BYJU'S Full Test for Board Term I

(CBSE Grade 12)

BIOLOGY ANSWER KEYS and SOLUTIONS

ANSWER KEYS

Q1	B.	Q21	B.	Q41	C.
Q2	D.	Q22	D.	Q42	B.
Q3	A.	Q23	D.	Q43	D.
Q4	C.	Q24	A.	Q44	B.
Q5	A.	Q25	A.	Q45	A.
Q6	D.	Q26	A.	Q46	D.
Q7	B.	Q27	A.	Q47	C.
Q8	C.	Q28	D.	Q48	B.
Q9	B.	Q29	A.	Q49	B.
Q10	B.	Q30	B.	Q50	D.
Q11	C.	Q31	C.	Q51	B.
Q12	A.	Q32	D.	Q52	A.
Q13	D.	Q33	D.	Q53	C.
Q14	C.	Q34	B.	Q54	C.
Q15	C.	Q35	C.	Q55	A.
Q16	A.	Q36	A.	Q56	A.
Q17	B.	Q37	A.	Q57	D.
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Q19	C.	Q39	D.	Q59	C.
Q20	A.	Q40	A.	Q60	A.

SOLUTIONS

SECTION - A

Q1

Primary male sex organs are placed inside a sac like structure called

A. Foreskin
B. Scrotum
C. Rete testis
D. Mons pubis

Answer: (B) Scrotum

Solution:

Testes are the primary male sex organs. They are placed inside a sac-like structure called scrotum.

Foreskin is the loose fold of skin covering the glans penis.

Rete testis is one of the male sex accessory ducts.

Mons pubis is a part of female external genitalia.

Q2

Match column I with column II and select the **correct** option.

Column I	Column II
a. Periodic abstinence	(i) Barrier methods
b. Cervical caps	(ii) Natural methods
c. Coitus interruptus	
d. Lactational amenorrhea	

A. a, b, c-i; d-ii
B. a, c, d-i; b-ii
C. a, b-ii; c, d-i
D. a, c, d-ii; b-i

Answer: (D) a, c, d-ii; b-i

Solution:

Natural methods of contraception include periodic abstinence, coitus interruptus, lactational amenorrhea, etc.

Barrier methods of contraception include condoms, cervical caps, vaults, etc.

Q3	Morula is one of the stages of embryogenesis. This stage has how many cell(s)? A. 8 to 16 B. 2 to 4 C. Single cell D. More than 32 cells **Answer:** (A) 8 to 16 **Solution:** Zygote is a single celled structure. Zygote undergoes cleavage and forms 2, 4, 8, 16 cells, etc. The embryo with 8 to 16 cells is called a morula.
Q4	A woman is in the second trimester of her pregnancy. Select the option which is unlikely for this woman. A. Placenta is formed B. Level of hormones like cortisol, thyroxine, etc. is high in her blood C. Menstrual cycle continues as normal D. Heart sound of the foetus can be heard through a stethoscope **Answer:** (C) Menstrual cycle continues as normal **Solution:** Second trimester of pregnancy lasts from 12 weeks to 24 weeks. By this time, placenta is formed and hormones like estrogen, progesterone, cortisol, thyroxine, etc. are high in blood plasma. The heart sound can be detected by stethoscope by the end of 1st month of pregnancy. Menstrual cycle halts in a pregnant woman.
Q5	A contraceptive pill called 'Saheli' was developed in India. Which institute was responsible for this? A. CDRI B. ART C. WHO D. RCH **Answer:** (A) CDRI **Solution:** 'Saheli' was developed by scientists at Central Drug Research Institute (CDRI) in Lucknow.

Q6	The human male ejaculates about 200 to 300 million sperms during a coitus of which, for normal fertility, at least how many of sperms must have normal shape, size and vigorous motility to successfully impregnate a female? A. 20-80 million B. 10-20 million C. 10-20 million D. 48-72 million **Answer:** (D) 48-72 million **Solution:** The normal sperm count per ejaculation is 200 to 300 million of which, at least 60% sperms must have normal shape and size and at least 40% of them must show vigorous motility for normal fertility. Hence, 48-72 million of sperms must have normal shape, size and vigorous motility to successfully impregnate a female.
Q7	The structure(s) which make up the birth canal is/are A. Only vagina B. Vagina and cervical canal C. Only cervix D. Cervix and uterus **Answer:** (B) Vagina and cervical canal **Solution:** Uterus is also called the womb. Neck of uterus is called cervix which forms birth canal along with vagina.
Q8	Choose the **incorrect** statement w.r.t. syphilis. A. It is a bacterial disease B. It affects the genitalia of infected people C. Even if detected early it cannot be completely cured D. It is transmitted through sexual contact, transfusion of blood or through the placenta to a foetus **Answer:** (C) Even if detected early it cannot be completely cured **Solution:** Syphilis can be completely cured if detected early.

Q9	Which one of the following is the **correct** match of the events occurring during menstrual cycle? A. Post menstrual phase: Rapid regeneration of myometrium and maturation of Graafian follicle B. Post ovulatory phase: Development of corpus luteum and increased secretion of progesterone C. Menstruation phase: Breakdown of myometrium when ovum not fertilized D. Luteal phase: LH and FSH attain peak level and sharp fall in secretion of progesterone **Answer:** (B) Post ovulatory phase: Development of corpus luteum and increased secretion of progesterone **Solution:** Graafian follicle ruptures during ovulation. This ruptured follicle transforms as corpus luteum during post ovulatory phase and increased secretion of progesterone.
Q10	A female has blocked oviducts but her ovaries function normally. Which infertility treatment would be most appropriate for her if she wants to get pregnant? A. IVF followed by ZIFT B. IVF followed by IUT C. GIFT D. AI **Answer:** (B) IVF followed by IUT **Solution:** A woman with normal ovaries produces an ovum every month. This ovum can be removed and can be fertilised *in vitro*. As her fallopian tubes are blocked, ZIFT [Zygote Intra Fallopian Transfer] is not suitable. Instead, embryo with more than 8 blastomeres can be transferred into the uterus [IUT-Intra Uterine Transfer]. This would be the most appropriate procedure for her. GIFT [Gamete Intra Fallopian Transfer] is the transfer of an ovum from a donor into the fallopian tube. AI is artificial Insemination.
Q11	The enzymes present in which part of the sperm helps it penetrate the ovum? A. Middle piece B. Tail C. Acrosome D. Neck

	Answer: (C) Acrosome **Solution:** Acrosome is filled with enzymes like hyaluronidase, zona lysin and corona penetrating enzyme which facilitate breakdown of corona radiata and zona pellucida and help the sperm in the penetration of ovum.
Q12	A woman is pregnant. Due to a history of Down's syndrome in her family, she decides to check whether the foetus is affected by this syndrome. How many of these methods will clarify this? a. Amniocentesis b. IUD c. MTP d. ICSI A. One B. Two C. Three D. Four **Answer:** (A) One **Solution:** Down's syndrome is a chromosomal disorder. The cells from the amniotic fluid have the same genetic constitution as the developing foetus. When this fluid is extracted and sampled, the foetal DNA can be examined for genetic disorders. This process is called amniocentesis. IUD [Intra Uterine Device] is a contraceptive device. MTP [Medical Termination of Pregnancy] is induced abortion. ICSI [Intra Cytoplasmic Sperm Injection] is a method of *in-vitro* fertilisation.
Q13	Which of the given statements are **correct** w.r.t. the events included in pollen-pistil interaction? (i) Germination of pollen grain. (ii) Deposition of pollen grain on stigma. (iii) Fertilisation of secondary nucleus by one male gamete. (iv) Entry of pollen tube in ovule. A. (i) and (iii) B. (ii) and (iii) C. (i), (ii) and (iii) D. (i), (ii) and (iv) **Answer:** (D) (i), (ii) and (iv)

	Solution: All the events from deposition of pollen on stigma until pollen tube enter the ovule are together referred to as pollen-pistil interaction. Hence, option D is correct.
Q14	When an individual is affected with phenylketonuria, which of the given conversion is most likely to occur? A. Phenylalanine to tyrosine B. Tyrosine to phenylalanine C. Phenylalanine to phenylpyruvic acid D. Glutamic acid to valine **Answer:** (C) Phenylalanine to phenylpyruvic acid **Solution:** The individual affected with phenylketonuria lacks a liver enzyme called phenylalanine hydroxylase that converts the amino acid phenylalanine into tyrosine. As a result of this phenylalanine is accumulated and converted into phenylpyruvic acid and other derivatives. Accumulation of these in brain results in mental retardation.
Q15	In human population, where genotype I^Ai represents blood group-A, ii represents blood group-O, I^AI^B represents blood group AB and I^Bi represents blood group-B; the pattern of genetic inheritance can be termed as A. Polygenic and qualitative inheritance B. Pleiotropy and incomplete dominance C. Co-dominance and multiple allelism D. Polygenic and quantitative inheritance **Answer:** (C) Co-dominance and multiple allelism **Solution:** The inheritance pattern of blood group in human population is multiple allelism and co-dominance.
Q16	Which of the following combination of gametes, represent the **correct** sex determination pattern in birds? A. Sperms (A + Z); Eggs (A + Z), (A + W) B. Sperms (A + Z); Eggs (A + Z), (A + O) C. Sperms (A + X), (A + O); Eggs (A + X) D. Sperms (A + X), (A + Y); Eggs (A + X) **Answer:** (A) Sperms (A + Z); Eggs (A + Z), (A + W)

Solution:
In birds, female heterogametic condition (ZW-ZZ) is seen. Hence, male bird produces sperm (A + Z) while, female bird produces two types of eggs (A + Z) or (A + W).

Q17

Mr. X and Ms. Z have chromosomal disorders. Mr. X has three sex chromosomes in each cell while Ms. Z has only one sex chromosome in each cell. Identify the disorder they are suffering from:

	Mr. X	**Ms. Z**
A.	Down's syndrome - Trisomy of chromosome 21	Klinefelter's syndrome - Trisomy of chromosome 18
B.	Klinefelter's syndrome - Presence of an additional copy of X-chromosome	Turner's syndrome - Absence of one of the X-chromosomes
C.	Down's syndrome - 44 + XX	Turner's syndrome - 44 + XO
D.	Klinefelter's syndrome - 44 + XX	Down's syndrome - 44 + XY

Answer: (B)

	Mr. X	**Ms. Z**
	Klinefelter's syndrome - Presence of an additional copy of X-chromosome	Turner's syndrome - Absence of one of the X-chromosomes

Solution:
According to given question, Mr. X has three sex chromosomes in each cell. Hence, the chromosomal complement should be 44AA + XXY. Hence, he is inflicted with Klinefelter's syndrome.
Ms. Z has only one sex chromosome in each cell. Hence, the chromosomal complement should be 44A + XO. Ms. Z is inflicted with Turner's syndrome (monosomy).

Q18

Which of the following statements are **correct** w.r.t. characteristics of wind pollinated flowers?

(i) Flowers packed into an inflorescence.

(ii) Presence of nectaries.

(iii) Pollen grains are surrounded by mucilaginous covering.

(i) Flowers have large feathery stigma.

A. (i) and (iii)
B. (i) and (ii)
C. (i) and (iv)
D. (ii) and (iii)

	Answer: (C) (i) and (iv) **Solution:** In wind pollinated flowers, flowers have large feathery stigma and flowers are packed into an inflorescence. Nectaries are absent in wind-pollinated flowers, instead they are present in insect pollinated flowers. Pollen grains are surrounded by mucilaginous covering in flowers when these are pollinated by water.
Q19	In *lac* operon, which of the given provides attachment site for RNA polymerase? A. Regulator gene B. Operator C. Promoter D. Structural gene **Answer:** (C) Promoter **Solution:** Promoter provides attachment site for RNA polymerase. Structural gene transcribes mRNA for polypeptide synthesis. Regulator gene synthesizes repressor protein which binds to operator.
Q20	Which of the given is **correct** about features of human genome? A. Repeated sequences make up very large portion of the human genome B. The average gene consists of 30000 bases C. More than 50 percent of the genome codes for proteins D. Chromosome Y has most genes (2968) and 1 has the fewest (231) **Answer:** (A) Repeated sequences make up very large portion of the human genome **Solution:** In human genome: • The average gene consists of 3000 bases. • Less than 2 percent of the genome codes for protein. • Chromosome 1 has most genes (2968) and Y has the fewest (231).
Q21	In *E.coli*, the *lac* operon gets switched off when A. Inducer molecule binds to repressor B. Repressor protein binds to operator C. RNA polymerase binds to operator D. Lactose is present

Answer: (B) Repressor protein binds to operator

Solution:
Repressor protein binds to operator → operon is switched off.
Inducer (lactose) binds to repressor → operon is switched on.

Q22

Double fertilization is a unique event in flowering plants. It results in

A. Fusion of two polar nuclei in embryo sac
B. Entry of pollen tube in embryo sac
C. Degeneration of antipodal and synergids
D. Production of zygote and primary endosperm nucleus (PEN)

Answer: (D) Production of zygote and primary endosperm nucleus (PEN)

Solution:
Double fertilization involves syngamy and triple fusion. Syngamy leads to production of zygote. Triple fusion forms PEN.

Q23

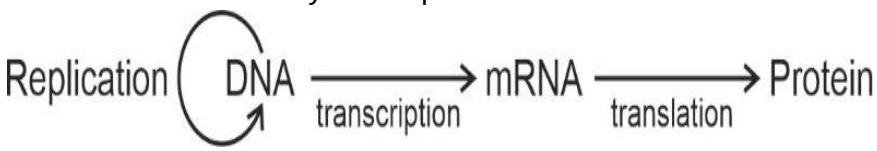
Consider the given schematic representation of central dogma and select the **correct** option w.r.t. labelled processes.

	Process-A	**Process-B**	**Process-X**
A.	Replication	Transcription	Translation
B.	Transcription	Replication	Translation
C.	Translation	Replication	Transcription
D.	Transcription	Translation	Replication

Answer: (D)

	Process-A	**Process-B**	**Process-X**
	Transcription	Translation	Replication

Solution:
Replication is a process by which a double-stranded DNA molecule is copied to produce two identical DNA molecules.
The process of copying genetic information from one strand of DNA into RNA is known as

	transcription. Translation refers to polymerisation of amino acids to form a polypeptide. The order and sequence of amino acids are defined by the sequence of bases in the mRNA. 
Q24	Which of the given acts as initiator codon? A. AUG B. UAA C. UAG D. UGA **Answer:** (A) AUG **Solution:** AUG is a start codon while, UAA, UAG and UGA are stop codons.
	SECTION - B
	Question No. 25 to 28 consists of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true and R is not the correct explanation of A C. A is true but R is false D. A is false but R is true
Q25	**Assertion:** A mature anther is tetrasporangiate. **Reason:** Each anther is a four sided tetragonal structure consisting of four microsporangia located at corners, two in each lobe. **Answer:** (A) Both A and R are true and R is the correct explanation of A **Solution:** Each anther is a four-sided tetragonal structure consisting of four microsporangia located at corners, two in each lobe. Hence, a mature anther is tetrasporangiate.
Q26	**Assertion:** Six different genotypes are possible for ABO blood groups in human population. **Reason:** ABO blood groups in human population are controlled by gene I which has three alleles.

	Answer: (A) Both A and R are true and R is the correct explanation of A **Solution:** Since, there are three different alleles. Therefore, six different genotypes are possible for ABO blood group in human population. Number of genotype for multiple allelism = $\frac{n}{2}(n+1)$ Since, n = 3 $\therefore \quad \frac{3}{2}(3+1) \Rightarrow 6$
Q27	**Assertion:** According to the 2011 census report, the population of India is increasing rapidly at a rate of 20/1000/year. **Reason:** This is due to decline in mortality rates of mothers as well as infants and the increase in the number of individuals in the reproductive age group. **Answer:** (A) Both A and R are true and R is the correct explanation of A **Solution:** The population of India has been rapidly increasing. This is due to many factors. Health facilities have increased, the mortality rates have decreased, living conditions have improved, etc. One of the hallmark of expanding population is the maximum number of individuals in the reproducible age.
Q28	**Assertion:** Presence of hymen is a definitive indicator of virginity or lack of sexual intercourse in women. **Reason:** Hymen can be torn by coitus as well as other factors. **Answer:** (D) A is false but R is true **Solution:** Hymen may or may not be torn by the first coitus. It can also be broken by a sudden fall or jolt, insertion of a tampon, sports activities like cycling, etc. Hence, presence or absence of hymen is not a reliable indicator of virginity or lack of sexual experience.
Q29	During transcription in eukaryotes, RNA polymerase I synthesize (i) 5.8S rRNA (ii) hnRNA (iii) 28S rRNA (iv) tRNA A. (i) and (iii) B. (ii) and (iv) C. (iii) and (iv) D. (i) and (iv)

	Answer: (A) (i) and (iii) **Solution:** Functions of different RNA polymerases in eukaryotes are as follows: (i) RNA polymerase I : 5.8S, 18S, 28S rRNA synthesis (ii) RNA polymerase II: hnRNA (heterogeneous nuclear RNA) synthesis (iii) RNA polymerase III: tRNA, scRNA, 5S rRNA and snRNA (small nuclear RNA) synthesis
Q30	Which of the given present in an embryo sac of an angiosperm produces a triploid tissue after fertilization? A. Egg B. Central cell C. Synergids D. Antipodal cells **Answer:** (B) Central cell **Solution:** Central cell fuses with a male gamete and produces primary endosperm nucleus (PEN) which is a triploid tissue.
Q31	mRNA is called as messenger RNA because A. It constitutes 5% of total RNA in cell B. It is longest RNA C. It carries genetic information provided by DNA D. It has structural and catalytic role during translation **Answer:** (C) It carries genetic information provided by DNA **Solution:** • rRNA has structural and catalytic role during translation. • mRNA is called as messenger or informational RNA as it carries genetic information provided by DNA.

Q32	How many traits of flower w.r.t. *Pisum sativum* were selected by Mendel for carrying out hybridisation experiment? A. Two B. One C. Six D. Four **Answer:** (D) Four **Solution:** Mendel has selected four traits of pea w.r.t. flower, *i.e.*, violet and white flower (flower colour) and axial and terminal flower (flower position) for carrying out hybridisation experiment.
Q33	In which of the given plants, autogamy is prevented but not geitonogamy? A. Castor and *Vallisneria* B. *Vallisneria* and Papaya C. *Vallisneria* and Maize D. Castor and Maize **Answer:** (D) Castor and Maize **Solution:** In monoecious plants, male and female flowers are produced on the same plant. This prevents autogamy but not geitonogamy. Ex - castor and maize. *Vallisneria* and papaya are dioecious plants. Autogamy as well as geitonogamy both are prevented in them.
Q34	During seed germination, micropyle A. Provides protection to embryo B. Facilitates entry of O_2 and water into the seed C. Develops from outer integument of ovule D. Develops from inner integument of ovule **Answer:** (B) Facilitates entry of O_2 and water into the seed **Solution:** During seed germination, micropyle facilitates entry of O_2 and water into the seed. Seed coat protects embryo. Seed coat is formed from integuments of ovule.

Q35	In Mendelian dihybrid cross, out of 80 individuals obtained in F_2 generation, how many are pure homozygous for both the characters? A. 10 B. 5 C. 20 D. 8 **Answer:** (C) 20 **Solution:** In Mendelian dihybrid cross, 4 among 16 progenies are pure homozygous *i.e.*, RRYY, RRyy, rrYY and rryy. Since, number of pure homozygous offsprings $= \frac{4}{16} \times 80 \Rightarrow 20$
Q36	Enumerate the number of nucleosomes present in the nucleus of diploid eukaryotic cell which possess 6.6×10^9 bp. A. 3.3×10^7 B. 6.6×10^9 C. 3.3×10^9 D. 6.6×10^7 **Answer:** (A) 3.3×10^7 **Solution:** One nucleosome has 200 bp. $\Rightarrow \quad \frac{6.6 \times 10^9}{200} = 3.3 \times 10^7$ nucleosomes
Q37	The process of translation of mRNA to proteins begins when A. Small ribosomal subunit encounters the mRNA B. tRNA is charged C. There is a formation of peptide bond between first two amino acids D. Amino acids are activated **Answer:** (A) Small ribosomal subunit encounters the mRNA **Solution:** When the small ribosomal subunit encounters an mRNA, the process of translation of mRNA to protein begins.

Q38	Which of the following cross in pea plant is considered to be a test cross? A. Terminal flowered plant × Terminal flowered plant B. Green pod plant × Yellow pod plant C. Tall plant × Tall plant D. White flowered plant × White flowered plant **Answer:** (B) Green pod plant × Yellow pod plant **Solution:** In a typical test cross, an organism showing a dominant phenotype is crossed with the recessive parent instead of self-pollination. Green pod plant × yellow pod plant represents a test cross.
Q39	Select the **odd** one w.r.t. IUDs. A. Lippes loop B. Multiload 375 C. Progestasert D. Implant **Answer:** (D) Implant **Solution:** Lippes loop, Multiload 375, Progestasert are different types of IUDs. Implant is a contraceptive implant, not an IUD.
Q40	When the uterine contractions are not strong enough for parturition, doctors booster the parturition process by injecting one or more of the following. Choose the **correct** number of the given options. a. Progesterone b. Oxytocin c. Prolactin d. hCG e. Estrogen f. Progestogen A. One B. Two C. Four D. Six **Answer:** (A) One **Solution:** Strong uterine contractions are required for a successful parturition. If a woman's uterine contractions are weak, she is injected with oxytocin. Oxytocin generates strong uterine contractions.

Q41

Select the correct option and complete the analogy.

Oogonia : Mitosis :: Primary spermatocyte : _____

A. Mitosis
B. Differentiation
C. First meiotic division
D. Second meiotic division

Answer: (C) First meiotic division

Solution:
During spermatogenesis, primary spermatocytes undergo first meiotic division and produce secondary spermatocytes.

Q42

Match column I and column II and select the **correct** option.

Column I	Column II
a. Sertoli cells	(i) Homologous to glans penis
b. Infertile couples	(ii) Formation of spermatozoa
c. Clitoris	(iii) Nourish sperms
d. Spermiogenesis	(iv) ART
	(v) IUD
	(vi) Spermatids to spermatozoa

A. a(ii), b(v), c(iii), d(iv)
B. a(iii), b(iv), c(i), d(vi)
C. a(iii), b(iv), c(ii), d(i)
D. a(ii), b(v), c(vi), d(iv)

Answer: (B) a(iii), b(iv), c(i), d(vi)

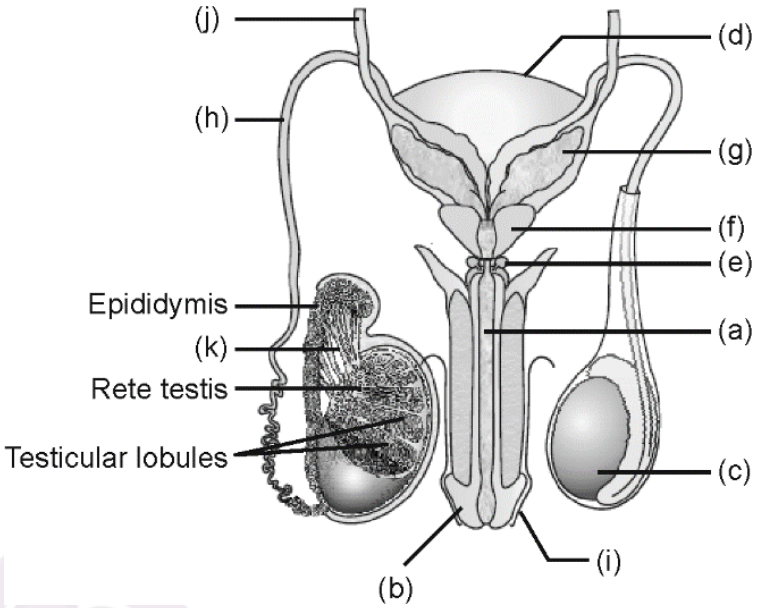
Solution:
The correct is diven below:

Sertoli cells - Nourish sperms
Infertile couples – ART
Clitoris - Homologous to glans penis
Spermiogenesis - Transformation of spermatids to spermatozoa

Hence, option B is correct.

Q43	A new born baby lost his mother at birth. He was fed cow's milk from day one. As the child grew up it was observed that its immune system was weak. This was due to A. Cow's milk lacked nutrients B. No mother to care for the baby C. Mother's milk is rich in lipids D. Baby did not get colostrum and mother's milk **Answer:** (D) Baby did not get colostrum and mother's milk **Solution:** The mother's milk produced during initial few days of lactation is called colostrum. It contains several antibodies which maintain a strong immune system in babies. When a baby does not get colostrum, his/her immune system tends to become weak. Hence, option D is correct answer.
Q44	Select the male sterilisation technique from the following. A. Tubectomy B. Vasectomy C. ET D. Insemination **Answer:** (B) Vasectomy **Solution:** Vasectomy is the process in which a small part of the vas deferens is removed or tied up through a small incision on the scrotum. It is a male sterilisation technique.
Q45	Select the options which would be applicable to both human ovaries as well as adrenal glands. a. Endocrine in function. b. Outer part is cortex and inner part is medulla. c. Produce catecholamines. d. Present in both males and females. A. a and b B. a, b and c C. b and c D. a, b and d **Answer:** (A) a and b **Solution:** Human ovaries produce hormones like estrogen and progesterone. Adrenal glands produce corticoids, adrenaline, etc. So both are endocrine in function. Ovaries and adrenal glands have an outer part called cortex and inner part called medulla.

	Adrenal glands are present in both males and females. Ovaries do not produce catecholamines.
Q46	Mammary ampulla is formed by the joining of several A. Mammary lobes B. Mammary glands C. Alveoli D. Mammary ducts **Answer:** (D) Mammary ducts **Solution:** Several mammary ducts join to form a wider mammary ampulla which is connected to lactiferous duct.
Q47	Select the **incorrect** statements from the following. a. The process of oogenesis starts during puberty in females. b. When the blastocyst gets implanted in the uterus, it is known as an ectopic pregnancy. c. Eyelashes of the foetus are formed at the end of first trimester. d. Bulbourethral glands are male accessory glands. A. b and c only B. a, c and d C. a, b and c D. c and d **Answer:** (C) a, b and c **Solution:** The process of oogenesis starts during the embryonic stage in females. When the blastocyst gets implanted in the fallopian tube, it is known as an ectopic pregnancy. Eyelashes of the foetus are formed at the end of second trimester.
Q48	Select the contraceptives from the following which can be self administered and does not need a professional. a. LNG-20 b. Diaphragms c. Condoms d. Vaults e. Tubectomy A. a, b, d B. b, c, d C. a, e D. b, c, d, e

	Answer: (B) b, c, d **Solution:** Diaphragms, condoms and vaults can be used by the individual himself/herself without any professional guidance. LNG-20 is a hormone releasing IUD which is inserted inside a female by a doctor or nurse. Tubectomy is a surgical procedure done by a doctor only.
	SECTION - C
Case	 A dead body was found by the police and it was brought for post-mortem. Given above is the diagram of reproductive system as observed by the medical students. Answer the questions given with the help of the diagram.
Q49	The structure 'a' acts as a passage for A. Urine only B. Urine or semen, at a time C. Semen only D. Sperms and urine, at a time **Answer:** (B) Urine or semen, at a time **Solution:** The structure 'a' is urethra. Urethra in males is a common passage for urine as well as semen, at different times.

Q50

The absence of which of the given options would make a man sterile due to absence of spermatogenesis?

A. b
B. d
C. g
D. c

Answer: (D) c

Solution:
Testis is a primary sex organ in males. It produces sperms. If a man does not produce sperms, then he cannot reproduce and is sterile. Structure labelled 'c' is testis.

Q51

'The testes are situated outside the abdominal cavity within a pouch called scrotum'. In some cases the testes fail to descend. Which of the following will be true for the individual?

A. His body will produce sperms like a normal man
B. The temperature regulation required for spermatogenesis will get affected
C. This can be treated by vitamin supplements
D. Sperms will be produced without tail

Answer: (B) The temperature regulation required for spermatogenesis will get affected

Solution:
The scrotum helps in maintaining the low temperature of the testes (2 - 2.5°C lower than the normal internal body temperature) necessary for spermatogenesis. So, the temperature regulation required for spermatogenesis will get affect when the testes fail to descend.

Q52

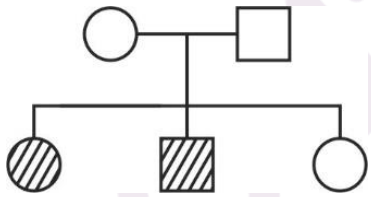
Match column I with column II and select the **correct** option.

Column I	Column II	
a. e	(i)	Loose fold of skin covering glans penis
b. h	(ii)	Its secretion lubricates penis
c. f	(iii)	Unpaired male accessory gland
d. i	(iv)	Tied up as a sterilisation procedure

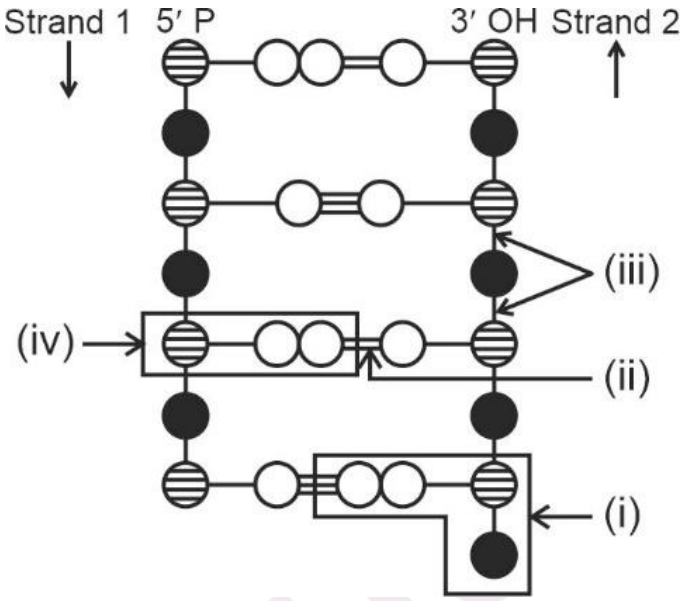
A. a(ii), b(iv), c(iii), d(i)
B. a(iii), b(i), c(ii), d(iv)
C. a(iii), b(iv), c(i), d(ii)
D. a(ii), b(iv), c(i), d(iii)

Answer: (A) a(ii), b(iv), c(iii), d(i)

	Solution: Bulbourethral glands (e) - Its secretion lubricates penis Vas deferens (h) - Tied up as a sterilisation procedure Prostate gland (f) - Unpaired male accessory gland Foreskin (i) - Loose fold of skin covering glans penis Hence, correct option is A.
Q53	Descriptors such as 'round and small' are used for which exocrine, paired male accessory gland. A. c B. g C. e D. f **Answer:** (C) e **Solution:** Bulbourethral glands (e) are 'round and small' exocrine, paired male accessory glands. The secretions of bulbourethral glands help in the lubrication of the penis.
Q54	Fill the blanks in following statements and choose the **correct** option. (i) _____ has Leydig cells which produce androgens. (ii) Cancer that affects _____ is common in males. (iii) Ejaculatory duct carries sperms from testis and fluid from _____. (iv) Bullocks are docile in comparison to bulls due to the removal of _____. A. i-e, ii-c, iii-g, iv-b B. i-h, ii-c, iii-e, iv-a C. i-c, ii-f, iii-g, iv-c D. i-c, ii-b, iii-f, iv-i **Answer:** (C) i-c, ii-f, iii-g, iv-c **Solution:** Leydig cells are present between the seminiferous tubules inside the testes. Prostatic cancer is common in males. Ejaculatory duct is formed by the fusion of vas deferens with the duct from seminal vesicle. Bullocks are castrated bulls due to the removal of testes.
Q55	In which of the given cross, F_1 progenies will be seen with tall stem? (i) Tt × Tt (ii) tt × tt (iii) TT × tt (iv) Tt × tt (v) TT × TT

	A. (i), (iii), (iv), (v) B. (ii), (iii), (iv), (v) C. (i), (ii) D. (i), (ii), (iii) **Answer:** (A) (i), (iii), (iv), (v) **Solution:** Tall stem is a dominant trait. To produce dominant trait in F_1 generation, both parents must have atleast a dominant allele. Hence, the crosses; Tt × Tt, TT × tt, Tt × tt and TT × TT will produce tall stem. The cross tt × tt produce plant with only dwarf stem.
Q56	Which of the following trait is represented by given pedigree?  A. Autosomal recessive B. Autosomal dominant C. Sex linked recessive D. Myotonic dystrophy **Answer:** (A) Autosomal recessive **Solution:** Given trait is not seen in the parents but seen in their offspring. Hence, it cannot be dominant trait. It is recessive trait. It cannot be sex linked as father is not affected but their daughter is affected. Thus, the given pedigree represents inheritance of autosomal recessive trait.

Q57 Given below is diagrammatic representation of DNA molecule. Identify the labelled parts (i), (ii), (iii) and (iv).



	(i)	(ii)	(iii)	(iv)
A.	Nucleotide	Phosphodiester bond	Hydrogen bond	Nucleoside
B.	Nucleoside	Hydrogen bond	Phosphodiester bond	Nucleotide
C.	Nucleoside	Phosphodiester bond	Hydrogen bond	Nucleotide
D.	Nucleotide	Hydrogen bond	Phosphodiester bond	Nucleoside

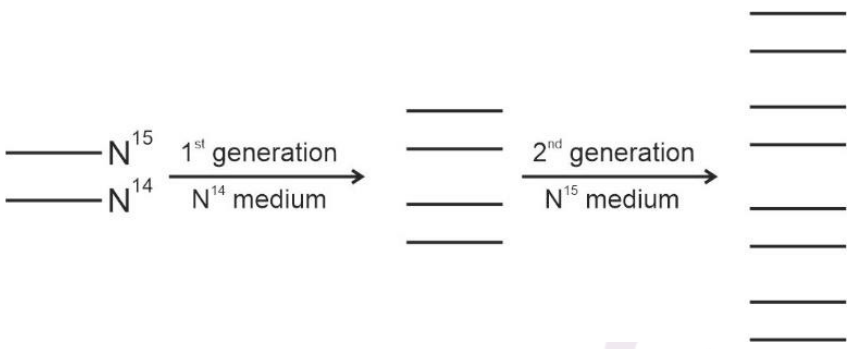
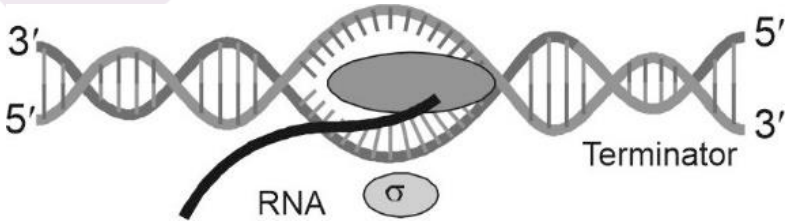
Answer: (D)

	(i)	(ii)	(iii)	(iv)
	Nucleotide	Hydrogen bond	Phosphodiester bond	Nucleoside

Solution:

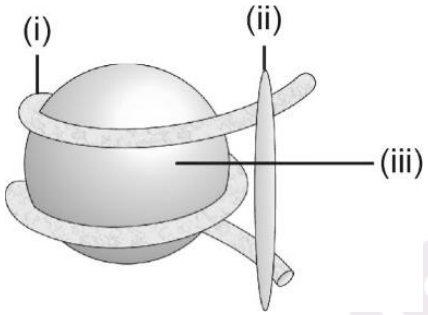
In the given diagrammatic representation of DNA molecule,

(i) Nucleotide
(ii) Hydrogen bond
(iii) Phosphodiester bond
(iv) Nucleoside

Q58	An *E.coli* with hybrid DNA was grown initially in a medium containing $^{14}NH_4Cl$ for one generation, then the cells were transferred to a medium with $^{15}NH_4Cl$ for second generation. In each generation there is replication of DNA.  Which of the following conclusions can be drawn on the basis of above experiment? A. 25% light DNA molecules are obtained in second generation B. Total heavy DNA obtained is 25% in first generation C. Light, heavy and hybrid DNA are obtained in equal proportion in both generations D. Hybrid and light DNA are obtained in equal proportion in first generation **Answer:** (D) Hybrid and light DNA are obtained in equal proportion in first generation **Solution:** According to given diagram, 50% hybrid and 50% light DNA are obtained in first generation while in second generation 25% heavy DNA, and 75% hybrid DNA are obtained. There is no light DNA obtained in second generation.
Q59	Which cellular process is shown below?  A. DNA replication B. Transcription - Initiation C. Transcription – Elongation D. Transcription - Termination **Answer:** (C) Transcription – Elongation

Solution:
The cellular process shown in the question is transcription-elongation.

Q60 A nucleosome is shown in the diagram given below.



	(i)	(ii)	(iii)
A.	DNA	H1 histone	Histone octamer
B.	H1 histone	DNA	Histone octamer
C.	DNA	Histone octamer	H1 histone
D.	Histone octamer	DNA	H1 histone

Answer: (A)

	(i)	(ii)	(iii)
	DNA	H1 histone	Histone octamer

Solution:
In the given figure of nucleosome,
(i) DNA
(ii) H1 histone
(iii) Histone octamer