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Candidates must write the Set No.
on the title page of the OMR Sheet.

**DAV PUBLIC SCHOOLS, ODISHA ZONE –I
PA-II EXAMINATION, 2021-22**

- Check that this question paper contains 11 printed pages.
- Set number given on the right hand side of the question paper should be written on the OMR SHEET by the candidate.
- Check that this question paper contains 60 questions.

**CLASS – XII
SUB: BIOLOGY(044)**

Time :90 Minutes

Maximum Marks:35

General Instructions:

1. *The question paper contains three sections.*
2. *Section A has 24 questions. Attempt any 20 questions.*
3. *Section B has 24 questions. Attempt any 20 questions.*
4. *Section C has 12 questions. Attempt any 10 questions.*
5. *All questions carry equal marks.*
6. *There is no negative marking.*

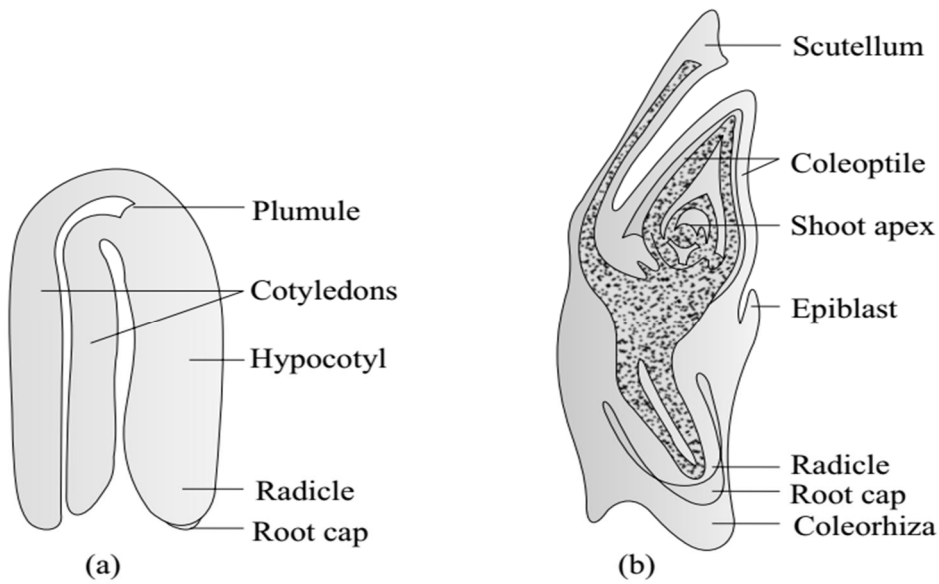
SECTION A

Section A consists of 24 questions. Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

Q1. 'Corn cobs have long tassels. This is because

- A. they are useful in protecting the pollen grains from wetting.
- B. they can easily attract insects.
- C. it helps them to reach the surface of water which helps them to get pollinated by insects.
- D. they can easily trap the pollen grains from air.

Q2. In the following diagrams (a) and (b), true homologous structures are



(a) A typical dicot embryo; (b) L. S. of an embryo of grass

- A. Coleoptile and scutellum
- B. Coleorhiza and scutellum
- C. Cotyledons and scutellum
- D. Hypocotyl and radicle

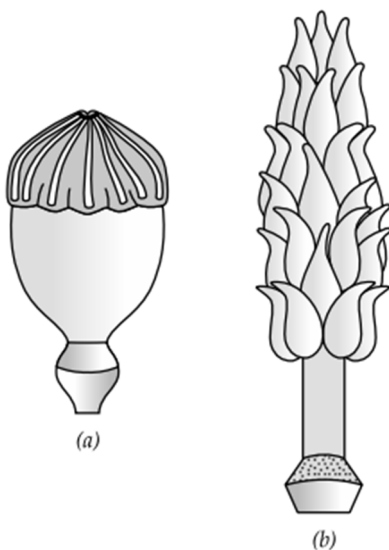
Q3. Male gametophyte in angiosperms produces

- A. Single male gamete and two vegetative cells
- B. Three male gametes
- C. Single male gamete and a vegetative cell
- D. Two male gametes and a vegetative cell

Q4. Normally, one embryo develops in one seed, but when an orange seed is squeezed, many embryos of different shapes and sizes are seen. This is so because

- A. Orange shows parthenocarpy
- B. Orange shows Parthenogenesis
- C. Orange shows Polyembryony
- D. None of these

Q5. Following are the pictures of *Papaver* (a) and *Michelia* (b). Choose the correct option with respect to the difference in the structure of their ovaries.

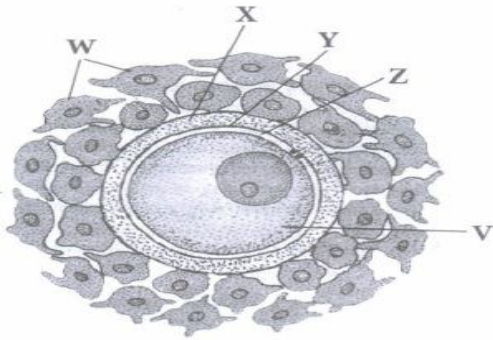


- A. a-Apocarpous; b-Syncarpous B. a-Syncarpous; b-Apocarpous
 C. a-Apocarpous; b-Multicarpellary D. a-Monocarpellary; b-Apocarpous

Q6. Which of the following statement is true about chorionic villi?

- A. Chorionic villi appear on morula after implantation
 B. The chorionic villi and uterine tissues become interlocked and form placenta
 C. Chorionic villi develops from the inner cell mass.
 D. All of the above

Q7. In the following diagram of the ovum identify 'W' and 'X'.



- A. W-Zona pellucida, X-Corona radiata B. W-Yolk sac, X-Zona Pellucida
 C. W-Corona radiata, X-Oolemma D. W-Corona radiata, X-Zona pellucida

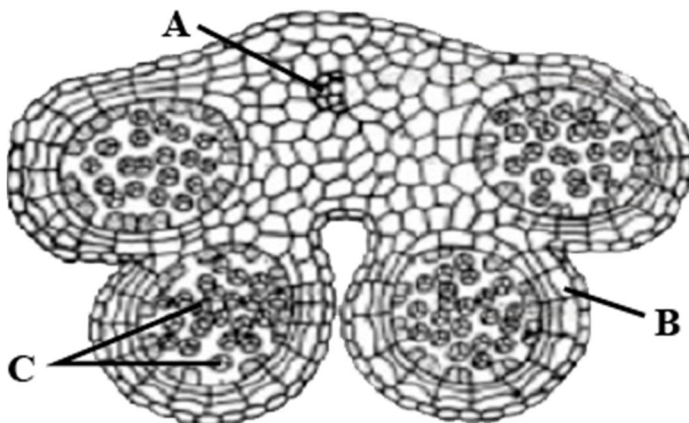
Q8. GnRH secreted from hypothalamus acts at the anterior pituitary gland and stimulates secretion of

- A. FSH B. LH C. Progesterone D. Both (A) and (B)

Q9. Which of the following is the correct sequence of different stages of embryonic development?

- A. Zygote-blastula-morula-gastrula B. Zygote-morula-blastula-gastrula
 C. Zygote-blastula-gastrula-morula D. Zygote-morula-gastrula-blastula

Q10. The following is the diagram of TS of anther. Identify the parts labelled A, B and C.



- A. A-Endothecium, B-Connective tissue, C-Pollen grains
 B. A-Connective tissue, B-Endothecium, C-Pollen grains
 C. A-Pollen grain, B-Connective tissue, C-Endothecium
 D. A-Endothecium, B-Pollen grains, C-Connective tissue

Q11. Oldest viable seed is of

- A. *Pisum* B. *Lupinus* C. *Phoenix* D. Mulberry

Q12. How many gametes would be produced if the genotype of a parent is AaBbCc?

- A. 3 B. 6 C. 8 D. 9

Q13. Mother's group is 'B' and father has blood group 'A'. Both are heterozygous. If they have identical twins, percentage probability of both twins having blood group 'A' is

- A. 100% B. 50% C. 25% D. 12.5%

Q14. Which of the following is responsible for Turner's syndrome?

- A. Monosomy of X chromosome B. Monosomy of 21 chromosome
C. Trisomy of 21 chromosome D. Trisomy of X chromosome

Q15. In Pea plant the gene that controls flower colour also controls seed coat colour.

This is an example of

- A. Polygenic inheritance B. Incomplete dominance
C. Co-dominance D. Pleiotropy

Q16. Which one of the following statements is correct?

- A. Homozygous sex chromosome ZZ determines female sex in birds.
B. XO type of sex chromosomes determines male sex in grasshopper
C. XO condition in humans determines the male sex
D. Homozygous sex chromosome XX produce male in Drosophila.

Q17. Thalassaemia in humans

- A. is an autosome linked recessive blood disorder
B. can transmit from parents to offspring when both parents are unaffected carriers (heterozygous)
C. caused due to mutation or deletion of one of the alpha or beta -globin chain.
D. All of the above

Q18. Commonly used vectors for cloning in human genome projects are

- i. Yeast Artificial Chromosome. ii. Bacterial Artificial chromosome.
iii. Plasmid iv. Bacteriophage

Choose the correct option

- A. i and iv B. i and ii C. ii and iii D. iii and iv

Q19. RNA polymerase which is on the promoter, moves to the structural genes to transcribe them. However, it happens when

- A. there is repressor on the operator B. inducer binds to structural genes
C. there is no repressor on the operator D. RNA polymerase binds to regulator gene

Q20. The location of terminator in the transcription unit is

- A. towards 3' end of template strand B. towards 5' end of coding strand
C. Within the promoter region D. towards 3, end of coding strand

Q21. Choose the correct statements.

1. Polycistronic mRNA is generally found in Eukaryotes
2. The RNA polymerase II transcribes m RNA genes
3. The process of translation begins when mRNA encounters large ribosomal subunit
4. There is no tRNA whose anticodon is complementary to stop codons.

A. 1 and 2 B. 2 and 3 C. 1,2 and 4 D. 2 and 4

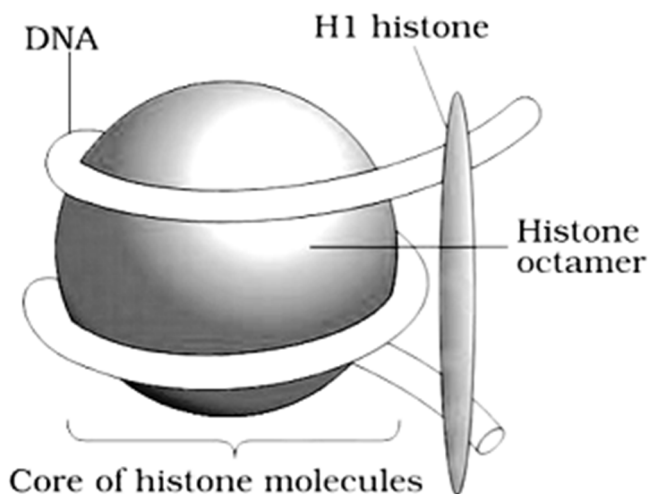
Q22. While analysing the DNA of an organism a total of 5674 nucleotides were found, out of which the proportion of different bases were: Adenine=28%, Guanine=22%, Thymine=23% and Cytosine=27%. Considering Chargaff's rule it can be concluded that

- A. it is a double stranded circular DNA B. it is a double stranded linear DNA
C. it is a single stranded DNA D. it is a single stranded RNA

Q23. DNA replication is semi-conservative because

- A. only one of the parental strand acts as template
B. both the strands of new molecule are synthesized new
C. one of the strands in each molecule synthesised is parental and the other is new.
D. the daughter strand synthesised are dispersive.

Q24. The negatively charged DNA coils around the positively charged histone proteins to form the following structure.



NUCLEOSOME

How many nucleosomes are likely to be present in a human cell?

- A. 6.6×10^9 B. 3.3×10^9 C. 6.6×10^7 D. 3.3×10^7

SECTION B

Section B consists of 24 questions (Sl. No. 25 to 48). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

Question No 25 to 28 consists of two statements-Assertion(A) and Reason (R).

Answer these questions selecting the appropriate options 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: In IVF, fertilisation is done inside the body of the woman.

Reason: Zygote or early embryo up to 8 blastomere stage is transferred to fallopian tube.

Q26. Assertion: Oral contraceptive pills are an effective method of contraception with few side effects.

Reason: Oral pills like *Saheli* inhibit ovulation and implantation.

Q27. Assertion: The endometrium undergoes cyclical changes during menstrual cycle.

Reason: Perimetrium contracts strongly during delivery of the baby.

Q28. Assertion: Colour blindness occurs in about 8% of males and only about 0.4% of females.

Reason: The genes that lead to colour blindness are located on X chromosome.

Q29. The concentrations of which of the following hormones will increase in the maternal blood after formation of the following structure.

i. hCG

ii. progesterone

iii. hPL

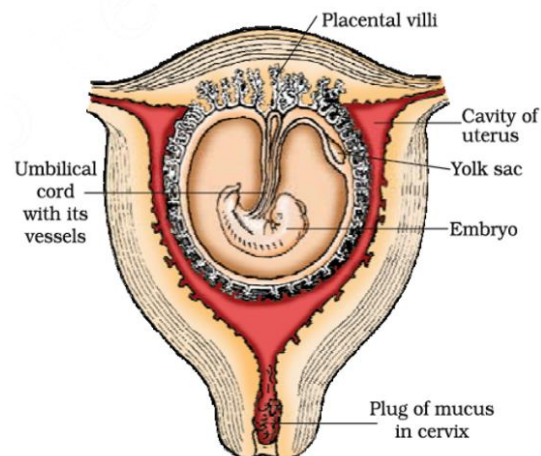
iv. estrogen

A. i and ii only

B. ii and iv only

C. iii and iv only

D. i, ii, iii, and iv



Q30. In a fertilised embryo sac, the haploid, diploid and triploid structures respectively are

A. Synergid, zygote and primary endosperm nucleus

B. Synergid, antipodal and polar nuclei

C. Antipodal, synergid and primary endosperm nucleus

D. Synergid, polar nuclei and zygote

Q31. Two types of flowers with their pollination is seen in plants are chasmogamy & cleistogamy. Chasmogamous flowers usually have strikingly coloured petals and nectar glands in contrast to cleistogamous flowers. Advantage of cleistogamy is

A. higher genetic variability

B. more vigorous offspring

C. no dependence on pollinators

D. vivipary

- Q32.** A newly born calf died due to some diseases. In order to induce release of milk, which of the following hormone can be given to the mother cow?
 A. Prolactin B. Progesterone C. Oxytocin D. Relaxin
- Q33.** A female cannot produce ovum but can provide suitable conditions for embryo development. The ART that can be used in this case is
 A. ICSI B. AI C. IUI D. GIFT
- Q34.** Identify the correct statement(s) about IUDs.
 1. Copper ions suppress sperm motility and fertilising capacity of sperms.
 2. IUDs increase phagocytosis of sperms.
 3. LNG 20 is a copper releasing IUD.
 4. Hormone releasing IUDs make the uterus unsuitable for implantation.
 A. 1 and 2 only B. 2 and 3 only C. 1, 2 and 3 only D. 1, 2 and 4 only
- Q35.** A bilobed dithecous anther has 500 microspore mother cells per microsporangium. How many male gametophytes can this anther produce?
 A. 2000 B. 16000 C. 4000 D. 8000
- Q36.** Two organisms with a genotype of HhYy (H-height, Y-colour) were mated. What is the probability for the offspring to carry one of the dominant characters?
 A. 1/4 B. 1/16 C. 4/16 D. 6/16
- Q37.** In *Mirabilis jalapa*, RR is phenotypically red flowers, rr is white and Rr is pink. Select the correct phenotypic ratio in F₂ generation when a cross is performed between RR X rr.
 A. 3 Red : 1 White B. 2 Red : 2 White
 C. 1 Red: 2 Pink: 1 White D. 2 Red: 1 Pink : 1 White
- Q38.** What would be the genotypes of the parents if the offspring have the phenotypes in 3:1 proportion?
 A. AA X Aa B. AA x AA C. Aa x Aa D. Aa x aa
- Q39.** A Haemophilic male marries a carrier female. What will be the probability of haemophilic daughter among all offspring.
 A. 25% B. 50% C. 75% D. 100%
- Q40.** In a cross YYRr X Yy RR, the offspring will show the genotypic ratio
 A. 2 YyRR : 2YYRR B. 1 YYRR : 3YyRR
 C. 4 YYRR : 0 yyRR D. None of the above
- Q41.** Failure of the two homologous chromosomes to separate and move towards opposite poles during anaphase I is called

A. Crossing over

B. Non-disjunction

C. Linkage

D. Recombination

Q42.If a double stranded DNA contains 23% adenine bases then what will be the percentage of cytosine bases present in that molecule?

A.23%

B.77%

C.27%

D.73%

Q43.The length of *E.coli* containing 4.6×10^6 bp would be

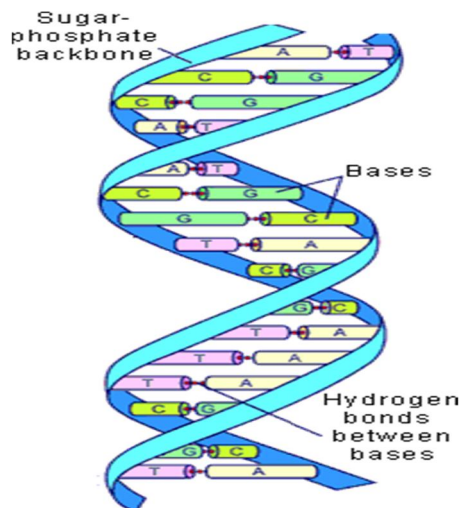
A. 1.564cm

B.1.564mm

C.1.564 m

D.15.64cm

Q44.The width of the following molecule is 2nm and is maintained throughout its length. This is due to



A. The backbone of the molecule is made up of sugar and phosphate.

B. The length of the pitch is 3.4nm.

C. A purine always base pairs with a pyrimidine and vice versa.

D. A purine always base pairs with purine and pyrimidine with pyrimidine.

Q45.If Meselson and Stahl's experiment is continued for five generations in bacteria the ratio of $^{15}\text{N}/^{15}\text{N} : ^{15}\text{N}/^{14}\text{N} : ^{14}\text{N}/^{14}\text{N}$ containing DNA in the fifth generation would be

A. 1:0:31

B. 0:1:15

C. 0:1:7

D. 0.1:31

Q46.The hn RNA consists of both coding as well as non-coding sequences. The coding sequences are called (i) . The non-coding sequences called (ii) are removed and the coding sequences are joined in a process called (iii) to form mRNA.

A. (i) intron (ii) exon (iii) capping

B. (i) exon (ii) intron (iii) tailing

C. (i) exon (ii) intron (iii) splicing

D. (i) intron (ii) exon (iii) splicing

Q47.VNTRs are key factors in DNA profiling because

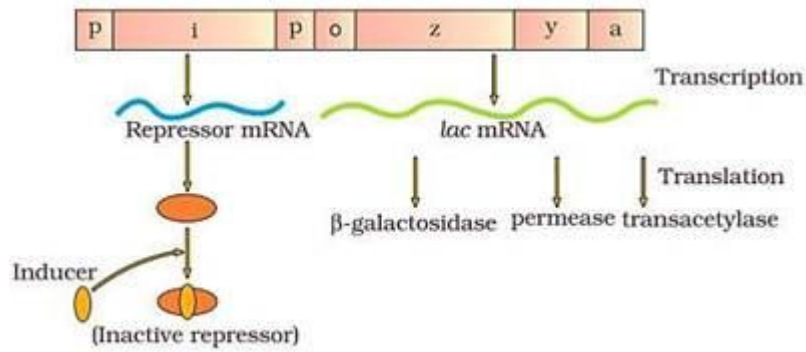
A. the length of the regions having VNTRs is same in each individual.

B. the length of the regions having VNTRs is different in each individual.

C. they are made up of ribonucleotides

D. they have same length within family members.

Q48.



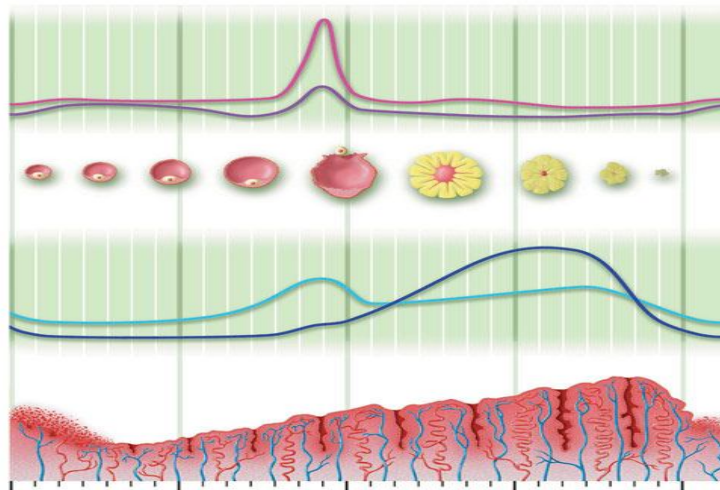
The inducer that is used to inactivate the repressor in the above diagram is/are

- A. Glucose B. Lactose C. Allolactose D. Both B and C

SECTION C

Section -C consists of one case followed by 6 questions linked to this case (Q.N0.49 to 54). Besides this,6 more questions are given. Attempt any 10 questions in this section. The first attempted 10 questions would be evaluated.

Case -To answer the questions, study the diagram given below representing ovarian and uterine events at different stages of menstrual cycle.



Q49. Ovulation takes place due to rapid increase of

- A. ACTH B. LH C. Estrogen D. Progesterone

Q50. Progesterone is synthesised in

- A. menstrual phase B. follicular phase
C. ovulatory phase D. secretory phase

Q51. Estrogen is synthesised from

- A. Corpus luteum B. Corpus albicans
C. Graafian follicle D. Endometrium

Q52. What is being released from the ovary during ovulation?

- A. Primary Oocyte at Anaphase I stage
- B. Ovum
- C. Secondary oocyte at Metaphase II stage
- D. Graafian follicle

Q53.If fertilisation does not take place, then

- A. progesterone synthesis increases
- B. perimetrium degenerates
- C. menstrual cycle ceases
- D. corpus luteum degenerates to form corpus albicans

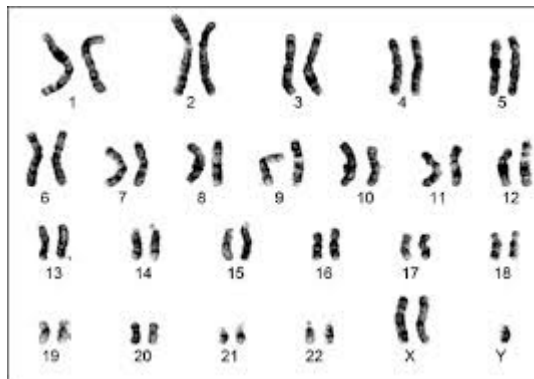
Q54.The cessation of menstrual cycle is called

- A. Menarche
- B. Puberty
- C. Ovulation
- D. Menopause

Q55.The pattern of inheritance exhibited by human skin colour is/are

- A. pleiotropy
- B. Polygenic inheritance
- C. Quantitative inheritance
- D. Both B and C

Q56.Placed below is a karyotype of a human being.

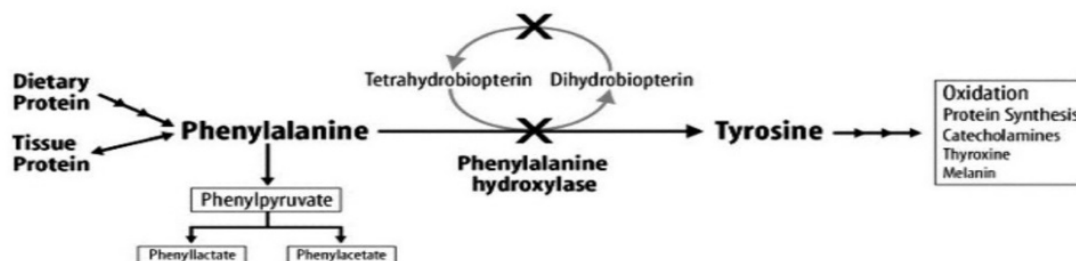


On the basis of this karyotype, which one of the following conclusions can be drawn:

- A. Normal human male
- B. Person is suffering from haemophilia
- C. Affected individual is a male suffering from Down's syndrome
- D. Affected individual is a male with Klinefelter's syndrome

Q57.

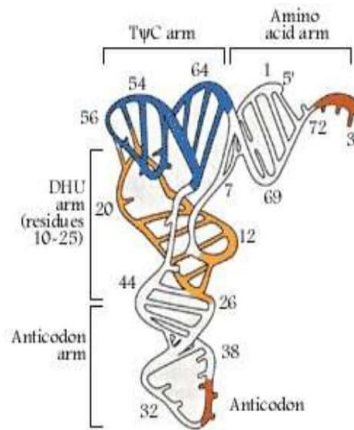
Phenylketonuria (PKU)



The above diagram depicts the cause of Phenylketonuria. It is a type of

- A. autosomal dominant disorder
- B. sex linked recessive disorder
- C. autosomal recessive disorder
- D. sex linked dominant disorder

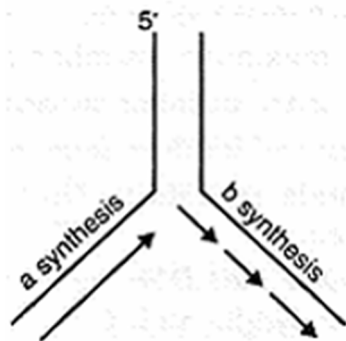
Q58. Identify the following structure.



- A. 2 Dimensional model of Mrna
- C. 2Dimensional model of tRNA

- B. Cloverleaf model of tRNA
- D. 3Dimensional model of tRNA

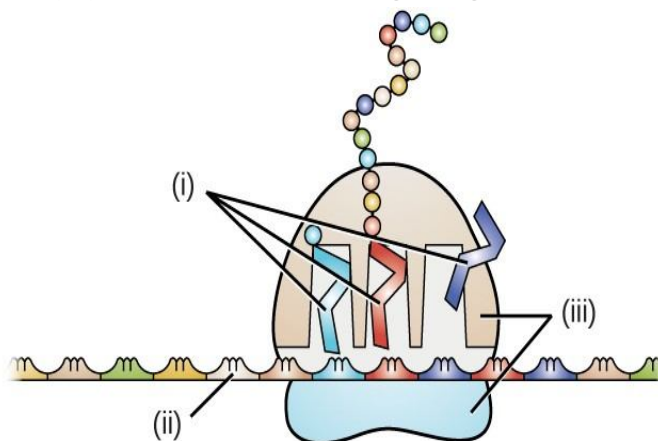
Q59.



The above diagram represents replication fork which shows there is continuous synthesis from one of the strands of DNA whereas discontinuous synthesis from the other strand. The reason could be

- A. DNA replication is carried out by primase
- B. DNA polymerase enzyme synthesises DNA only in 5'-3' direction
- C. DNA polymerase enzyme synthesises DNA only in 3'-5; direction
- D. Discontinuous fragments can only participate in transcription

Q60. Identify (i), (ii) and (iii) from the following diagram.



- A. i-Ribosome, ii-mRNA, iii-t RNA
- C. i-t RNA, ii-m RNA, iii-Ribosome

- B. i-amino acid, ii-t RNA, iii-Ribosome
- D. i-mRNA, ii-Ribosome, iii-tRNA