trend, but the viral STDs like herpes genitalis and condylomata acuminata are showing upward trend. There is a decline in the number of patients with STDs attending the hospital. Whether this is due to an actual decrease in the incidence of STDs or due to other factors is uncertain. The increased availability of facilities for treatment of STDs at peripheral centers might be a factor leading to a decline in the number of patients with STDs approaching higher centers like the teaching hospital where this study was undertaken. The emphasis on the syndromic approach to the management of STDs might have increased the accessibility to healthcare for these patients with STDs. Awareness about HIV and fear of contracting the STDs are likely to have influenced the risk-taking behavior of people, thereby reducing the likelihood of being infected with STDs. Another factor to be considered is the widespread use of antibacterials, including quinolones and the new macrolides, for the treatment of other diseases. This can result in partial treatment or modified course of the bacterial STDs, thereby leading to apparent reduction in the total number of cases of STDs attending STD clinics as well as a decrease in the proportion of bacterial to viral STDs

Which of the following is not a bacterial STD?

A) Syphilis B) Gonorrhea C) Herpes genitalis D) Chlamydiasis

Choose the odd one out-

A) Genital herpes B) Genital warts C) Trichomoniasis D) Hepatitis B

Which of the following symptoms is not seen in case of an STD?

A) Slight pain in genitals B) Swelling in the genitals
C) Itching and fluid discharge from the genitals D) Redness/discoloration in the genitals

Which of the following is not a complication which arises when STDs are not treated on time?

A) PID B) Infertility C) Cancer of the rectum D) Still births

Assertion: Persons in the age group between 15-24 years is more vulnerable to sexually transmitted infections. Reason: People in reproductive age get sexually transmitted infections during sexual intercourse with their partner.

A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B) Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C) Assertion is true but the Reason is false.
D) Both Assertion and Reason are false.

(ANSWERS- 5.1-C, 5.2- C, 5.3-D, 5.4-C, 5.5-C)

6. ORAL CONTRACEPTIVES-

Oral Contraceptives are in the form of pills that are either progestogens (progesterone) or a progestin-estrogen combination. These are female contraceptives administered for 21 days in a month. Saheli isworld's first and only oral non steroidal contraceptive pill. 'Saheli' aka Centchroman (ormeloxifene30mg) is the only non—steroidal pill with zero side effects available in the world. The Government ofIndia guidelines for Emergency Contraception recommend use of Levonorgestrel (progestogen only)NG 075 mg as a "dedicated product" for effective emergency contraception. The Drug Controller ofIndia has approved only Levonorgestrel for use as ECP.

OCs are taken for a period of _____days, starting within the first _____days of menstrual cycle and after a gap of ___days during which menstruation occurs it is repeated every month.(fill in the blanks)

A) 21, 7, 5 B) 5, 7, 21 C) 21, 5, 7 D) None of the above

Sahel- an OC has the following features- It is non steroidal. It has many side effects It is once a weekpill. It has low contraceptive value.

A) True B)False C) Not sure

Which is not true about the mode of action of OCs?

A) They inhibit ovulation.
B) They suppress sperm motility and fertilizing capacity of sperms
C) They alter the quality of cervical mucus to retard sperms.
D) They inhibit implantation.

OCs contain –

A) Progesterone only
B) A combination of oestrogen and progesterone
C) None of the above
D) Both the above

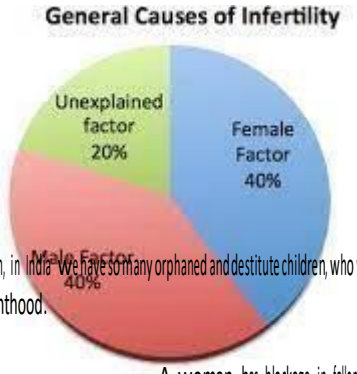
Assertion: Emergency contraceptives are used to avoid pregnancy due to casual unprotected sex or due to rape. Reason: These are very effective if given within 72 hours of unprotected sex.

A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B) Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C) Assertion is true but the Reason is false.
D) Both Assertion and Reason are false.

(ANSWERS- 6.1-C, 6.2-B ,6.3-B ,6.4-D ,6.5-A)

Competency Based Questions-

7. INFERTILITY- A large number of couples all over the world including India are infertile, i.e. they areunable to produce children inspite of unprotected sexual co-habitation. In the opinion of the IndianSociety of Assisted Reproduction, about 10 to 14 % of Indians are infertile which amounts to about 275 million couples struggling with their dreams of starting a family and raising a child. Femaleinfertility - 30-40% Male infertility- 30-40%. The reasons for this could be many—physical, congenital,diseases, drugs, immunological or even psychological.



Specialized health care units (infertility clinics, etc.) could help indiagnosis and corrective treatment of some of these disorders and enable these couples to have children. However, where such corrections are not possible, the couples could be assisted to have children through certain special techniques commonly known as assisted reproductive technologies (ART). All these techniques require extremely high precision handling by specialized professionals and expensive instrumentation. Therefore, these facilities are presently available only in very few centres in the country. Obviously their benefits are affordable to only a limited number of people.

Emotional, religious and social factors are also deterrents in the adoption of these methods. Since the ultimate aim of all these procedures is to have children, in India we have so many orphaned and destitute children, who would probably not survive till maturity, unless taken care of. Our laws permit legal adoption and it is as yet, one of the best methods for couples looking for parenthood.

A woman has blockage in fallopian tubes which cannot be treated. Which ART would you suggest to this couple for becoming parents?

A) GIFT (Gamete Intra fallopian transfer)
B) ZIFT (Zygote intra fallopian transfer)
C) IUT (Intra uterine transfer)
D) Any of the above

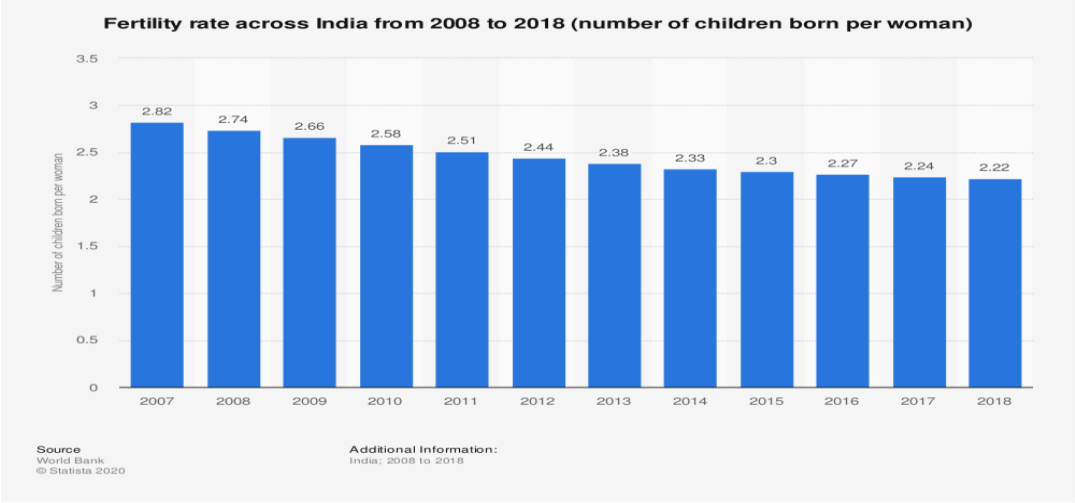
A male who cannot produce sufficient number of motile and functional sperms can have a baby by adopting which technique (suggest the best and cost effective technique)-

A) GIFT (Gamete Intra fallopian transfer)
B) ZIFT (Zygote intra fallopian transfer)
C) ET (Embryo transfer)
D) AI of the above

A couple produces functional gametes but the female is unable provide conditions for fertilization of gametes .Which technique would you suggest to the couple to have a baby?

A) GIFT (Gamete Intra fallopian transfer)
B) ZIFT (Zygote intra fallopian transfer)
C) AI (artificial insemination)
D) None of the above

Observe the following graph. The TFR (total fertility rate) is declining on our country from 2007-2018. Which of the following is a reason for infertility in India?



A) Psychological problems
B) Immunological problems
C) Congenital problems
D) All the above

Assertion: Women in India are often blamed if a couple is child less

Reason: In a male dominating society like ours, women are blamed whereas problem always lies with the male partner.

A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B) Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C) Assertion is true but the Reason is false.
D) Both Assertion and Reason are false.

(ANSWERS- 7.1- C, 7.2-A ,7.3-B ,7.4-D ,7.5- C)

8. SURGICAL METHODS- Observe the given picture and answer to the following questions-

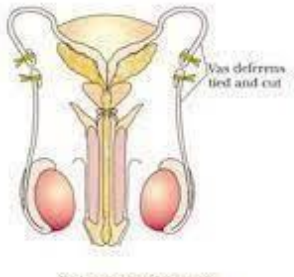


Figure 4.4a Vasectomy

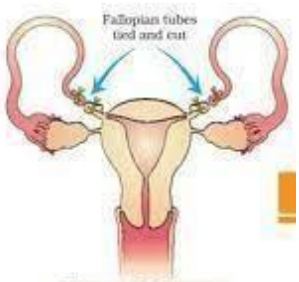


Figure 4.4 (b) Tubectomy

A woman went to the doctor for permanent contraceptive method as she already has two children. The doctor advised her permanent method of contraception and explained her procedure, which is-

A) tubectomy where both the oviducts are cut and tied.
B) Vasectomy, where both the vas deferens are cut and tied.
C) Oral emergency contraceptives
D) None of the above

Removal of gonads is not a method of contraception because-

A) It stops gametogenesis for ever.
B) It alters the sex hormonal balance in the body
C) It makes the person infertile
D) All the above

Why are both the vas deferens cut and tied in vasectomy?

A) To stop the transport of sperms out to the female reproductive tract.
B) To stop the sperm from fertilizing the secondary oocyte in oviduct.
C) To stop sperm production.
D) All the above

Which of the following point is true about surgical methods of contraception?

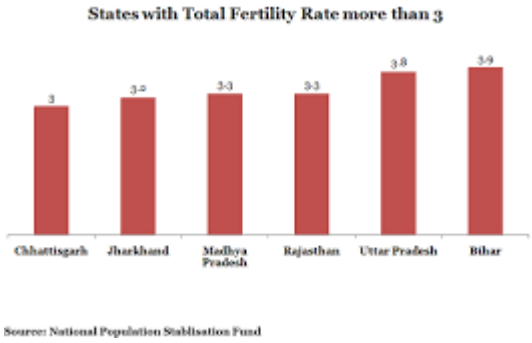
A) Highly effective and reversible and can be performed by quacks also.
B) Less effective, irreversible and can be done only by qualified doctors
C) Highly effective and irreversible so terminal method of contraception performed by qualified doctors
D) Highly effective, reversible with few side effects.

Assertion: Widespread use of contraceptive is an effective method to control population growth but it has possible ill effects also Reason: It can lead to conflicts between couples about when to have a child and how many to produce

A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B) Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C) Assertion is true but the Reason is false.
D) Both Assertion and Reason are false.

(ANSWER- 8.1-A, 8.2-D, 8.3-A ,8.4-C ,8.5-C)

9. POPULATION EXPLOSION



Observe the graph showing total fertility rates(TFR) across various states in India. Which state hasmaximum TFR ?

A) Uttar Pradesh B) Bihar C) Rajasthan D) Chhattisgarh

There is population explosion in the state which has highest TFR. So, what steps the state authoritiesmust take to control population?

A) Use mass media to educate people about advantages of small family.
B) Distribute free contraceptives- condoms, IUDs, OCs.
C) Declare and popularise various incentives for small families.
D) All the above.

What could be the possible reasons for population explosion in that state?

A) Decline in death rate, IMR, MMR. B) Increase in number of people in reproducible age.
C) Increase in birth rate. D) All the above.

What are the problems that this state is facing due to population explosion?

A) Shortage of basic requirements like food, shelter and clothing
B) More working hands means more income.
C) Better standard of living of people with more children.
D) All the above.

If more and more couples in this state become infertile, then problem of population explosion can be solved?

A) True B) False

(ANSWERS- 9.1-B, 9.2-D, 9.3-D , 9.4-A , 9.5-B)

OTHER MULTIPLE CHOICE QUESTIONS-

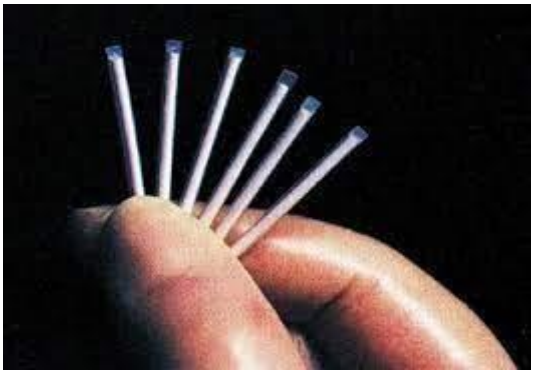
1. Which of the following STDs is completely curable if timely and proper treatment is sought?

A) HIV- AIDS B) Genital herpes C) Hepatitis-B D) Chancroid

2. Mention the precautions that the vulnerable age group people should take to avoid contracting the STDs-
   A) Avoid sex with unknown and multiple partners
   B) Use condoms during coitus
   C) Consult a qualified doctor in case of symptoms
   D) All the above

3. Which of the following is not a mode of action of IUDs?
   A) Increase phagocytosis of sperms
   B) Inhibit ovulation
   C) Make the cervix hostile to sperms and uterus unsuitable for implantation.
   D) Supress sperm motility and fertilizing capacity of sperms

4.



Identify this contraceptive used by females-

A) Injectibles B) Implants C) Emergency contraceptive d) Oral contraceptive

What is the basic chemical composition present in above contraceptive which makes it an effective contraceptive?

   A) Steroid hormones-Progesterone alone or combination with estrogen.
   B) Copper ions
   C) Both the above
   D) None of the above

5. What is the difference between implants and oral contraceptives?
   A) Implants are effective for longer duration.
   B) Implants are inserted under the skin; need not be remembered and taken daily.
   C) Both A and B
   D) None of the above (ANSWERS- 1-D,

2- D 3- B 4 1-B 4 2-A 5- C)

CHAPTER-5 : PRINCIPLE OF INHERITANCE AND VARIATION MCQ TYPE

QUESTIONS :-

1. Who rediscovered the mendel's work:-
   a. Correns b. Hugo de Vries c. Tschermak d. Al of the above
2. In which year the mendel's work has been published:-a. 1864
   b.1865 c.1866 d. 1867
3. Who has given the concept of gene mapping:-
   a. Morgan b. Gregor John Mendel c. Alfred Sturtevant d. Henking
4. Male heterogametic condition found in :-
   a. Humanbeing b.Fowl c.BothA&B d. Notcertain
5. Who invented X chromosomes-
   a. MacClintok b. Johenson c. Morgan d. Henking
6. Trisomy foundin:-
   a.Turner'sSyndrome b. Klinefelter'ssyndrome
   c. Down's Syndrome d. Al of the above
7. Failure of which stage of cytokinesis cause polyploidy:-
   a. Prophase b. Metaphase c. Anaphase d. Telophase
8. In phenylketonuria the amino acid phenylalanine fails to convert in which amino acid:-
   a. Serine b. Tyrosine c. Glutamic Acid d. Valine
9. In Sickle cell anemia , at which position , the amino acid get changed:-
   a. Fourth position b.Fifth position c.Sixth position d. Seventh position
10. If the diploid number of chromosomes are 32 in honey bees, then how many chromosomes found in the male honey bees or drones:- a. 16 b.32
    c.48 d. 16 & 32 both
11. There is certain feminine features develop in an individual with XXY chromosomes configuration, then what is the suitable term can be given to the situation:-
    a. Gynaecomastia b. Gynaecophoria
    c. Gynaecoinducia d. Gynaecoblastia
12. Which of the following disease belong to autosomal recessive mendelian disorder:-
    a. Colour blindness b. Haemophilia
    c. Sickle cell anaemia d. Al of the above
13. Incomplete Dominance , is the deviation of which law of Mendel:-
    a. Law of dominance b.Law of segregation c.Law of independent assortment d.All of the above
14. Pleiotropy, can be defined as:-
    a. When one gene control one trait
    b. When one gene exhibit multiple traits
    c. When multiple genes control one trait
    d. When multiple genes control multiple traits.
15. Polygenic inheritance can be observed in:-
    a. Inthe eye colourofhuman being
    b. Intheskincolourofhumanbeing
    c. Inthe haircolourpattern
    d. Al of the above
16. In fowl , which parent is responsible to determine the sex of offsprings :-
    a. Male parent b. Female parent
    c.Bothparents d. Byenvironment conditions
17. Inpeaplants, thepodshapemaybeinflatedorconstricted, whichtraitisdominanttrait:-
    a. Inflated b.Constricted c. Both of them d. Not certain
18. What would be the phenotype of a plant that has genotype Tt :-
    a. Tall b. Dwarf c. Semi dwarf d. Not certain
19. Out of sperms and ova , which gamete is responsible to determine sex in chick :-
    a. Sperm b. Ovum

c.Boththegametes d. Dependupon environment conditions

20. What will be the percentage of pea plants that would be homozygous recessive in the F2 generation , when tall F1 heterozygous pea plants are selfed :- a. 25% b. 50%
c. 75% d. 100%

21. What percentage of homozygous and heterogeneous populations are produced in F2 generation in amendelianmonohybrid cross :- a. 25% and 25% b. 50% and 50%
c. 25% and 75% d. 25 % and 50%

22. Write the genotypes Mendel obtained , after the cross between f-1 violet flowered plants with whiteflowered pea plant:-
a. VV & vv b. VV & Vv c. Vv & Vv d. Vv & vv

23. Which law of Mendel , has universally accepted
a. Law of dominance
b. Law of segregation
c. Law ofindependentassortment
d. None ofthese

24. RrYy has been crossed with rryy. Give a suitable term of the cross-
a. Monohybrid cross b. Test cross c. Back cross d. Self cross

25. Howmanyalleles are responsible todetermine theskincolourofhumanbeing:-
a. 2pairs b.3pairs c.4pairs d. 5pairs

26. In a population of Drosophila, 25% offsprings are similar to their parents , reason behind thissimilarlyis :-
a. Recombination b. Linkage c. Variation d. Al of the above

27. In human being , the 2n=46, how many linkage groups are found on it :-
a. 23 b. 46 c. 23 pairs d. 46 pairs

28. In the male gamete of an organism 8 chromosomes are found .Out of which one is X chromosome.how many autosomes will be found in the gamete:- a. 7 b. 8
c. 14 d. 16

29. Male honey bees produced by parthenogenesis ,which type of cel division found duringGametogenesisofsuchmalebees:-
a. Mitosis b. Meiosis c. Amitosis d. Al of the above

30. Which of the following is x linked recessive disease:-
a. Sickle cell anemia b.Thalassemia
c. Phenylketonuria d. Haemophila

31. Which of the following organism , has XO sex chromosome in male individuals:-
a. Human being b.Fowl c.Insects d. None ofthe above

32. A human zygote has XXY sex chromosome along with 22 pairs of Autosome, what will be the sexof the individual the individual developing from the zygote:-
a. Male b. Female c. Both A & B d. Not certain

33. There is a gene which is responsible to control the shape of the seeds and the size of the starch grains and the nature of protein coat around The Seed. Which type of gene it would be:-
a. Polymorphic gene b. Pleiotropic gene c. Multiple genes d. Al of the above

34. What are the number of chromosomes, retain the genes for Alpha thalassemia and beta thalassemia respectively:-
a. 11&16 b.16&11 c.16&20 d. 11 & 20

35. An individual human being has 45 chromosomes, which type of chromosomal disorders likely tooccur:-
a. Down's syndrome b. Turner's syndrome
c. Klinefelter syndrome d. Noneofthe above

36. A colour blind son born from normal parents, what would be the genotype of the maternalgrandfather:-
a. X^cY b. X^cY^c c. XY d. None ofthe above

37. Mother's blood group is A and father's blood group is B and the daughter's blood group is O. Whatwill be the blood group of other children:-

a. A b. B c. AB d. Al of the above

38. What are the outcome of gene mapping-

a. The chances of recombination b. The chances of linkage

c. To locate at the proper locus of a gene d. Al of the above

39. Phenylalanine hydroxylase enzyme , responsible to convert :-

a. Phenylalanine to glutamic Acid b. Phenylalanine to valine

c. Phenylalanine to tyrosine d. Phenylalanine to glycine

40. What is the phenomenon that occurred in the failure of separation of homologous chromosomes , during meiosis-

a. Non Isolation b. Non distinction c. Non disjunction d. Nonseparation

41. The genotype of affected individual with sickle cell anemia will be:-

a. Hb^sHb^s b. Hb^sHb^a c. Hb^aHb^a d. Hb^aHb^s

42. During sickle cell anemia , in what form does the replacement can be seen in codon :-

a. GAGtoGTG b. GAGtoGUG c. GAGtoGCG d. GAG to CAG

43. A haemophilic son born to normal parents Give the genotype of parents-

a. Mother XXfather XCY b. Mother X^hX , father XY

b. MotherXX, fatherXY d. None of the above

44. Which of the following is not a wild type phenotype in drosophila-

a. Miniature wings b. White eye c. White body d. Normal wing

45. How many contrasting characters are found in the pea plants:-

a. 5 pairs b. 6 pairs c. 7 pairs d. 8 pairs

46. In which year chromosomal theory of inheritance was postulated:- a. 1900 b. 901 c. 1902 d. 1903

47. How does mendelian disorders caused:-

a. Due to defected autosomal gene

b. Due to defected X linked gene

c. Due to defected autosomal as well as X linked gene

d. None of the above

48. In complete linkage, the off springs with recombination, in F2 generation are:- a. 1.1% b. 1.2 % c. 1.3 % d. 1.4%

49. In incomplete linkage , the offsprings with parental combination in F2 generation are:- a. 68.2% b. 62.8% c. 68.3 % d. 62.3 %

50. Two heterozygous parents are crossed. if two loci are linked what would be the distribution of phenotypic features in F1 generation for a dihybrid cross:-

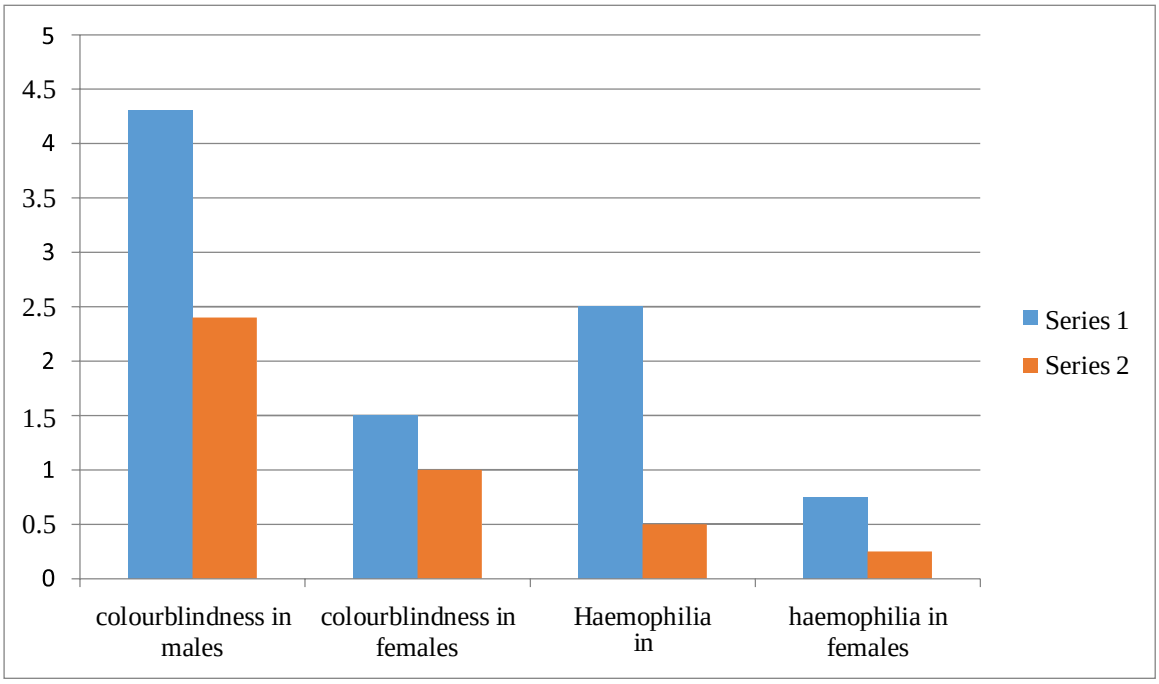
a. Complete linkage b. Incomplete linkage

c. Partial complete linkage d. Partial incomplete linkage

- Multiple allelism is the concept which tells us :-
  - B) One gene control several traits
  - C) Several genes control one treat
  - D) One gene control one trait
  - E) Several genes control several traits
- Which example is given by ABO blood group pattern:-
  - B) Codominance
  - C) Incomplete dominance
  - D) Polygenic inheritance
  - E) Multiple allelism
- In a monohybrid cross in F2 generation 64 dwarf plants have been produced how many hybrid tal plants will be produced in the same cross- B) 64 b. 128 c. 192 d. 256
- Why the traits of plants in F2 generation of mendelan monohybrid cross , not blended :-
  - B) Because the factors are located at different loci
  - C) Because due to no crossing over
  - D) Because factors are found on different chromosomes
  - E) Al of the above

CRITICAL & CREATIVE THINKING QUESTIONS:-

The chances of colour blindness about 8 % of males and only about .4 % of females This is because thegenes that lead to red green colour blindness are on the X chromosome. Males have only one X chromosome and females have 2. Another sex linked recessive disease, which shows its transmission from unaffected carrier female tosome of the male progeny has been widely studied. In this disease a singleproteinthatisapart of thecascadeofproteinsinvolvedin theclotting of theblood is affected. Due to this in an affected individual a simple cut will result in nonstop bleeding. The heterozygous female (carrier) for haemophilia may transmit the disease to sons. The possibility of a female becoming a haemophilic isextremelyrarebecausemotherofsuchafemalehastobeatleastcarrierandthefathershouldbe haemophilic.



Note :- in each group bar 1 represent the individuals of less than 12 years of age. And bar 2 represent theindividualsofmorethan12yearsofage. GRAPH : DEPICTS THE VIABILITY OF

INDIVIDUALS WITH X LINKED MENDELIAN DISORDERS

1. The reason for low viability of human females with haemophilia is :-
   a. Non clotting of the blood
   b. Loss of major volume of blood during menstruation.
   c. Lack of the coagulating protein
   d. Al of the above.
2. What is the reason of the drastic loss of viability of affected males with haemophilia :-
   a. Lowvolumeofblood b. Lack of the clotting protein
   c. Less platelet count d. Al of the above.
3. Which protein is responsible for coagulation of blood :-
   a. Fibrin b.Albumin c.Globulin d. None of the above
4. Why the colour blindness is more common in male than females :-
   a. It is caused by a recessive gene.
   b. It is located on X chromosome.
   c. Female can be of heterozygous genotype.
   d. Al of the above.
5. Howcarriermothermaynotinheritcolourblindnesstoheroffsprings:-
   a. Affected gene is only found on one X chromosome.

b. Mother may inherit normal X chromosome to the new generation.
c. Offsprings will be heterozygous genotype.
d. All of the above.

CASE BASE STUDY QUESTIONS: - MENDELIAN DISORDERS

Broadly, genetic disorders may be grouped into two categories – Mendelian disorders and Chromosomal disorders. Mendelian disorders are mainly determined by alteration or mutation in the single gene. These disorders are transmitted to the offspring on the same lines as we have studied in the principles of inheritance. Most common and prevalent Mendelian disorders are Haemophilia , Cystic fibrosis , Sickle cell anemia, Colour blindness , Phenylketonuria , Thalassemia. The Mendelian disorders may be recessive or dominant. Similarly the trait may also be linked to the case of sex chromosome like haemophilia. It is evident that this X – linked recessive trait shows transmission from carrier female to male progeny. A Mendelian disorder caused if the mutated gene is found either in homozygous or in heterozygous forms. A recessive disease only expressed in the homozygous genotype, whereas the dominant diseases expressed in heterozygous genotype also. The defected gene may be found on to the autosome, like in thalassemia, the alpha type, gene is found on chromosome number 16 and beta type the gene is found on chromosome number 11. On the other hand when the defected gene is on X chromosome , then it will be considered as X linked diseases. Father never transmit or inherit the X linked diseases to the son, because from father
–Y‖ chromosome get inherited to his son and this chromosome not has any gene of the diseases.

1. Which disease is not Mendelian Disease :-
   a. Down's Syndrome
   b. Sickle cell Anemia
   c. Thalassemia
   d. Phenylketonuria
2. A female with gene of colour blindness may be normal , because :-
   a. One X chromosome has the defected /mutated gene
   b. Both X chromosomes have defected/mutated gene.
   c. Y chromosome has the defected/muted gene.
   d. Both A & B
3. A son not getting X linked Mendelian disease from affected father because :-
   a. The gene is located on X chromosome.
   b. Father inherit Y chromosome to his son.
   c. X chromosome is inherited to the daughter.
   d. All of the above
4. Sickle cell Anemia and thalassemia are different from each other :-
   a. They created by autosomal genes.
   b. They are related to the disorder of blood.
   c. They are autosomal recessive diseases.
   d. Sickle cell anemia is qualitative and thalassemia is quantitative diseases.
5. Which two colours can not be identified in the colour blindness :-
   a. Blue & green b. Red & green c. Red & blue d. Violet & blue

CASE BASED STUDY QUESTIONS :- PARTHENOGENESIS

In the population of honey bees, the male honey bees develop from unfertilized ovum, and the number of chromosomes found in the male bees are 16. The male honey bees are also called as drones. And they have half number of the chromosomes with respect to the females. Male bees are haploid and female bees are diploid. Female bees have 32 chromosomes. During Gametogenesis male bees perform mitosis , whereas the female bees perform meiosis. If we study the making of progeny among the honey bees , we found that the female bees make both male and female , and the male bees only make females. That is why the male not have father as well as male bees not have son. Meanwhile the male honeybees have grandfather and grandson as well.

1. Why mitosis not applicable during gametogenesis of female honeybees :-

a. Female bees are haploid.
b. Female bees are diploid.
c. Female bees need to produce haploid offsprings.
d. Female bees need to produce male bees by parthenogenesis.

2. A male honey bee not has son because :-
   a. The male gamete are not in proper number.
   b. The male gametes are not used to make male offsprings
   c. The male gametes are yet to be in diploid chromosome number.
   d. The female gamete develop in to a male bee directly.
3. What is the number of chromosomes in the queen honey bee :-
   a. 16 b.32 c.48 d. Not certain
4. What is the role of the mitosis in the Gametogenesis in male honey bees :-
   a. It maintains haploid number of chromosomes.
   b. Since the male bees are haploid , so meiosis is not needed.
   c. For the making of the diploid offsprings
   d. Al of the above.

CASE BASE STUDY QUESTIONS:- CO-DOMINANCE

In the case of co-dominance, the f-1 generation resembles both parents. A good example is different types of red blood cells that determine ABO blood grouping in human being. ABO blood groups are controlled by the gene I. The plasma membrane of the red blood cells has sugar polymers that protrude from its surface and the kind of sugar is controlled by the gene. The gene I has three alleles I^A, I^B and i. The allees I^A and I^B produce a slightly different form of the sugar while allele it does not produce any sugar. Because humans are diploid organisms, each person possesses any two of the three I gene alleles. I^A and I^B are completely dominant over I, in other words when I^A and i are present, I^A expresses. (because it does not produce any sugar), and when I^B and I are present I^B expresses. But when I^A and I^B are present together then both express their own types of sugars. This is because of co-dominance. Hence red blood cells have both A and B types of sugars. Since there are three different alleles, there are six different combinations of these three alleles that are possible, and therefore, a total of six different genotypes of the human ABO blood types.

1. The ploidy level of human being is :-
   a. Haploidy b. Diploidy c.Triploidy d. Not certain
2. Which of the following gene is not produce sugar :-
   a. I^A b. I^B c. I^AI^B d. i
3. how many types of sugars are found in red blood cells :-
   a. A type sugar b. B type sugar
   c. Both A & B type sugar d. A is rarely found and B is commonly found
4. How many alleles are responsible to determine blood group :- a. 2 b. 3 c. 4 d. 5
5. How many types of genotypes are found to make the human blood group :- a. 4 b. 5 c. 6 d. 7

Read the following Assertion and Reason based questions and select the most appropriate answer for the questions:-

a. Assertion and reason both are correct, and reason is correct explanation of the assertion.
b. Assertion and reason both are correct, and reason is not correct explanation of the assertion.
c. Assertion is correct and reason is incorrect.
d. Assertion is incorrect and reason is correct.

1. Assertion- the point mutation is the substitution or replacement of a single nucleotide from DNA. Reason:- Sickle cell anemia caused due to point mutation.
2. Assertion - Colour Blindness caused due to a recessive gene , which is found in X chromosome. Reason:- Colour blindness is an example of X linked Recessive disease.

3. Assertion - there are three pairs of alleles , which responsible to control the human skin colour.Reason - The inheritance of human skin colour called as Polygenic Inheritance.
4. Assertion:- The nondisjunction of the homologous chromosome, is resulting as non proper distribution of the chromosomes Reason :- Down's Syndrome disease is caused due to the non disjunction of the chromosomes.
5. Assertion:- There are triple alleles, IA, IB, i responsible to control the blood group of human being Reason :- The controlling of one trait by number of alleles is called as multiple allelism.
6. Assertion :- when a pure red flowered and pure white flowered , dog flower plants are crossed together, pink flowered plants are produced in f-1 generation. Reason :- this is the incomplete dominance , which create the pink colour of the flowers.
7. Assertion :- if the genotype is –Tt‖, The phenotype of the pea plant is tall.
   Reason :- Mendel's first law – law of Dominance – work to create phenotype in the heterozygous genotype.
8. Assertion :- The life span of Drosophila , is about 2 weeks.
   Reason:- for the linkage , T. H. Morgan selected , Drosophila as an experimental insect.
9. Assertion :- Alfred Sturtevant , used the frequency of recombination, to measure the distance between genes.
   Reason:- more frequency of recombination means , genes are located farther , low frequency of recombination means genes are located nearer.
10. Assertion :- In fowls , the female has ZW and male has ZZ sex chromosome.
    Reason :- the sex determination in the fowls is done by the female, not by the male parent.
11. Assertion :- The male honey bees or the drones produced by parthenogenesis Reason :- Male honey bees perform mitosis during Gametogenesis.
12. Assertion:- In human female, XX is the sex chromosomal configuration. Reason :- The determination of the sex is done by both the parents.
13. Assertion :- in phenylketonuria , phenyl alanine is excreted by help of urine.Reason :- Phenyl alanine has poor absorption , by the kidney.
14. Assertion:- The possibility of a female becoming a haemophilic is extremely rare. Reason :- mother must be at least carrier and father must be affected by the disease.
15. Assertion :- beta thalassemia , production of beta chain affected.
    Reason:- it caused due to mutation in one or both genes on chromosome no. 16.
16. Assertion :- Chromosomal disorders can be classified into aneuploidy or polyploidy Reason:- Chromosomal disorders can be caused either gaining of extra copy number of chromosomes or an increase in a whole set of chromosome .
17. Assertion:- A male child can not be affected by colour blindness Reason:- mother is a carrier for colour blindness.
18. Assertion :- a female individual has rudimentary or non functional ovaries Reason:- Sterility of the female caused due to the Turner's Syndrome.
19. Assertion :- Genes and chromosomes have parallel behavior.
    Reason :- Sutton & Boveri introduced chromosomal theory of inheritance to prove it.
20. Assertion :- The work of Mendel , remain , unrecognized till 1900.
    Reason:- Expression of the traits, did not blend with each other, was not accepted by his contemporaries.

Study the following diagrams and give the answer of the following questions :-

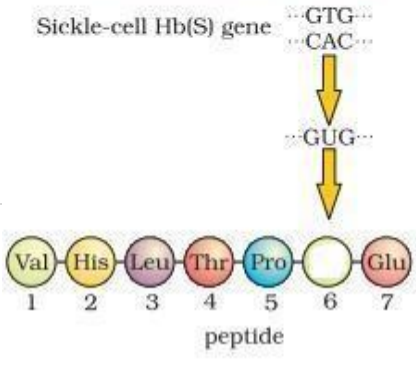
1. Which disease is represented in the karyotype :-
   a. Turner's Syndrome b. Klinefelter'sSyndrome
   c. Down'sSyndrome d. None of theabove
2. Which pair of chromosome karyotype is representing the defect :-
   a. 20th pair b.21st pair c.22nd pair d. 23rd pair
3. What is the term used for such triple chromosomal condition :-
   a. Triploidy b. Trisomy c. Triple chromosomes d. Al of the above
4. Select the most appropriate symptoms of the disease :-
   a. Bigandwrinkledtongue b. Broadflatface
   c. Congenital heart disease d. Al of the above
5. Why this condition appeared :-
   a. Due to failure of segregation ofchromosomes
   b. Due to Aneuploidy
   c. Due to an additional chromosome
   d. Al of the above

Study the following diagram and answer the question :-

6. Mention the chromosomes in the male and femalebird respectively :-
   a. XY&XX
   b. XO&XX
   c. ZZ&ZW
   d. ZW&ZZ

7. Which is the dominant trait of the position of flower:- Terminal
a. Axial
b. Lateral
c. Sub terminal
d.

8. Which amino acid found at sixth position :- Glutamic
a. Acid
b. Valine
c. Glysine
d. Serine
9. GUG codon is found in:-

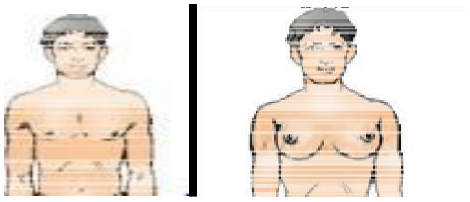


a. DNA
b. t RNA
c. r RNA
d. m RNA

10. Which type of polypeptide is found at the end :-
    a. HbA Polypeptide
    b. HbS Polypeptide
    c. Both A & B
    d. Normal Polypeptide

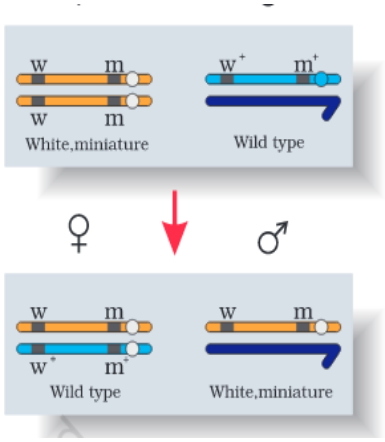
11. Which type of disease , does the sickle cell anemia is :-3
    a. Autosomal Recessive disorder
    b. Autosomal Dominant Disorder
    c. X linked Recessive Disorder
    d. X linked Dominant Disorder

12. In the Hb(S) gene , which triple nucleotide , make codon GUG :-
    a. GTG
    b. CAC
    c. Both A & B
    d. None of the above



A B

13. Which individual exhibit Gynaecomastia :-
    a. A
    b. B
    c. Both A & B
    d. None of the above



14. Which type of cross is depicted in the above mentioned diagram :-
    a. Complete linkage
    b. Incomplete linkage
    c. Incomplete dominance
    d. Co-dominance

CHAPTER 6 MOLECULAR BASIS OF INHERITANCE

MCQS BASED QUESTIONS

1 InaDNAstrand,thenucleotidesarelinkedtogetherby-
(a)glycosidicbonds (b) phosphodiester bonds (c) peptide bonds (d) hydrogen bonds

2 The size of DNA of bacteriophage lambda is (a)50000bp
(b)48502 bp (c)48602 bp (d)58000 bp

3 Nucleic acid is a polymer of
(a)Nucleoside (b)Nitrogenous bases (c)Phosphate gp (d)Nucleotides

4 The component of nucleoside are
(a)Pentose sugar, phosphate gp (b)Pentose sugar , Nitrogenous base(c)Nitrogenous base, Phosphate group
(d)None of the above

5 Nucleotide contains
(a)Pentose sugar, nitrogenous base, phosphate group(b)Pentose sugar , nitrogenous base(c)Nitrogenous base, phosphate gp
(d)None

6 Adenine pairs with thymine with
(a)1 hydrogen bond (b)2hydrogenbond (c)3hydrogenbond(d)4hydrogenbond

7 Cytosine pairs with guanine
(a)3 hydrogen bond (b)2 hydrogen bond(c)1 hydrogen bond(d)4 hydrogen bond

8 Nitrogenous bases present in DNA are(a)AdenineGuanineCytosineUracil
(b)AdenineGuanineCytosineThymine(c)AdenineGuanineCytosine
(d)GuanineCytosineUracil

9 Which statement about Polynucleotide chain is not true?
a)a nucleoside has three components- nitrogenous base, pentose sugar and phosphate group(b)Adenine and Guanosine are Purines(c)two nucleotides are joined by Phospho-di-ester linkage to form dinucleotide(d)a polynucleotide has a free phosphate moiety and -OH at two opposite ends

10 Which of the following is not true or DNA double helix structure?

(a) two nucleotides have anti-parallel polarity
(b) bases in two strands are linked by Hydrogen bonds
(c) Two chains are coiled in a left handed fashion
(d) pitch of the helix is 34 nm

11 When & Who discovered double helical model of DNA Identity the correct option(a)1952Rosalind Franklin & Mourice Wilkins(b)1953, Watson & Crick (c)1953,Watson & Rosalind Frankin
(d)1955, Watson & Rosalind Franklin

12 Central dogma states that genetic information flows from

(a) DNA - RNA —Protein b. RNA- Protein- DNA c. Protein-RNA-DNA d.RNA- DNA-Protein

13 Find the correct statement from below

(a) In prokaryotes DNA being positively charged is held by some negatively chargedproteins to form nucleoid

(b) in eukaryotes there is a set of negatively charged proteins called histones

(c) Histones are rich in lysine and Arginine residues

(d) 6 molecules of histones with DNA forms nucleosome

14 The size of nucleosome

a) 20bpb)200bp c) 250 bp d) 150 bp

15 Which of the following statement is not correct?a)DNA is positively charged

b) Histone proteins are positively charged

c) Histone proteins are rich in lysine & Arginined)Euchromatin is transcriptionally active

16 Identify the incorrect statement regarding transforming principle a)Done by Frederick Griffith in 1928

b) Used Streptococcus bacteria

c) S strain is non virulentd)Experimental organism is mice

17 Biochemical characterisation of transforming principle is done by a)Avery ,McLeod & Mc cartyb)Frederick Griffith

c)Avery & Mc leodd)None

18 Identify the incorrect statement regarding Hershey & Chase experiment

a) Experiment proves that DNA is the genetic material

b) They used bacteriophage

c) Protein labelled with p32 & DNA with s35d)Bacteriophage is a virus.

19 A genetic material must fulfil certain criteria. Which one of the following is not such a criterion.a)It should Replicate

b) It should be chemically and Physically stable

c) It should mutate fast required for evolution

d) It should express in the form of Mendelian Characters

20 In a DNA helix, the distance between two consecutive bases on the same chain isa)2 nm b)3.4 nm c)0.34 nm d)34 nm

21 The term used by mendel for inheritance molecules a)Genes b)Factors c)Alleles d)None

22 Identify the incorrect statementa)Purines are Adenine & Guanine

b) Pyrimidines are Cytosine, Thymine , Adenine

c) Adenine pairs with thymine by 2 Hydrogen bond

d]Guanine pairs with cytosine by 3 hydrogen bond

23 RNAislabiledue topresenceofa]Hydrogen at 2' C in Ribose sugar
b) OH at 2' C in Ribose sugar
c) OH at 2'C in Deoxyribose sugar
d) None oftheabove

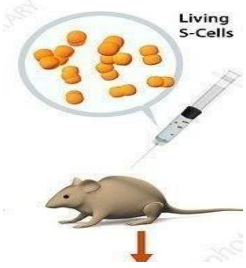
24 Which of the genetic material mutate at faster rate?a]RNA b]DNA c]Both
d]None

25 DNA is structurally stable due to .
a]Presence of thymine b]Presence of uracil c]Presence of adenine d]None

26 The first genetic material is
(a)Protein (b) Carbohydrates (c)DNA (d) RNA

27 WHAT IS hnRNA
a]HUMAN RNA b]HYPER NUCLEAR RNA
c]HETERONUCLEAR RNA d]HETEROGENEOUS NUCLEAR RNA

28 WHAT WILL BE THE EFFECT OF THIS EXPERIMENT ON RAT (A)RAT COAT BECOMES SMOOTH
(B) RAT DIES
(C) RAT IS UNAFFECTED
(D) RAT BODY SHOW PHAGOCYTOSIS AND NO PNEUMONIA



29 The promoter site and terminator site for transcription are located at-
(a) 3(downstream)endand5'(upstream)endrespectivelyoftranscriptionunit
(b) 5"(upstream)endand3(downstream)endrespectivelyoftranscriptionunit
(c) 5 (upstream)end
(d) 3' (downstream)end

30 With regard to mature mRNA in eukaryotes, which of the following is true ?
(a) Exons and introns do not appear in the mature RNA
(b) ExonsappearbutintronsdonotappearinthematuremRNA ()Intronsappear butexonsdonotappearinthematuremRNAbse
(d) Both exons and introns appear in the mature mRNA

31 If the number of base pairs in a double stranded DNA is 200 The number of ADENINE is 60 then what will the numbers of GUANINE. a)60 b)40c)80 d)100

32 Discontinuous synthesis of DNA occurs on one strand because
(a) DNA molecule being synthesized is very long
b) DNA dependent DNA polymerase catalyses polymerisation only in one direction (5-3')
(c) It is a more efficient process
(d) DNA ligase has to have some role

33 Which of the following are the functions of RNA ?
(a) It is carrier of genetic information from DNA to ribosome synthesizing polypeptides
(b) Itcarriesaminoacidstoribosomes
) It is constituent component of ribosomes
(d) All of the above

34 RNA polymerase II is responsible for the transcription of
(a) tRNA B r RNA C hnRNA D snRNA

35 In eukaryotic cell transcription, RNA splicing and RNA capping take place in

(a) Nucleus (b) Cytoplasm (c) Ribosomes (d) Golgi body

36 Choose Stop codons among the following:
a)UAA b)UCA c)UCC d)UAC

37 Triplet UUU codes for
(a) leucine (b) methionine (c) phenylalanine (d) glycine

38 A gene of operon which forms the repressor protein is
(a) Operator (b) Promoter (c)Regulator (d) Structural

39 In the absence of lactose, the operator gene of lac-operon is suppressed by genetic material
(a) Structural gene (b) Repressor protein
c)Regulator gene (d) Promoter gene

40 Control of gene expression takes place at the level of
(a) DNA replication (b) Transcription
(c)Translation (d) None of these

41 In E-coli, the lac operon gets switched on when
(a) lactose is present and it binds to the repressor
(b) repressor binds to operator region
(c) RNA polymerase binds to the operator.
(d) lactose is present and it binds to RNA polymerase

42 Which of the following play a role in protein synthesis?
(a) Introns (b) Exons
(c) Both (a) and (b) (d) None of the above

44 Repressor protein is produced by
(a) Regulator gene (b)Operator gene
(c) Structural gene (d) Promoter gene

45 The protein of DNA, which contains information for an entire polypeptide is called as
(a) Cistron (b) Muton
(c) Recon (d)Operon

46 WHAT IS THE FIRST AMINO ACID ADDED DURING PROTEIN SYNTHESIS a)GLYCIN b)METHYLEME
c)METHIONINE d)VALINE

47 WHAT IS THE TYPE OF CENTRIFUGATION IS USED IN MESELSON AND STAHL EXPERIMENT
a) CaC_2 DENSITY GRADIENT CENTRIFUAGATION
b) CsCl DENSITY GRADIENT CENTRIFUAGATION
c) NaCl DENSITY GRADIENT CENTRIFUAGATION
d) BUFFER MEDIATED GRADIENT CENTRIFUAGATION

48 If a person has VNTR of 10 nucleotides in his satellite DNA of chromosome no 8 then what will be the VNTR of his son and daughter of that chromosome?
a) both son and daughter will have the same
b) son will have 8 but daughter will have 4
c) it can't be determined.

49 Satellite DNA is an example of ----------DNA which shows DNA ---------- which is ---------- in nature. Choose right sequences of the answers a)genomic , inheritable , variable b)repetitive , polymorphism , variable c)polymorphism , variable, repetitive d)repetitive , polymorphism , inheritable

50 Identify the incorrect statement regarding DNA fingerprinta)Bulk DNA forms a major peak b)Satellite DNA is a repetitive DNA

c) Satellite DNA code for proteins
d) Minisatellite & Microsatellite is a satellite DNA

ANSWER-

SR. NO	ANSWER	SR. NO	ANSWER	SR. NO	ANSWER
1	b	21	b	41	a
2	b	22	b	42	b
3	d	23	b	44	a
4	b	24	a	45	a
5	a	25	a	46	c
6	b	26	d	47	b
7	a	27	d	48	a
8	b	28	b	49	d
9	a	29	b	50	c
10	c	30	b		
11	c	31	b		
12	a	32	b		
13	c	33	d		
14	b	34	c		
15	c	35	b		
16	c	36	a		
17	a	37	c		
18	c	38	c		
19	c	39	b		
20	c	40	b		

ASSERTION -REASON TYPE QUESTIONS:

These questions consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.

A . If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
B. If both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
C. If Assertion is true but the Reason is false.
D. If both Assertion and Reason are false

1. Assertion: Both deoxyribose and ribose belong to the same class of sugar called pentoses.
Reason : They differ only at the 3' C of the pentose sugsar.

2. Assertion : DNA and histone proteins are both charged materials
Reason : DNA is negatively charged and HISTONE proteins are positively charged.

3. Assertion: DNA is considered as stable genetic material than RNA .Reason:It allows less mutation than RNA and it is double stranded.

4. Assertion: AUG codon has dual function.
Reason : AUG acts as start codon and it codes for methionine.

5. Assertion:DNA replication is semi conservative in nature .
Reason : The new DNA formed has both strands newly formed.

6. Assertion: Mathew Meselson and Franklin Stahl performed experiment using Heavy N source in nutrition medium for the growth of bacteria.
Reason: Density gradient centrifugation was used to separate the heavy DNA particles

7. Assertion: During DNA replication both strands are replicated in same direction. Reason: DNA replication can do replication in any direction.

8. Assertion : Transcription takes place on the template strand.
Reason : The polarity of template strand is 3' to 5'.

11. Assertion:In prokaryotes transcription and translation takes place simultaneously Reason : There is no nuclear boundary in prokaryotes.

12. Assertion: The genetic code is degenerate
Reason: Some amino acids are coded by more than one codon.

13. Assertion: Sickle-cell haemoglobin has a valine in place of glutamic acid at position 6 in the β polypeptide chain.
Reason: Sickle-cell anaemia is expressed only in homozygous recessive state.

14. Assertion: DNA fingerprinting is very well known for its application in paternity testing in case of disputes.
Reason: It employs the principle of polymorphism in DNA sequences as the polymorphisms are inheritable from parents to children.

15. Assertion:Human Genome Project was a megaproject launched to find out the complete DNA sequence of human genome.
Reason: It was possible only with the help of genetic engineering techniques to isolate and clone any piece of DNA and fast techniques for determining DNA sequences

16. Assertion: Lactose in lac operon is INDUCER Reason: Lactose inactivates the repressor gene.

17. Assertion: No lac mRNA is made in the presence of glucose.
Reason: In the presence of glucose and lactose activity of lac operon is not needed.

18. Assertion : Genetic codon is nearly universal.
Reason :as from bacteria to human it codes for same amino acids with some expections like in mitochondrial codons.

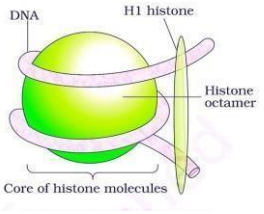
19. Assertion: DNA finger printing is based on polymorphisms in repetitive DNA. Reason:The polymorphisms are inheritable in nature.

20. Assertion:Assertion: 99.9% nucleotide bases are exactly the same in all people.

Reason: There are many locations where SNPs occur in human genome.

CASE STUDY / DIAGRAM BASED QUESTIONS

1. Observe following diagram and give answers.



i) **Identify the structure in following diagram.**

a) Ribosome b)Nucleosome
c)Histosome d)Centrosome

ii) **How many base pair of DNA Helix are found in the structure?**

a)1000 b)500 c) 200 d) 100

iii) **Which amino acid are found richly in histone protein.**

a) Glysine and Proline b) Proline and Arginine c)Lysine and Arginine d)Lysine and Glysine

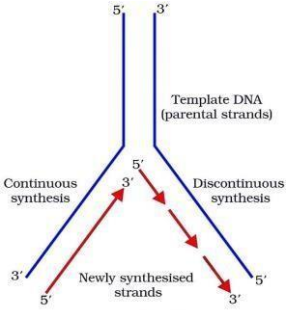
iv) **How many molecules are found in one Histone unit.**

a)1 b)2 c)4 d) 8

v) **What is the chemical nature and charge of Histone protein.**

a)Acidic and Positive b) Basic and Negative
c)Basic and Positive d) Acidic and Negative

2. Observe following diagram and give answers.



i) **Identify the following diagram?**

a) Replicating fork b) ORI c)Template strand
d) Coding strand

ii) **Give the term for Starting point of Replication**

a) ORI b) ARS c) ROP d) SSB

iii) **Give the term for DNA fragments produced by Discontinuous synthesis.**

a) Sokazaki Segment b) Mokazaki Segment
c) Okazaki Segment d) Zokazaki Segment

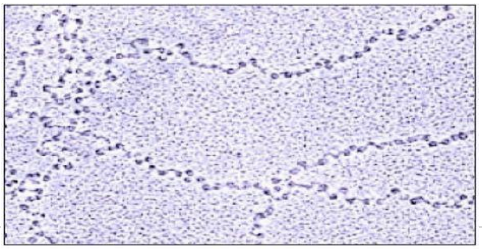
iv) **Give the name of enzyme which bind DNA fragments producedby Discontinuous synthesis.**

a) DNA Ligase b) DNA Polymerase c) DNAase d) Endonuclease

v) **In which stage of cell cycle this structure is formed.**

a) G1 b)G2 c)S d) M

3. Observe following diagram and give answers.



i) **Identify the following diagram.**

a) EM Picture- Bead in String b)Nucleosome c) LinkerDNA d)Histone

ii) **Give the term for Regions in given structure which are loosely packed and stains lightly.**

a) Heterochromatin b) Euchromatin
c) Pseudochromatin d) None of above

iii) **Give the term for Regions in given structure which are densely packed and stains dark.**

a) Heterochromatin b) Euchromatin c) Pseudochromatin d) None of above

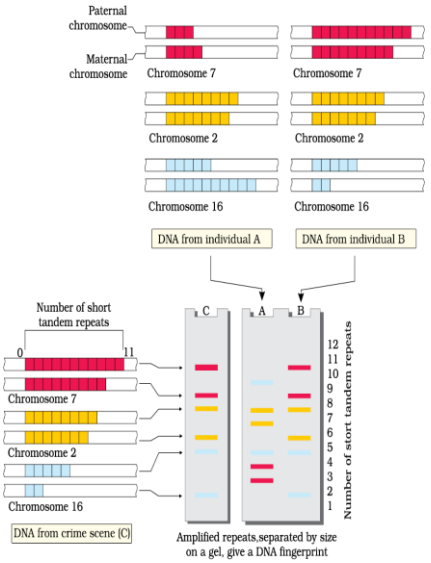
iv) **Give the scientific term for Bead on string structure.**

a) Chromatin b) Nucleosome c) Linker DNA d) Histone

v) **In which stage of cell division chromatin is modified in chromosomes and seen clearly.**

a) Prophase b) Metaphase c) Anaphase d) Telophase

4. Study the following crime case in which DNA finger print of two individual suspects A and B obtained from their DNA sample and DNA sample from the crime scene has the DNA fingerprint C to answer the following questions:



i) The technique to obtain separate bands of DNA fragments is

a) PCR b) Gel electrophoresis
c) DNA fingerprint d) Souther blotting.

ii) These short tendom repeates are present in

a) Satellite DNA
b) ANY part of DNA
c) Homologous DNA
d) Single strand DNA

iii) This technique relies on which characteristics of DNA polymorphisms

a) they are variable
b) they are inheritable
c) they are different from individual to individual
d) they are short DNA fragments

i) only a ii) b, c and d iii) b and c iv) all of the above

iv) Is it right tic compare the VNTR of chromosome no 16 of C with the chromosome no 7 of the suspects. Yes/no

v) The red bands of chromosomes are obtained at

a) anode pole of gel electrophoric plate.
b) cathode pole of gel electrophoric plate.
c) neutral pole of gel electrophoric plate
d) anywhere of gel electrophoric plate.

5. Read following and give answers.

Genghis Khan, the fearsome Mongolian warrior of the 13th century, may havedone more than rule the largest empire in the world;according to a recently published genetic study, he may have helped populate it too. An international group ofgeneticists studying Y-chromosome genome data under HGP have found that nearly 8percent of the men living in the region of the former Mongol empire carry y-chromosomes that are nearly identical. That translates to 0.5 percent of the malepopulation in the world, or roughly 16 million descendants living today.

i) Identify the phenomena mentioned above.
   a) Human genome project
   b) Density gradientseparation
   c) Radioactive marking
   d) Heavy Isotope marking

ii) Which chromosome has fewest genes.
   a) 1st b)X c) Y d) 3rd

iii) Which chromosome has most genes.
   a) X b) Y c)1st d) 2nd

iv) major approaches involved in Methodologies of HGP
   a) Expressed Sequence Tags (ESTs) b) Sequence Annotation
   c)Bothaandb d) Noneof above

v) Which is not a goal of HGP.
   a) Identify al the approximately 20,000-25,000 genes in human DNA
   b) Determine the sequences of the 3 billion chemical base pairs that make uphuman DNA
   c) Store this information in databases & Improve tools for data analysis
   d) Inhibition of transfer related technologies to other sectors, such as industries

	1	2	3	4	5
i	B	A	A	A	A
ii	C	A	B	A	C
iii	C	C	A	iii	C
iv	D	A	B	NO	C
v	C	C	B	B	D