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MOLECULAR BASIS OF INHERITANCE - I (UP TO DNA, RNA)
TRUE & FALSE/AR/ STATEMENTS)

1. Identify the correct statement
   (1) Morgan proposed the principles of inheritance
   (2) Mendel was aware of chemical nature of factors
   (3) Avery et al worked to determine the biochemical nature of 'transforming principle'
   (4) R-strain bacteria have a mucous coat, while S-strain does not
2. **Statement-I** : The backbone of a polynucleotide chain is formed due to sugar and phosphates.
   Statement-II : In RNA , every nucleotide residue has an additional -OH group present at 2'-position in the ribose.
   (1) Both statement-I and statement-II are correct
   (2) Both statement-I and statement-II are incorrect
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct
3. **Assertion** : Taylor et al proved that the DNA in chromosomes also replicate semiconservatively.
   Reason : Taylor et al used radioactive thymidine during experiment on *vicia faba.*
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
4. **Statement-I** : Frederick Griffith proposed the central dogma in molecular biology.
   Statement-II : In some viruses the flow of information is in reverse direction that is from RNA to DNA.
   (1) Both statement-I and statement-II are correct
   (2) Both statement-I and statement-II are incorrect
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct
5. Which of the following statement is incorrect ?
   (1) Bacteriophage $\times$ 174 has 5386 nucleotides
   (2) Uracil is present in RNA at the place of thymine
   (3) Two nucleotides are linked through 3'-5' phosphodiester linkage to form a dinucleotide
   (4) Nucleotide has 2 components - nitrogenous bases and phosphates
6. **Assertion** : If *E.coli* was allowed to grow for 80 minutes then proportion of light and hybrid densities of DNA will be 1:7 (Meselson and Stahl experiment).
   Reason : The samples were separated independently on CsCl gradients to measure the densities of DNA .
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
7. **Statement-I** : Avery et al proved that DNA is the hereditary material.
   Statement-II : Hershey and chase worked on *streptococcus pneumonia*.
   (1) Both statement-I and statement-II are correct
   (2) Both statement-I and statement-II are incorrect
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct
8. Which of the following statement is incorrect w.r.t Hershey and Chase experiment?
   (1) They grew some viruses on a medium that contained radioactive phosphorus and some others on radioactive sulfur
   (2) Sequence of this experiment is infection $\rightarrow$ blending $\rightarrow$ centrifugation
   (3) Proteins did not enter the bacteria from the viruses
   (4) Bacteria which was infected with viruses that had radioactive DNA were not radioactive

9. Which of the following pair of the statements are incorrect?
   (i) The chromatin that is more densely packed and stains dark are called as heterochromatin
   (ii) Euchromatin is loosely packed and stains light
   (iii) Chromosome that are further coiled and condensed at metaphase stage of cell division to form chromatin fibres
   (iv) A typical nucleosomes contains 100 bp of DNA helix
   (1) (i) and (ii) (2) (iii) & (iv)
   (3) (i),(ii) &(iii) (4) (i) & (iii)

10. How many phosphodiester bonds and H-bonds respectively will be found in a dsDNA of 50 bp having 20 adenine bases?
   (1) 49, 130 (2) 98, 130
   (3) 49, 120 (4) 98, 120

11. **Assertion** : Viruses having RNA genome, show shorter life span, mutate and evolve faster.
   Reason : RNA is chemically more reactive and structurally less stable.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

12. **Statement-I** : The length of DNA is usually defined as number of nucleotides.
   Statement-II : The length of DNA of *E.coli* is 1.36 mm.
   (1) Both statement-I and statement-II are incorrect
   (2) Both statement-I and statement-II are correct
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct

13. Which of the following statement is incorrect?
   (1) DNA has evolved from RNA with chemical modifications that make it more stable.
   (2) Double helical structure of DNA was given by Watson and Crick
   (3) DNA being more stable is preferred for storage of genetic information
   (4) DNA can directly code for the synthesis of proteins

14. Which of the following is correct statement w.r.t Griffith 's experiment?
   (1) Biochemical nature of genetic material was defined
   (2) When - strain(live) was injected into mice then mice lived
   (3) Mice infected with the R- strain do not develop pneumonia
   (4) Transforming principle enabled the S-strain to synthesise a smooth polysaccharide coat and become virulent

15. **Statement-I** : RNA is the genetic material in Tobacco Mosaic viruse.
   Statement-II : In TMV, DNA performs the dynamic functions of messenger and adapter.
   (1) Both statement-I and statement-II are correct
   (2) Both statement-I and statement-II are incorrect
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct

16. Which of the following statement is incorrect?
   (1) Length of human DNA of skin cell is 2.2 meters.
   (2) The distance between two consecutive base pairs as 0.34nm
   (3) In *E.coli* , DNA is scattered throughout the cell as there is no defined nucleus
   (4) DNA being negatively charged is held with some positively charged proteins

17. **Statement-I** : Nucleosomes constitute the repeating unit of a structure in nucleus called chromatin.
   Statement-II : The packaging of chromatin at higher level requires additional set of proteins that collectively are referred to as histone proteins.
   (1) Both statement-I and statement-II are correct
   (2) Both statement-I and statement-II are incorrect
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct

18. How many of the following statements are correct wrt Double helix model
   a. DNA is made up of two polynucleotide chains
   b. The two chains have anti- parallel polarity
   c. Adenine forms two hydrogen bonds with Thymine
   d. The two chains are coiled in a right - handed fashion
   e. Guanine is bonded with cytosine with three H- bonds
   (1) 2 (2) 3
   (3) 4 (4) 5

19. **Assertion** : RNA was the first genetic material.
Reason : Essential life processes such as metabolism,splicing evolved around RNA.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

20. Identify the incorrect match
(1) Meischer- nuclein
(2) Francis crick- central dogma
(3) Nucleosome - histone octamer
(4) Chromosome - beads-on-string

Answer

1.	(3)	6.	(2)	11.	(1)	16.	(3)
2.	(1)	7.	(2)	12.	(2)	17.	(1)
3.	(2)	8.	(4)	13.	(4)	18.	(4)
4.	(4)	9.	(2)	14.	(3)	19.	(1)
5.	(4)	10.	(2)	15.	(3)	20.	(4)

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Molecular basis of inheritance-II (Replication, Transcription, Genetic code, Translation)

(True & False / Assertion-Reason / Statements / Match Questions)

1. Match the entries in column A with entries in column B

	Column-A		Column-B
p.	DNA $\rightarrow$ hn RNA	(i)	Replication
q.	DNA $\rightarrow$ DNA	(ii)	Splicing
r.	hn RNA $\rightarrow$ m RNA	(iii)	Translation
s.	m RNA $\rightarrow$ protein	(iv)	transcription

(1) p–(iv); q–(i); r–(ii); s–(iii)
(2) p–(i); q–(ii); r–(iii); s–(iv)
(3) p–(iv); q–(ii); r–(i); s–(iii)
(4) p–(ii); q–(iv); r–(i); s–(iii)

2. Match the column

	Column-A		Column-B
a.	RNA pol. –I	(i)	hn RNA
b.	RNA pol. –II	(ii)	sn RNA
c.	RNA pol. –III	(iii)	rRNA

(1) a–(ii); b–(i); c–(iii) (2) a–(iii); b–(i); c–(ii)
(3) a–(i); b–(ii); c–(iii) (4) a–(i); b–(iii); c–(ii)

3. **Statement-I** : Split–gene arrangement represent an ancient feature of genome.
Statement-II : Presence of intron is reminiscent of antiquity.
(1) Both statements I & II are correct
(2) Both statements I & II are incorrect
(3) Statements I is correct but statement II is incorrect
(4) Statements I is incorrect but statement II is correct

4. How many of the following statements are incorrect?
a. Rous sarcoma virus shows reverse transcription
b. First step of central dogma is translation
c. Reverse transcription is catalysed by reverse transcriptase
d. In HIV genetic material is a polynucleotide with uracil as one of the pyrimidine component
(1) one (2) three
(3) four (4) two

5. Depending upon the chemical nature of the template (DNA or RNA) and the nature of nucleic acid synthesised from it (DNA or RNA). Select the correct match showing different types of nucleic acid polymerases

	Column-A		Column-B
(i)	RNA $\rightarrow$ DNA	a.	DNA depending RNA polymerase
(ii)	DNA $\rightarrow$ RNA	b.	DNA dependent DNA polymerase
(iii)	RNA $\rightarrow$ RNA	c.	RNA dependent DNA polymerase
(iv)	DNA $\rightarrow$ DNA	d.	RNA dependent RNA polymerase

(1) (i)–c; (ii)–a; (iii)–d; (iv)–b
(2) (i)–b; (ii)–a; (iii)–c; (iv)–b
(3) (i)–c; (ii)–b; (iii)–d; (iv)–a
(4) (i)–d; (ii)–c; (iii)–b; (iv)–a

6. **Statement-A**:Tailing involves addition of adenylate residues (200-300) to the 3'-end in a template independent manner in prokaryotes..
Statement-B: Primary transcript contain both the exons and the introns and are non-functional in eukaryotes.
(1) Statement-A is correct and Statement-B is incorrect
(2) Statement-A is incorrect and Statement-B is correct
(3) Both Statements are correct
(4) Both Statements are incorrect

7. Which of the following statements are correct w.r.t. transcription?
a. The process of splicing involves *snurps* and represents the dominance of RNA world.
b. DNA sequence also codes for t-RNA and r-RNA
c. UTR's are present in mRNA at both 5' and 3' end are required for efficient transcription.
d. Transcription occurs in nucleus in bacteria
e. Initiation factor, σ transiently associates with DNA polymerase
(1) a, b (2) b, c
(3) b, c, d (4) c, d, e

8. Select the correct match w.r.t scientists and their contribution

	Column-A		Column-B
(i)	Marshall Nirenberg	a.	Polynucleotide phosphorylase enzyme that helps in polymerising RNA with defined sequences in a template independent manner
(ii)	George Gamow	b.	Synthesis of protein in a cell-free system
(iii)	Severo Ochoa	c.	Chemical method for the synthesis of RNA molecules with defined combination of bases
(iv)	Har Gobind Khorana	d.	Proposed that genetic code should constitute a combination of three bases

(1) (i)–b; (ii)–d; (iii)–a; (iv)–c
(2) (i)–c; (ii)–a; (iii)–b; (iv)–d
(3) (i)–a; (ii)–b; (iii)–c; (iv)–d
(4) (i)–d; (ii)–a; (iii)–c; (iv)–b

9. **Statement-I** : Smaller subunit of ribosome catalyses the formation of peptide bond (between two amino acids) during translation.
Statement-II : The peptide bond formation during translation is crucial for ligation of okazaki fragments.
(1) Both statements I & II are correct
(2) Both statements I & II are incorrect
(3) Statements I is correct but statement II is incorrect
(4) Statements I is incorrect but statement II is correct

10. **Assertion**:Process of translation requires transfer of genetic information from a polymer of nucleotides to a polymer of amino acids .
Reason: Genetic code could direct the sequence of amino acids during synthesis of proteins.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

11. **Assertion**:One of the property of genetic code is degeneracy .
Reason: Some amino acids are coded by more than one codon.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

12. Match the column

	Column-A		Column-B
(i)	tRNA	a.	Process of removal of introns
(ii)	Capping	b.	Part of transcription unit that helps in initiation of transcription
(iii)	Splicing	c.	reads the genetic code present on mRNA
(iv)	Promoter	d.	addition of methyl guanosine triphosphate to 5' of hnRNA

(1) (i)–b; (ii)–d; (iii)–a; (iv)–c
(2) (i)–c; (ii)–d; (iii)–a; (iv)–b
(3) (i)–a; (ii)–b; (iii)–c; (iv)–d
(4) (i)–d; (ii)–a; (iii)–c; (iv)–b

13. Which of the following statement is incorrect w.r.t tRNA?
(1) tRNA has an anticodon loop that has bases complementary to the code
(2) It has an amino acid acceptor end to which it binds to amino acids
(3) tRNA are specific for each amino acid
(4) tRNA, earlier called sRNA (soluble RNA) was discovered after the postulation of genetic code

14. Select a pair of correct statements
a. To synthesise a protein in a cell, the mRNA provides the template
b. rRNA plays catalytic role during translation
c. RNA polymerase uses nucleoside monophosphate as substrate during transcription
d. Helicases open the DNA helix during transcription
(1) a & b (2) a & c
(3) b & c (4) c & d

15. **Assertion**: Replication and transcription occur in the nucleus but translation occur in cytoplasm of eukaryotes.
Reason: mRNA is transferred from the nucleus to the cytoplasm where ribosomes and amino acids are available for protein synthesis .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

16. How many of the following statements are correct w.r.t translation ?
a. In its first phase, amino acids are activated in the presence of ATP and are linked to their cognate mRNA
b. Cellular factory responsible for synthesising protein is the ribosome
c. A translational unit in mRNA is the sequence of RNA that is flanked by the start codon (AUG) and the stop codon and codes for a polypeptide
d. Start codon (AUG) is recognised only by the initiator tRNA
e. During elongation, ribosome moves from codon to codon along tRNA
(1) 3 (2) 2
(3) 4 (4) 5

17. Select the option in which all the entries are correctly filled

	DNA, coding strand,5′–3′	mRNA codon, 5′–3′	Anticodon	Amino acid
(1)	UAC	AUG	UAC	methionine
(2)	ACC	UGG	ACC	tryptophan
(3)	TAG	UAG	AUC	tyrosine
(4)	AGT	AGU	UCA	serine

18. Select the incorrect match w.r.t Genetic code
(1) Universality — Form bacteria to human beings, UUU codes for phenyl alanine
(2) No punctuations — Code is read in mRNA in a contiguous fashion
(3) Dual function — AUG codes for methionine and also act as initiator codon
(4) Non-ambiguity — One codon may code for more than one amino acid

19. Which of the following statements are incorrect?
a. RNA polymerase uses DNA primer during transcription
b. Process of splicing represents dominance of RNA world
c. RNA polymerase binds to structural gene to initiate transcription
d. In eukaryotes, RNA polymerase II transcribes precursor of mRNA
(1) a & b (2) a & c
(3) b & d (4) c & d

20. Select a pair of incorrect statements w.r.t transcription
a. RNA polymerase is only capable of catalysing the process of elongation
b. Association of RNA polymerase with (σ) sigma factor or (ρ) Rho factor alter its specificity to either initiate or terminate the process.
c. Processing is required in bacterial mRNA before it become functional
d. It occurs inside the nucleus in a bacterial cell.
(1) a & b (2) b & c
(3) c & d (4) b & d

21. **Assertion**: In a prokaryotic cell, translation can begin much before the mRNA is fully transcribed.
Reason: Transcription and translation can be coupled in bacteria as there is no separation of cytosol and nucleus in bacteria.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

22. Arrange the steps of translation in correct sequence
a. small subunit encounters an mRNA
b. aminoacylation of tRNA
c. ribosome moves from codon to codon
d. sequential binding of aminoacyl tRNA to appropriate codon in mRNA
e. release of polypeptide from ribosome
f. binding of release factor to stop codon
(1) b, a d, c, f, e
(2) b, d, a, f, c, e
(3) a, c, d, b, e, f
(4) c, d, a, e, f, b

23. How many of the following statements are correct w.r.t. replication ?
    a. DNA polymerase enzyme is a highly efficient enzyme
    b. *E.coli* complete the process of replication within 18 minutes
    c. Deoxyribonucleoside triphosphates serve dual purpose
    d. Any mistake during replication would result into mutation
    e. Energetically replication is a very expensive process
    (1) 4 (2) 5
    (3) 3 (4) 2

24. **Statement-I** : In living cells, the process of replication requires a set of catalysts(enzymes).
    Statement-II : In addition to DNA dependent DNA polymerase, many additional enzymes are required to complete the process of replication with high degree of accuracy
    (1) Both statements I & II are correct
    (2) Both statements I & II are incorrect
    (3) Statements I is correct but statement II is incorrect
    (4) Statements I is incorrect but statement II is correct

25. Identify the incorrect match
    (1) Leading strand —5′→ 3′
    (2) Okazaki fragments — 3′→ 5′
    (3) joining of okazaki fragment — DNA ligase
    (4) Replication fork — Y-shaped

26. Identify the incorrect statement
    (1) DNA dependent DNA polymerase catalyse polymerisation only in one direction i.e. 5′→ 3′
    (2) The discontinuously synthesied fragments are later joined by the enzyme DNA ligase
    (3) The replication occur within a small opening of the DNA helix, referred to as replication fork
    (4) Polymerisation of one strand (on the template with polarity 5′→ 3′) is continous

27. **Statement-I** : The DNA polymerase on their own cannot initate the process of replication.
    Statement-II : Replication can initiate randomly at any place in DNA
    (1) Both statements I & II are correct
    (2) Both statements I & II are incorrect
    (3) Statements I is correct but statement II is incorrect
    (4) Statements I is incorrect but statement II is correct

28. How many of the following statements are incorrect?
    a. In eukaryotes, the replication of DNA takes place at S-phase of the cell cycle
    b. A failure in cell division after DNA replication result into polyploidy
    c. Two strands of DNA can be separated in its entire length
    d. Average rate of polymerisation of DNA in *E.coli* is approximately 2000 bp per second
    e. DNA polymerase uses RNA template to catalyse the polymerisation of deoxyribonucleotides
    (1) 2 (2) 3
    (3) 4 (4) 1

29. **Statement-I** : Process of copying genetic information from one strand of the DNA into RNA is termed as translation .
    Statement-II : Principle of complementarity govern the process of transcription .
    (1) Both statements I & II are correct
    (2) Both statements I & II are incorrect
    (3) Statements I is correct but statement II is incorrect
    (4) Statements I is incorrect but statement II is correct

30. Select a pair of correct statements ?
    a. In replication process, total DNA of an organism gets duplicated
    b. In transcription, only a segment of DNA is copied into RNA
    c. A transcription unit in DNA is defined by the two regions in the DNA
    d. Both the strands of DNA are copied during transcription
    (1) c and d (2) a and b
    (3) b and d (4) b and c

31. Which one of the following pair is correctly matched w.r.t. codon and amino acid coded by it ?
    (1) UUA– glycine (2) AAA–lysine
    (3) GAG–alanine (4) AUG–cysteine

32. **Statement-I** : During transcription, if both strands of DNA act as a template, they would code for different proteins.
    Statement-II : If one segment of DNA would be coding for 2 different proteins, this would complicate the genetic information transfer machinery. .
    (1) Both statements I & II are correct
    (2) Both statements I & II are incorrect
    (3) Statements I is correct but statement II is incorrect
    (4) Statements I is incorrect but statement II is correct

33. Identify the incorrect statement
(1) DNA dependent RNA polymerase catalyses the polymerisation of RNA in only one direction i.e. 3′ → 5′
(2) Transcription unit in DNA is defined by promoter, structural gene and terminator
(3) Polarity of template strand in transcription is 3′ → 5′
(4) Strand of DNA with polarity 5′ → 3′ is referred to as coding strand

34. **Assertion**: The strand of DNA which does not code for RNA is referred to as coding strand.
Reason: This strand has same sequence as RNA except thymine at the place of uracil.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

35. Which of the following statement is incorrect?
(1) The promoter and terminator flank the structural gene in a transcription unit
(2) Presence of promoter defines the template and coding strand
(3) The terminator is located toward 5′end of the coding strand
(4) There are additional regulatory sequences that may be present further upstream or downstream to the promoter

36. **Statement-I** : Promoter is a DNA sequence that provide binding site for RNA polymerase.
Statement-II : By switching the position of promoter with terminator, the definition of coding and template strands could be reversed .
(1) Both statements I & II are correct
(2) Both statements I & II are incorrect
(3) Statements I is correct but statement II is incorrect
(4) Statements I is incorrect but statement II is correct

37. **Statement-I** : Terminator in a transcription unit usually defines the end of the process of transcription.
Statement-II : RNA polymerase transcribe the promoter and structural gene.
(1) Both statements I & II are correct
(2) Both statements I & II are incorrect
(3) Statements I is correct but statement II is incorrect
(4) Statements I is incorrect but statement II is correct

38. Observe the following hypothetical sequence from a transcription unit and choose the correct answer
3′—ATGCATCGAT 5′
5′—TACGTAGCTA 3′
Statement-I : The strand with polarity 3′ → 5′ is the template .
Statement-II : Sequence in RNA would be 5′UACGUAGCUA 3′ .
(1) Both statements I & II are correct
(2) Both statements I & II are incorrect
(3) Statements I is correct but statement II is incorrect
(4) Statements I is incorrect but statement II is correct

39. How many of the following statements are correct?
a. Translation & transcription are energetically expensive processes and have to be tightly regulated.
b mRNA acts as a catalyst for peptide bond formation in bacteria & is called ribozyme.
c. The total DNA of an organism is copied to RNA during transcription.
d. The strand that has polarity 3′ → 5′ act as template, and is also referred to as coding strand.
e. Introns or intervening sequences do not appear in mature or processed RNA.
(1) 2 (2) 3
(3) 4 (4) zero

40. An actively dividing bacterial culture is grown in a medium containing radioactive adenine ($\overset{*}{A}$). After all the adenine is labelled, the bacteria are transferred to a medium containing non-radioactive adenine(A). Following one round of replication in this non-radioactive medium, DNA is analysed. Which of the following sequence could represent this DNA?
(1) $\overset{*}{A}ATTG\overset{*}{A}TC$ / $TT\overset{**}{A}ACTAG$
(2) $\overset{**}{A}ATTG\overset{*}{A}TC$ / TTAACTAG
(3) $\overset{**}{A}ATTG\overset{*}{A}TC$ / $TT\overset{**}{A}ACT\overset{*}{A}G$
(4) AATTGATC / TTAACTAG

41. During transcription
(1) RNA is synthesised from 3′ to 5′ direction
(2) Template DNA strand is read in 3′ to 5′ direction
(3) Coding strand codes for synthesis of RNA
(4) Primer is removed by RNA polymerase I

42. If the number of okazaki fragments in a discontinuous strand are 7, then the number of primers attached with them, will be
(1) 7 (2) 10
(3) 14 (4) 1

43. **Assertion**: DNA replication occurs within a small opening of DNA helix referred to as replication fork.
Reason: For long DNA molecules, two strands cannot be separated in its entire length, due to high energy requirement.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

44. **Assertion**: DNA synthesis is primed by short segments of RNA which are later removed by enzyme.
Reason: DNA polymerase cannot initiate the synthesis of DNA chains by itself.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

45. **Assertion**: The two strands of the double helix unwind and serve as templates for the synthesis of complementary strands.
Reason: Complementary nature of two strands of DNA forms the basis for the faithful duplication of genetic material .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

46. During protein synthesis, polypeptide sequences are dictated by $\frac{a}{b}$ and represented by
(1) a-mRNA, b-DNA
(2) a-DNA, b-mRNA
(3) a-DNA, b-DNA
(4) a-mRNA, b-mRNA

47. Select the incorrect match w.r.t structure of tRNA
(1) 3′ end of tRNA — amino acid attachment site
(2) DHU loop — Enzyme binding site
(3) Anticodon loop — pairs with codon in mRNA
(4) T Ψ C loop — aminoacyl tRNA synthetase enzyme

48. Select the incorrect match
(1) Genetic RNA — QB bacteriophage
(2) mRNA — UTR's (untranslated regions)
(3) tRNA — adapter molecule
(4) Exons — intervening sequences

49. Select a pair of correct statements
a. For initiation of translation, there is specific initiator tRNA
b. The secondary structure of tRNA looks like a clover- leaf
c. These are three separate tRNA's for stop codons
d. UTR's are present at 3′ end of tRNA
e. 28S rRNA occur in large subunit of prokaryotic ribosome
(1) b & e (2) d & c
(3) a & b (4) a & d

50. Which of the following statement is correct?
(1) In TMV, RNA found is non-genetic
(2) mRNA acts as a template for transcription
(3) tRNA is the smallest among the three types of RNAs
(4) mRNA accounts for 70–80% of the total RNA content of the cell

Answers

1.	(1)	15.	(1)	29.	(4)	43.	(1)
2.	(2)	16.	(1)	30.	(2)	44.	(1)
3.	(1)	17.	(4)	31.	(2)	45.	(2)
4.	(1)	18.	(4)	32.	(1)	46.	(2)
5.	(1)	19.	(2)	33.	(1)	47.	(4)
6.	(2)	20.	(3)	34.	(1)	48.	(4)
7.	(1)	21.	(1)	35.	(3)	49.	(3)
8.	(1)	22.	(1)	36.	(1)	50.	(3)
9.	(2)	23.	(2)	37.	(3)		
10.	(2)	24.	(1)	38.	(1)		
11.	(1)	25.	(2)	39.	(1)		
12.	(2)	26.	(4)	40.	(2)		
13.	(4)	27.	(3)	41.	(2)		
14.	(1)	28.	(1)	42.	(1)		

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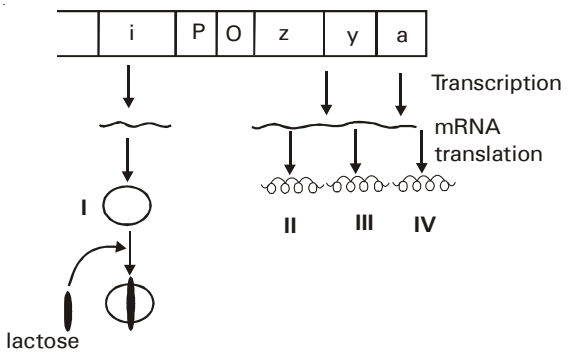
Molecular basis of inheritance-III

(True & False / Assertion-Reason / Statements / Match Questions)

1. At the molecular level, expression of a gene results in the formation of a
   (1) polypeptide (2) protein
   (3) cistron (4) enzyme
2. In eukaryotes, regulation of gene expression could be exerted at
   (a) transcriptional level(formation of primary transcript)
   (b) processing level (regulation of splicing)
   (c) translational level
   (d) transport of mRNA from nucleus to cytoplasm
   (1) only a (2) b & d only
   (3) a, b & d (4) a, b, c & d
3. Select the incorrect statement
   (1) Beta-galactosidase in *E. coli* is used to catalyse the hydrolysis of a disaccharide, lactose into galactose and glucose
   (2) If lactose is absent in the medium, synthesis of enzyme beta-galactosidase is not required
   (3) Lactose permease increases permeability of the cell to β -galactosidase
   (4) Lactose is the substrate for the enzyme beta-galactosidase and it regulates switching on and off of the operon
4. For questions (4, 5) study the following diagram carefully



   Select the incorrect statement.
   (1) In this operon, lactose is working as an inducer
   (2) 'I' is the activator, which is inactivated by interaction with lactose (inducer)
   (3) This operon refers to *lac* operon and consists of one regulatory gene, 'i' gene and three structural genes z, y, a
   (4) Operon is in 'switched on' position where RNA polymerase could access to promoter and transcription proceeds.
5. Select the option that correctly labels I,II, III, IV

	I	II	III	IV
(1)	Repressor protein	β-galactosi-dase	Lactose permease	Transace-tylase
(2)	β-galactosi-dase	Lactose permease	Transace-tylase	Repressor protein
(3)	Lactose permease	Transace-tylase	Repressor protein	β-galactosi-dase
(4)	Transace-tylase	Repressor protein	Lactose permease	β-galactosi-dase

6. In *lac* operon of *E.coli*, assume that mutation occured that leads to deletion of 'i' gene (regulatory gene); it will result in
   (1) permanent attachment of repressor to operator gene
   (2) inhibition of binding of RNA polymerase to promoter gene
   (3) non-uptake of lactose from medium
   (4) non-regulated translation of z, y & a
7. According to Jacob-Monod (*lac* operon) model of gene regulation, inducer in a bacterial cell probably combines with
   (1) promoter region, activating RNA polymerase
   (2) structural genes, stimulating them to synthesise mRNA
   (3) operator region, dissociating repressor
   (4) repressor protein, inactivating them
8. Which of the following statement's is/are incorrect?
   a. In a transcription unit, the activity of RNA polymerase at a given promoter is regulated by interaction with accessory protein
   b. Accessory protein affect the ability of RNA polymerase to recognise start sites.
   c. Operator region is adjacent to promoter element in most operon
   d. In most cases, sequences of operator bind an inducer protein
   e. The accessibility of promoter regions of prokaryotic DNA is in many cases regulated by interaction of proteins with sequences termed operator.
   (1) b & e only (2) a & d only
   (3) d only (4) c only

9. Operon is a
   (1) sequence of three nitrogen bases determining a single amino acid
   (2) gene responsible for 'switching on' and 'switching off' of other genes
   (3) set of closely placed genes regulating a metabolic pathway in prokaryotes
   (4) segment of DNA specifying a polypeptide

10. How many of the following statements are correct w.r.t *lac* operon?
   a. Regulation of transcription is the primary step for regulation of gene expression
   b. *Lac* operon is the prototype operon in bacteria
   c. It codes for genes responsible for metabolism of lactose
   d. It is regulated by the amount of lactose in the medium where bacteria are grown
   e. Regulation of *lac* operon is viewed as regulation of enzyme synthesis by its substrate
   (1) 1 (2) 2
   (3) 4 (4) 5

11. Frameshift mutation
   (1) removes amino acids from the protein
   (2) replaces one amino acid with another
   (3) adds nucleotides to RNA after transcription
   (4) introduces a new sequence of amino acid not normally found

12. Which of the following statement is correct?
   a. Mutation may involve deletions and rearrangements in a segment of DNA
   b. Mutations may result in loss or gain of a gene and so a function
   c. Sickle cell anemia is a diseased condition that result due to point mutation (change of single base pair) in the gene for beta globin chain
   d. Effect of point mutations that inserts or deletes a base in structural gene involves the change in reading frame from the point of insertion or deletion
   (1) a & b (2) c & d
   (3) a, b & c (4) a, b, c & d

13. Gene mutation involving insertion or deletion of three or its multiple bases
   (a) does not alter the reading frame
   (b) insert or delete one or multiple codons
   (c) insert or delete multiple amino acids
   (d) changes the reading frame
   (e) replace one or more amino acids
   (1) d & e (2) a, b & c
   (3) b & d (4) b, c, & d

14. In an *E. coli* strain, i gene gets mutated and its product cannot bind the inducer molecule. If growth medium is provided with lactose, what will be the outcome?
   (1) RNA polymerase will bind the promoter region
   (2) Only z gene will be transcribed
   (3) z, y, a genes will be transcribed
   (4) z, y, a will not be translated

15. A base substitution mutation in a gene sometimes has no effect on the protein (the gene codes for). Which of the following could account for this?
   (1) Such mutation are quite rare
   (2) Some codons are coding for more than one amino acid
   (3) Some amino acids have more than one codon
   (4) A mechanism repairs the mRNA molecule

16. The impact of having the human genome sequence will be
   a. enabling a radically new approach to biological research
   b. that scientists can study all the genes in a genome together
   c. enabling the scientist to study all transcripts in a particular tissue or organ or tumour
   d. enabling the scientist to study how thousands of genes and proteins work together in interconnected network to orchestrate the chemistry of life
   (1) a, b & d (2) b & c only
   (3) d only (4) a,b, c & d

17. Human Genome Project (HGP) was
   a. called as megaproject and launched in the year 1990
   b. a 13-year project coordinated by U.S. Department of Energy and National Institute of Health .
   c. completed in 2008
   d. closely associated with the rapid development of a new area in biology called Bioinformatics
   (1) a, b & d (2) b & c only
   (3) d only (4) a,b, c & d

18. Which of the following statement/s is/are incorrect?
   a. A DNA sequence coding for tRNA or rRNA is called a gene
   b. A DNA segment coding for a polypeptide is termed as cistron
   c. Structural gene is polycistronic in prokaryotes
   d. Monocistronic structural gene is split-gene in eukaryotes
   e. Exons are DNA segments that are transcribed but not translated
   (1) a & e (2) b, c & d
   (3) c & d (4) e only

19. In HGP, learning about non- human organisms DNA sequences can lead to an understanding of their natural capabilities that can be applied towards solving challenges in
    a. health care
    b. agriculture
    c. energy production
    d. environmental remediation
    (1) a & b only (2) c only
    (3) b & d only (4) a, b, c & d

20. How many of the following non-human model organisms have also been sequenced?
    a. Bacteria
    b. Yeast
    c. *Coenorhabditis elegans*
    d. *Drosophilla*
    e. Rice
    f. *Arabdiopsis*
    (1) Zero (2) Four
    (3) Three (4) All of these

21. Which of the following observations were drawn from human genome project?
    (a) Less than 2 percent of the genome codes for proteins
    (b) 99.9% nucleotide bases are exactly the same in all people
    (c) Total number of genes is 1,40,000 much higher than previous estimates of 30,000
    (d) Functions are unknown for over 50 percent of the discovered genes
    (1) c only (2) a, b & d
    (3) c & d (4) a, b, c & d

22. Select the correct sequence of steps w.r.t. sequencing of human genome (sequence annotation)
    a. sequencing of fragments using automated DNA sequencers
    b. annotation of sequences
    c. isolation of total DNA from a cell
    d. alignment of sequenced fragments based on overlapping regions.
    e. cloning of fragment in a suitable host
    (1) c, e, a, d, b (2) b, e, a, d, c
    (3) c, e, d, a, b (4) a, b, c, d, e

23. Satellite DNA
    a. is a type of repetitive DNA where a small stretch of DNA is repeated many times
    b. can be classified into different categories depending on base composition (A:T rich or G:C rich), length of segment and number of repetitive units
    c. normally code for specific proteins
    d. form a small portion of human genome
    (1) a & b (2) c & d
    (3) b & d (4) only c

24. Which of the following statement is incorrect w.r.t DNA polymorphism?
    (1) It forms the basis of genetic mapping of human genome as well as of DNA finger printing
    (2) It is the variation at genetic level that arises due to mutation
    (3) Can not be inherited from parents to children
    (4) Is the basis of paternity testing in case of disputes

25. VNTR's
    a. stands for variable number of tandem repeats
    b. belong to a class of satellite DNA i.e. mini-satellite
    c. size varies from 0.01 to 200 kb
    d. copy number remain same for a pair of homologous chromosome in an individual
    (1) a & c (2) a & b
    (3) b & c (4) c & d

26. The technique of DNA fingerprinting involves the following events in the order
    a. DNA digestion by restriction endonuclease
    b. autoradiography
    c. hybridisation using probe
    d. southern blotting
    e. DNA isolation
    f. separation of DNA fragments
    (1) e, a, f, d, c, b (2) e, a, d, b, c, f
    (3) a, c, f, d, b, e (4) c, a, f, b, c, d

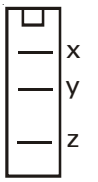
27. Select the incorrect statement
    (1) Using PCR, DNA from a single cell is enough to perform DNA fingerprinting analysis
    (2) The probability of variation in non-coding DNA sequence would be higher than in coding sequences
    (3) DNA polymorphism play important role in evolution and speciation
    (4) A somatic cell mutation that does not impairs reproductive ability of individual can spread to other members of population through sexual reproduction

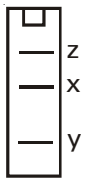
28. Which suspect would you charge with crime?

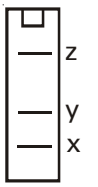
Victim	Crime scene sample	Suspect A	Suspect B

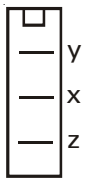
    (1) suspect A
    (2) suspect B
    (3) both suspect A & B
    (4) Neither suspect A nor B

29. The segment of DNA has restriction site I & II that create fragments x, y & z which of the following results produced by gel electrophoresis would represent the correct separation of fragments?

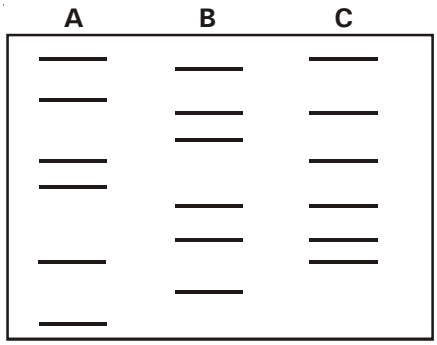
(1) 

(2) 

(3) 

(4) 

30. Below is the diagram of gel electrophoresis showing 3 rows of band. Out of 3 rows A, B, C; one row is of child and other two rows of parents. Which row is of child?



(1) A (2) B
(3) C (4) data insufficeint

31. A quick way to compare the DNA sequences of any two individuals is
(1) sequencing the whole genome (DNA)
(2) DNA fingerprinting
(3) Fingerprinting
(4) DNA Polymorphism

32. In DNA fingerprinting, probe used is made up of
(1) bulk genomic DNA
(2) radiolabelled VNTR
(3) RNA
(4) polypeptide

33. Match the column w.r.t *lac* operon

a.	y-gene	(i)	β -galactosidase
b.	a-gene	(ii)	repressor protein
c.	i-gene	(iii)	transacetylase
d.	z-gene	(iv)	permease

(1) a-iv, b -iii, c -ii, d -i (2) a-iii, b -i, c -ii, d -iv
(3) a-i, b -ii, c -iv, d -iii (4) a-ii, b -i, c -iv, d -iii

34. Match the column

	Column I		**Column II**
(i)	Regulatory gene	(a)	binding site for RNA polymerase
(ii)	Operator	(b)	codes for repressor protein
(iii)	Promoter	(c)	binding site for repressor protein
(iv)	Structural gene	(d)	codes for a polypeptide

(1) (i)-b, (ii) -c, (iii) -a, (iv)-d
(2) (i)-a, (ii) -d, (iii) -b, (iv)-c
(3) (i)-c, (ii) -a, (iii) -b, (iv)-d
(4) (i)-d, (ii) -c, (iii) -b, (iv)-a

35. Select the incorrect match w.r.t HGP
(1) Chromosome 1 – 2968 genes
(2) Chromosome 22 – 231 genes
(3) Average gene – 3000 bases
(4) Human genome – 3164.7 million bases

36. Match Column-I (scientists) with column-II (Discoveries) and select the correct option

	Column-I (Scientists)		**Column-II (Discoveries)**
a.	Alec Jeffreys	(i)	Automated DNA sequencer
b.	F. Sanger	(ii)	*Lac* operon
c.	Jacob & Monod	(iii)	DNA finger printing

(1) a–(ii); b–(i); c–(iii) (2) a–(iii); b–(i); c–(ii)
(3) a–(iii); b–(ii); c–(i) (4) a–(i); b–(ii); c–(iii)

37. A normal DNA sequence reads "ATT TAG CTA'. It undergoes different types of mutation. Select the incorrect match w.r.t. DNA sequence and the type of mutation
(1) ATT AAA TAG CTA – Insertion
(2) ATT AGC TA – Substitution
(3) ATG TAG CTA – Point mutation
(4) ATT AGC TA – frame shift mutation

38. Select the incorrect match w.r.t HGP
(1) YAC and BAC – cloning vectors
(2) Human chromosome 22 – Last chromosome to be sequenced
(3) SNP's (single nucleotide polymorphism) – 1.4 million location where single base DNA difference occur in human
(4) Dystrophin – largest known human gene at 2.4 million bases

39. **Assertion :** Mutation studies help to know the effect of large deletions and rearrangements in a segment of DNA.
Reason : The relationships between genes and DNA are best understood by mutation studies.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

40. **Assertion**: Repetitive sequence are stretches of DNA sequences that are repeated many times, sometimes hundered to thousand times.
Reason: Repetitive sequences have no direct coding function, but they shed light on chromosome structure, dynamics and evolution.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

41. **Assertion :** For a child, 50% band resemble mother parent and other 50% father parent.
Reason : Child inherit one chromosome from mother parent while its homologue from father parent
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

42. **Statement-I** : 3300 books would be required to store the information of DNA sequence from a single human cell, if each book contain 1000 pages and each page has 1000 letters on it.
Statement-II : Total estimated cost of HGP was 9 million US dollar if cost of sequencing is US $ 3 per base pair
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

43. **Statement I :** Expressed sequence tags (EST) focused on identifying all the genes that are expressed as RNAs
Statement II : Sequence annotation refers to simply sequencing the whole set of genome that contained all the coding & non-coding sequence, and later assigning different region in the sequence with function
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

44. **Statement I :** The paternal and maternal chromosome contain different copy numbers of VNTR
Statement II: Copy number (VNTR's) show very high degree of polymorphism
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

45. **Statement I:** Bands on an autoradiogram give a characteristic pattern for an individual's DNA.
Statement II: Band pattern differs from individual to individual in a population except the case of monozygotic (identical) twins.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

46. **Statement-I** : Metabolic, physiological or environmental conditions regulate the expression of genes.
Statement-II : Each operon has its specific operator and specific repressor.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

Answers

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

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Sexual Reproduction in Flowering Plants
(True & False/AR/ Statements)

1. **Assertion** : Pollen-pistil interaction is a dynamic process.
   Reason : All the events from pollen deposition on stigma until pollen tube enter ovary are together referred to as pollen-pistil interaction .
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
2. **Assertion** : Cleistogamy is a contrivance for self pollination.
   Reason : Cleistogamous flowers invariably show geitonogamy.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Assertion is true statement but Reason is false
   (3) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (4) Assertion is false
3. **Assertion** : Unisexuality and self incompatibility are devices that promote self-pollination and discourage cross pollination.
   Reason : Majority of flowering plants produce imperfect flowers and pollen grains are likely to come in contact with stigma of same flower .
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Assertion is true statement but Reason is false
   (3) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (4) Assertion is false
4. **Assertion** : One of the problems of plant hybridization is that hydrid seeds have to be produced every year.
   Reason : If hybrids are made into apomicts then there is no segregation of characters in the hybrid progeny and farmers can keep on using hybrid seeds to raise new crop year after year and need not to buy hydrid seed every year .
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
5. **Assertion** : Seed is the basis of agriculture.
   Reason : Seed dormancy and dehydration are crucial for storage.
   (1) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (2) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
6. **Assertion** : Embryo develops at the micropylar end of the embryo sac.
   Reason : In the grass family, the single cotyledon is called scutellum .
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

7. **Assertion** : Apomixis is a kind of asexual reproduction.
Reason : When offspring is produced by a single parent with/without the involvement of gamete formation, the reproduction is asexual.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

8. **Assertion** : Pollen grains are well preserved as fossils.
Reason : Sporopollenin is the most resistant organic material known that cannot be degraded by any enzyme/bacteria.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

9. **Assertion** : In angiosperms endosperm is triploid while in gymnosperms endosperm is haploid.
Reason : In angiosperms, endosperm is formed before fertilization and in gymnosperms endosperm is formed after fertilization.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

10. **Assertion** : Process of formation of megaspores from megaspore mother cell is megasporogenesis.
Reason : Megasporogenesis occurs inside ovule.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

11. **Assertion** : In angiosperms, five nuclei are involved in fertilisation.
Reason : Double fertilisation occurs in all seed plants.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

12. **Assertion** : Wind pollinated flower often have many ovules.
Reason : Cleistogamy is seen in *Vinca*.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

13. **Statement-I** :In stamens the distal part of the filament is attached to the thalamus or petal of the flower.
Statement-II : In dithecous anther, a longitudinal groove runs lengthwise that separating the two theca.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

14. **Statement-I** : Inner wall layer of pollen is discontinous and made up of pectin and cellulose.
Statement-II : Germ pore is present where sporopollenin is absent.
(1) Both statement-I and statement-II are correct
(2) Statement-I is incorrect but statement-II is correct
(3) Both statement-I and statement-II are incorrect
(4) Statement-I is correct but statement-II is incorrect

15. **Statement-I** : Hilum is the junction between funicle and placenta.

Statement-II : In Anatropous ovule, body of ovule is completely inverted so that mciropyle and hilum lie close to each other.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

16. **Statement-I** : In monosporic development embryosac formation takes place from a single megaspore.

Statement-II : It is most common type and is found in 80% of seed plants.

(1) Both statement-I and statement-II are incorrect
(2) Both statement-I and statement-II are correct
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

17. **Statement-I** : Well exposed stamen is present in anemophilous flower.

Statement-II : Light and non-sticky pollens are the features of wind pollinated plants.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

18. **Statement-I** : In monoecious plant species such as castor and maize autogamy can be prevented but not geitonogamy.

Statement-II : In dioecious plants species such as papaya, both autogamy and geitonogamy can be prevented.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

19. **Statement-I** : The special cellular thickening at the chalazal end guide the pollen tube into the synergids.

Statement-II : Central cell is a largest cell of embryo sac.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

20. **Statement-I** : Transfer of pollen grains from anther to stigma of same flower is autogamy .

Statement-II : Cleistogamous flowers are rarely autogamous as there is chance of cross pollination landing on stigma.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

21. **Statement-I** : Some monocots of flowering plants are water pollinated.

Statement-II : Water lily, water hyacinth, lotus are hydrophilous flowers.

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

22. **Statement-I** : Pollen kitt is present in entomophillous flower.

Statement-II : Sporo-pollenin which is most resistant and inorganic material deposited on the exine of pollen grain.

(1) Both statement-I and statement-II are correct
(2) Statement-I is correct but statement-II is incorrect
(3) Both statement-I and statement-II are incorrect
(4) Statement-I is incorrect but statement-II is correct

23. Select the incorrect statement
(1) Pollinia are found in *Calotropis*
(2) Orthotropus ovule is the most primitive type with micropyle, chalaza and funicle in a straight line
(3) Pollen tube enters into the embryo sac through degenerated synergid
(4) A young microspore possess two male gametes

24. Identify the type of endosperm on the basis of following characters
(i) PEN undergoes successive nuclear division to give rise to free nuclei
(ii) Seen in coconut
(1) Nuclear endosperm
(2) Helobial endosperm
(3) Cellular endosperm
(4) Ruminate endosperm

25. A tetrasporangiate anther produces 1600 microspores. Considering each microsporangium produces equal number of microspores, how many microspore mother cells will be present in each microsporangium?
(1) 400 (2) 64
(3) 100 (4) 6400

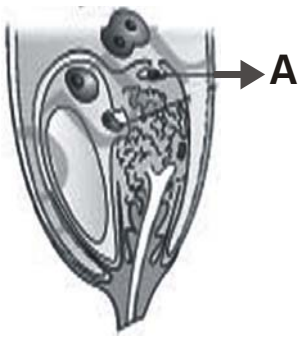
26. Which of the following statement is false?
(1) Gymnosperms do not show sexual reproduction
(2) Angiosperms show heterospory
(3) Diversity of structure of the inflorescences, flower and floral parts are adaptations to ensure formation of end products of sexual reproduction, the fruits and seeds
(4) Filiform apparatus is found at micropylar end of synergids

27. If there are 42 chromosomes in the leaf cell of a flowering plant, then which of the following structure will have 21 chromosomes?
(1) Megaspore mother cell
(2) Endosperm
(3) Root cell
(4) Egg

28. Which of the following statements is/are correct?
a. Endothecium possess α-cellulosic thickening on its inner and radial wall
b. Pollen can be stored in pollen banks
c. All flowering plants show sexual reproduction
d. Stored pollen can be used in crop breeding programmes
(1) a, b, c (2) b, c, d
(3) b, d (4) a, b, c, d

29. Identify the incorrect statement
(1) Megaspore mother cell differentiate towards the micropylar end of nucellus
(2) Generally chalazal megaspore is functional
(3) Mature male gametophyte of angiosperms is highly reduced having only two cells
(4) Fats in cytoplasm of pollen grain protect chromosomes of pollen from radiation damage

30. In the following diagram, A represents



(1) degenerating synergid
(2) male gamete
(3) egg cell
(4) vegetative cell

31. What is wrong about tapetum?
(1) Innermost wall layer of anther
(2) also called as fibrous layer
(3) produces pollen kitt
(4) produces callase enzyme

32. Select the incorrect statement/s
a. Flowers are embryological and morphological marvels
b. Several hormonal and structural changes are initiated in plants which lead to the differentiation and further development of the floral primordium
c. Six out of eight nuclei get surrounded by cell wall during embryo sac development
d. For the formation of male gametophyte, one meiosis and three mitosis are required
(1) c & d (2) a & c
(3) d only (4) a & b

33. Each pollen grain has two male gametes, even then atleast 100 pollen grains and not 50 pollens are required to fertilise 100 ovules present in a carpel because
(1) only one male gamete is functional
(2) it is the pollen tube and not the individual male gamete that enters the ovule
(3) one male gamete degenerates during its development
(4) both the male gametes used up in fertilising the egg cell

34. Choose the correct pair of statements
a. Emasculation is required in case of unisexual flowers
b. Pollen pistil interaction is a dynamic process
c. Orchid fruit contains only a few tiny seeds
d. Fruits formed as a result of fertilisation could be a false fruit
(1) a & b (2) c & d
(3) a & c (4) b & d

35. Select the incorrect statement
(1) Each ovule normally has one embryo sac
(2) Each embryo sac has only one egg
(3) Number of ovules in an ovary is same in all plants
(4) Number of ovaries present in a flower depends upon the type of gynoecium

36. How many of the seeds given below are endospermic?
Castor, barley, maize, orchid, beans, wheat, pea.
(1) 7 (2) 5
(3) 6 (4) 4

37. Identify the incorrect statement
(1) Anemophilous flowers have a single ovule in each ovary
(2) Both xenogamy and geitonogamy are included under allogamy
(3) Autogamy requires synchrony in pollen release and stigma receptivity
(4) Majority of plants use abiotic agents for pollination

38. Autogamy can occur in a chasmogamous flower if
(1) pollen matures before maturity of ovule
(2) ovules mature before maturity of pollen
(3) both anther & stigma mature simultaneously
(4) stamen and stigma are of unequal lengths

39. While planning for an artificial hybridisation programme in date palm, which of the following steps would not be relevant?
(1) Bagging of female flower
(2) Dusting of pollen on the stigma
(3) Emasculation
(4) Collection of pollen

40. Which of the following is incorrectly matched?
(1) Megasporangium – Ovule
(2) Synergids – Cooperative cells
(3) Stamen – Microsporophyll
(4) Female gamete – Embryosac

41. Select the incorrect match
(1) Mango – Polyembryony
(2) Apomixis–found in some species of Asteraceae and Grasses
(3) Heart shaped stage–Monocot embryo
(4) Seed –Unit of dispersal and perennation

42. Select the correct match
(1) *Hibiscus* – Pentacarpellary apocarpous pistil
(2) *Papaver*– multicarpellary syncarpous pistil
(3) *Michelia* – Multicarpellary syncarpous pistil
(4) *Hibiscus*– Tricarpellary syncarpous pistil

43. Identify the incorrect match
(1) Large feathery stigma – Anemophilous flower
(2) Pollenkitt – Entomophilous flowers
(3) Long ribbon-like pollen grains – marine sea grasses
(4) Inserted and sticky stigma – Anemophilous flowers

44. Match the column

	Column -I		**Column-II**
a.	Nuclear endosperm	(i)	Castor
b.	Perispermic seed	(ii)	Maize
c.	Scutellum	(iii)	grasses
d.	Apomixis	(iv)	Coconut

(1) a–(ii),b–(i),c–(iii), d–(iv)
(2) a–(iv),b–(i),c–(ii), d–(iii)
(3) a–(i),b–(ii),c–(iii), d–(iv)
(4) a–(iii),b–(ii),c–(iv), d–(i)

Answer

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

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Reproduction in Organisms

(True & False / AR / Statements)

1. Select the incorrect match
   (1) *Pencillium* – Conidia
   (2) Sponge – Gemmule
   (3) *Chalmydomonas* – Zoospores
   (4) *Hydra* – akinete
2. Select the correct match w.r.t vegetative propagules in angiosperms
   (1) Potato – Offset
   (2) Water hyacinth – Rhizome
   (3) *Agave* – Bulbils
   (4) *Bryophyllum* – Eyes
3. Select the incorrect match
   (1) Earthworm – bisexual animal
   (2) *Marchantia* – dioecious plant
   (3) Date palm – unisexual flower
   (4) *Strobilanthes* – polycarpic plant
4. Match the entries in Column-I with entries in column-II

	Column -I		Column-II
a.	Frog	(i)	Bisexual
b.	Human	(ii)	Oviparous
c.	Ovule	(iii)	Pericarp
d.	Ovary wall	(iv)	Viviparous
e.	sweet potato	(v)	Seed

   (1) a–(i), b–(iv),c–(v),d–(ii), e–(iii)
   (2) a–(ii), b–(iv),c–(v),d–(iii), e–(i)
   (3) a–(i), b–(v),c–(iv),d–(ii), e–(iii)
   (4) a–(ii), b–(iv),c–(iii),d–(i), e–(v)
5. Select the correct match w.r.t chromosome number in meiocyte (diploid, 2n) and gametes (haploid, n) in given organisms

	Name of organism	Chromosome number in meiocyte	Chromosome number in gamete
(1)	***Ophioglossum***	**630**	**1260**
(2)	**Fruitfly**	**16**	**8**
(3)	**Maize**	**20**	**10**
(4)	**Onion**	**38**	**19**

6. How many of the following statements is/are true?
   a. Buds are unicellular in yeast but are multicellular in *Hydra*
   b. The ovary ripens to form fruit
   c. Penicillium is also called cup-fungi
   d. Meiosis is must in asexual reproduction
   e. Euglena divides by longitudinal binary fission
   f. Papaya plant is dioecious
   (1) 4 (2) 3
   (3) 5 (4) 2
7. Select the pair of correct statements
   a. Reproduction enables the continuity of species
   b. Clone is a group of genetically similar but morphologically dissimilar individuals
   c. Life span of organisms are not necessarily co-related with their sizes
   d. Stalk of ovule is called micropyle
   (1) a & d (2) b & c
   (3) a & c (4) b & d
8. Water hyacinth
   a. is one of the most invasive aquatic weeds
   b. found in rapidly flowing water
   c. drains carbon dioxide from water
   d. was introduced in India because of its beautiful flowers and shape of leaves
   (1) a & d (2) b & c
   (3) c & d (4) a & d
9. Select the incorrect statement
   (1) Cow shows oestrus cycle
   (2) Apes menstrual cycle
   (3) In haploid organisms, meiocytes undergo meiosis
   (4) Bird Turkey, show parthenogenesis
10. How many of following statements is/are incorrect
    a. In rhizome of banana and potato tuber, new plantlets arise from the nodes present in these modified stem
    b. Asexual reproduction is common method of reproduction in organisms having a relatively simple organisation like algae and fungi
    c. Most of the animals reproduce only sexually
    d. Sexual reproduction is an elaborate, complex and slow process as compared to asexual reproduction
    e. Birds living in nature lay eggs all through the year
    (1) 4 (2) 2
    (3) 1 (4) 5

11. Select the correct statement
    (1) Cucurbits bear male and female flowers on the same plant
    (2) Coconut is dioecious
    (3) Cockroach is hermaphrodite
    (4) Earthworm posses both male and female reproductive organ in same body, so is unisexual

12. **Statement-I** : At the end of meiosis, only one set of chromosome get incorporated into each gamete.
    Statement-II : Parental body is diploid in pteridophytes, gymnosperms and angiosperms.
    (1) Both statement-I and statement-II are correct
    (2) Both statement-I and statement-II are incorrect
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement-II is correct

13. **Statement-I** : Formation of diploid zygote is universal in all sexually reproducing organisms.
    Statement-II : Zygote is the vital link that ensures continuity of species between organisms of one generation and the next.
    (1) Both statement-I and statement-II are incorrect
    (2) Both statement-I and statement-II are correct
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement-II is correct

14. **Statement-I** : In seed plants, non-motile male gametes are carried to motile female gamete by water.
    Statement-II : In pteridophytes, fertilization is internal as it occurs inside venter of the archegonium.
    (1) Both statement-I and statement-II are correct
    (2) Both statement-I and statement-II are incorrect
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement-II is correct

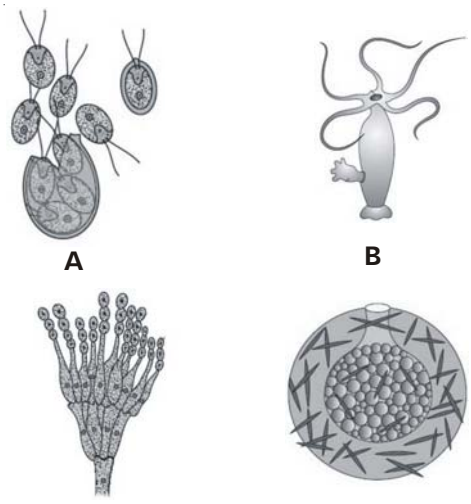
15. **Statement-I** : Pollination facilitates transfer of pollen grain to the stigma only in cross-pollinating plants excluding dioecious plants.
    Statement-II : In pea, transfer of pollen grain to stigma is relatively easy as anther and stigma are located close to each other.
    (1) Both statement-I and statement-II are correct
    (2) Both statement-I and statement-II are incorrect
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement-II is correct

16. **Statement-I** : In flowering plants, ovary develops into pericarp.
    Statement-II : Zygote develops into seed in seed plants.
    (1) Both statement-I and statement-II are correct
    (2) Both statement-I and statement-II are incorrect
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement-II is correct

17. Which of following statement is incorrect?
    (1) Animal may be either oviparous or viviparous
    (2) Embryonal protection and care are better in oviparous organism
    (3) Inside the mature seed is the progenitor of next generation, the embryo
    (4) Syngamy leads to formation of a specialised cell called zygote

18. Select the correct match
    (1) Honey bee – Parthenogenesis
    (2) Reptiles– Viviparous
    (3) Amphibians – internal fertilisation
    (4) Leech – unisexual

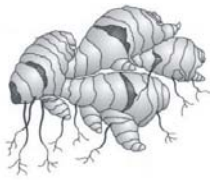
19. Select the correct option in which A, B, C, D are correctly identified



    (1) A– Zoopores of *Chlamydomonas*
    (2) B– Buds of *Yeast*
    (3) C– Conidia of *Aspergillus*
    (4) D– Sporangiospores in *Amoeba*

20. *Chara* shows the presence of
    (1) both stamen and carpel on the same plant
    (2) antheridiophore and archegoniophore on separate plant
    (3) nucule and globule on separate nodes
    (4) Upper oogonium and lower antheridium on same node of a plant

21. Which of the following option is incorrect w.r.t vegetative progagules in angiosperms



A

B

C

D

(1) A– Rhizome of Ginger
(2) B– Bulbil of *Agave*
(3) C–Leaf buds of *Bryophyllum*
(4) D– Stolons of Water hyacinth

22. How many of the following statement is/are correct *w.r.t* organisms showing internal fertilisation
a. They show great synchrony between sexes
b. Egg is formed inside female body
c. Male gamete is motile usually
d. there is significant reduction in the number of eggs produced
(1) 5 (2) 4
(3) 3 (4) 1

23. **Assertion** : Many algae show haplontic life cycle.
Reason : In algae, zygote divide by meiosis to form haploid spore that grow into haploid individuals.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

24. **Assertion** : Bony fishes show gametic fusion outside the body i.e external fertilisation .
Reason : large number of gametes are released into the surrounding medium in order to enhance the chances of syngamy .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

25. **Assertion** : Zygote undergoes both cell division(mitosis) and cell differentiation during embryogenesis.
Reason : An organism has specialised tissues and organ for which cell division increase the number of cells while differentiation helps group of cells to undergo certain modification .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

26. **Assertion** : In mammals, fertilised eggs are covered by hard calcareous shell .
Reason : Eggs are laid in safe place in the environment .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

27. **Assertion** : In flowering plants, the zygote is formed inside ovule.
Reason : In rotifers, the female gamete undergoes development to form new organisms without fertilisation .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

28. **Assertion** : Offspring formed due to sexual reproduction have better chances of survival.
Reason : Sexual reproduction introduces genetic variation, new character combination of offspring's .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

29. Select the incorrect statement

(1) Water is the medium for gamete transfer in bryophytes

(2) In bony fishes, syngamy occurs in water

(3) In seed plants, pollen are the carriers of male gametes

(4) Isogametes are found in *Fucus*

30. Select a pair of correct statement

a. Juvenile phase is also known as vegetative phase in plants

b. In flowering plants, vegetative propagules like gemmules and condia are capable of giving rise to new offspring

c. Under unfavourable condition, *Amoeba* shows encystation, forming three-layered hard covering or cyst.

d. Peepal tree has a much shorter life span than mango tree

(1) a & c (2) b & d

(3) a & b (4) b & c

Answer

1.	(4)	9.	(3)	17.	(2)	25.	(1)
2.	(3)	10.	(3)	18.	(1)	26.	(4)
3.	(4)	11.	(1)	19.	(1)	27.	(2)
4.	(2)	12.	(1)	20.	(4)	28.	(1)
5.	(3)	13.	(2)	21.	(4)	29.	(4)
6.	(1)	14.	(4)	22.	(2)	30.	(1)
7.	(3)	15.	(4)	23.	(1)		
8.	(4)	16.	(2)	24.	(2)		

PRINCIPLE OF INHERITANCE & VARIATIONS

(TRUE & FALSE/AR/ STATEMENTS)

1. A couple has two chlidren, Jiya with blood group 'O' and Rahul 'AB'. Select the correct match w.r.t genotype of various members of the family

	Member the family	Genotype
(1)	Jiya	I^AI^A
(2)	Rahul	I^AI^B
(3)	Father	I^AI^B
(4)	Mother	i i

2. A cross is made between dihybrid tall plant with yellow seeds (TtYy) and a hybrid tall plant with green seeds (Ttyy).Select the correct match w.r.t proportion of expected progeny

(1) Tall and green – $\frac{3}{8}$

(2) Tall and yellow – $\frac{1}{8}$

(3) Dwarf and green – $\frac{1}{4}$

(4) Dwarf and yellow – $\frac{3}{4}$

3. The following table shows the genotype for ABO blood grouping and their phenotypes. Fill the gaps left in the table

Genotype	Blood group / Phenotype
I^AI^A	y
x	AB
I^BI^B	B
I^Bi	w
z	O

w, x, y and z are respectively

(1) w = A; x = I^B i; y = B; z = I^AI^A

(2) w = B; x = I^AI^B ; y = A; z = i i

(3) w = O; x = I^AI^A; y = O; z = I^AI^B

(4) w = AB ; x = I^BI^A; y = A; z = I^BI^B

4. Grey colour (b^+/b), normal winged (vg^+/vg) F_1 female *Drosophilla* is crossed with black coloured (b/b), vestigial winged (vg/vg) male. The offspring were grey normal 126, black vestigial 124, grey vestigial 24 black normal 26

Answer the following question referring to the data

a. What is the recombination frequency between two genes?

b. What type of linkage is shown?

c. What is the distance between 'b' and 'vg' genes?

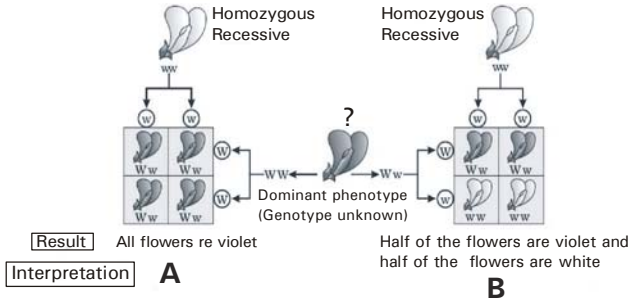
(1) a = 16.6% ; b = incomplete; c = 16.6map units

(2) a = 16%; b complete; c = 12.5

(3) a = 12.5; b = incomplete; c = 25

(4) a = 37.5; b = incomplete; c = 12.5

5. Following is the diagrammatic representation of a test cross. Select the option with correct interpretation 'A' and 'B' w.r.t unknown genotype of violet flower.



(1) A = homozygous recessive
B = homozygous dominant

(2) A = homozygous dominant
B = heterozygous dominant

(3) A = heterozygous dominant
B = homozygous dominant

(4) A = heterozygous dominant
B = heterozygous recessive

6. A perfectly normal female, whose brother is haemophilic marries a normal man.

a. What is phenotype and genotype of her father?

b. What is the probability of her first child to be haemophilic?

c. What is the genotype of her mother?

(1) a = haemophilic , X^hY; b = 25%; c = XX

(2) a = normal , XY; b = zero ; c = XX^h

(3) a = haemophilic , X^hY; b = zero; c = X^hX^h

(4) a = normal , X^hY; b = 50% ; c = XX^h

7. In a certain plant, yellow fruit colour (Y) is dominant to green (y) and round shape (R) is dominant to long (r). The two genes involved are located on different chromosome.When (YyRr) is self pollinated. The expected result will be

(1) Phenotypic ratio; 9:3: 3: 1

(2) Genotypic ratio ; 1: 1: 1:1

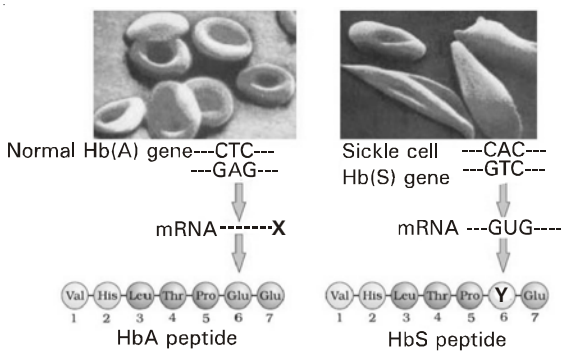
(3) Parentals and receombinants in the ratio 1:1

(4) All parentals and no recombinants

8. In *Antirrhinum* 'RR' is phenotypically red 'rr' is white and 'Rr' is pink. Select the correct match mentioning w.r.t the ratio in progeny of following crosses.

	Cross		**Progeny**
(1)	RR × Rr	–	2 Red :1 Pink
(2)	RR × rr	–	All Pink
(3)	Rr × Rr	–	2 Red : 1 Pink : 1 White
(4)	Rr × rr	–	1 Red : 1 Pink

9. Following is the micrograph of RBCs and the amino acid composition of relevant portion of β –chains of haemoglobin from a normal individual and from an individual with sickle -cell anaemia . Identify x and y



(1) x = CAC ; y = valine

(2) x = GAG ; y = valine

(3) x = GAG ; y = glutamic acid

(4) x = GUG; y = glutamic acid

10. Which one of the following correctly respresents the nature of blood in ABO system of blood groups pertaining to presence of antigens and antibodies?

	Blood group	**Antigen**	**Antibody**
(1)	O	A	a
(2)	A	A	b
(3)	B	B	Absent
(4)	AB	Absent	a,b

11. Match the column

	Column-I	**Column-II**
a.	Incomplete dominance	(i) *Drosophilla*
b.	Law of segregation	(ii) *Antirhinum majus*
c.	linkage	(iii) *Pisum sativum*

(1) a–(i), b–(ii), c–(iii) (2) a–(ii), b–(iii), c–(i)

(3) a–(iii), b–(ii), c–(i) (4) a–(iii), b–(i), c–(ii)

12. Match the entries in column-I with column-II

	Column-I	**Column-II**
a.	Alfred strutevant	(i) Chromosomal theory of inhertitance
b.	Mendel	(ii) Linkage
c.	Sutton	(iii) 'Mapped' position of gene on chromosome
d.	Morgan	(iv) Law of independent assortment

(1) a–(iii), b–(iv), c–(i),d–(ii)

(2) a–(ii), b–(iv), c–(i),d–(iii)

(3) a–(i), b–(ii), c–(iii),d–(iv)

(4) a–(iii), b–(ii), c–(i),d–(iv)

13. **Statement-I** : Independent pairs of chromosome segregate independently of each other.
Statement-II : One pair of gene always segregate independently of another pair.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

14. **Statement-I** : Mendel worked with tiny fruitflies, *Drosophilla melanogaster*.
Statement-II : Fruitfly can be grown on simple synthetic medium in the laboratory.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

15. **Statement-I** : Inheritance is the process by which characters are passed on from parent to progeny.
Statement-II : Variation is the degree by which progeny differ from their parents.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

16. **Statement-I** : Hybrid plants having alleles which express contrasting traits are called heterozygous.
Statement-II : A true breeding, homozygous plant has allelic pair of identical gene.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

17. **Statement-I** : Segregation of alleles is a random process that leads to blending of traits .
Statement-II :Morgan gave the concept of blending inheritance.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

18. **Assertion** : Independent assortment occurs when the gene under study are located on different chromosomes..
Reason : Unlinked genes show independent assortement.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

19. **Assertion** : Monohybrid phenotypic test cross ratio is 1:1.
Reason : 1:1 test cross ratio proves that segregation of factors of one character is independent to segregation of factors of other character.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

20. **Assertion** : A gamete carry either of the two traits of a character.
Reason : A gamete recieve only one of the two factors .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

21. **Assertion** : Pleiotropy can be defined as the effect of single gene on multiple phenotypic expression.
Reason : Only a boy child could be born with substitution of glutamic acid by valine on 6th codon of β -chain of haemoglobin.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

22. **Assertion** : Linkage is a phenomenon of inheritance of genes in which genes present on a particular chromosome show their tendency to inherit together.
Reason : Genes grouped on the same chromosome are always tightly linked, they showed very low recombination frequency.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

23. **Assertion** :The law of dominance is used to explain the expression of only one of the parental character in a monohybrid cross in the F_1 generation .
Reason : The law of dominance explains the proportion of 3:1 obtained at the F_2 generation .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

24. **Statement-I** : Sutton united the knowledge of chromosomal segregation with mendelian principles and called it the chromosomal theory of inhertitance.

Statement-II : Morgan discovered the basis for the variation that sexual reproduction produced. .

(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

25. If F_1 progeny
a. resemble either of the two parents
b. resemble both the parents
c. was in-between the two parents
(1) a–codominance; b–dominance; c– incomplete dominance
(2) a–dominance; b– incomplete dominance ; c–codominance
(3) a– incomplete dominance ; b–codominance; c– dominance
(4) a–dominance; b–codominance; c– incomplete dominance

26. *Drosophila melanogaste*r
a. is a fruitfly
b. complete its life cycle in about two months
c. show clear differentation of sexes,the male & female
d. shows a few somatic variations that can be seen with low power microscope
(1) a & c (2) a, b & c
(3) b & d (4) a, b & d

27. Select the correct statement w.r.t dihybrid cross
a. Phenotypic F_2 ratio 9:3:3:1 is expected when two genes are independent
b. Two genes may not segregate independently of each other
c. Tightly linked genes on the same chromosome show higher recombination
d. Genes far apart on the same chromosome show very few recombination
e. Two genes in a dihybrid cross may be present on same chromosome
(1) a,b & e (2) c & e
(3) b, c & d (4) b, d & e

28. How many of the following statements is/are correct?
a. Walter Sutton and Theodore Boveri noted that the behaviour of chromosome was parallel to behaviour of genes
b. Mendel's work suggested that factors (genes) were discrete units
c. Chromosome are structures in the nucleus that appeared to double and divide just before each cell division
d. Sutton and Boveri argued that the pairing and separation of a pair of chromosomes would lead to segregation of a pair of factors they corried
e. The two homologous chromosome of a pair segregate during Anaphase -I of meiosis-I.
f. Movement of chromosome during meiosis cannot explain Mendel's law
(1) 1 (2) 3
(3) 5 (4) 2

29. How many of the following statement/s is/are correct?
a. Genes which code for a pair of contrasting traits are known as alleles
b. Alleles are slightly different forms of the same gene
c. Trait expressed in F_1 hybrid is dominant
d. Punnett seqare was developed by a German Botanist, Reginald Punnett
e. In an individual, factors occur in pairs
f. Multiple alleles are present on different chromosome
(1) 2 (2) 4
(3) 3 (4) 5

30. Starch synthesis in pea seeds is controlled by one gene. It has two alleles (**B** and **b**). Starch is synthesised effectively by_____homozygotes and therefore, _____ starch grains are produced. In contrast,_____ homozygotes have lesser efficiency in starch synthesis and produce _____ starch grains. After maturation of the seeds, BB seeds are _____ and the bb seeds are _____. Heterozygotes produce round seeds, and so **B** seems to be the dominant allele. But, the starch grains produced are of _____size in **Bb** seeds.
(1) BB, large,bb, smaller, round, wrinkled, interme diate
(2) bb, large,BB, smaller, round, wrinkled, interme diate
(3) BB, smaller ,bb, larger, round, wrinkled, intermediate
(4) BB, large,bb, smaller, round, wrinkled, larger

31. **Statement- I** : Polygenic traits are generally controlled by three or more genes.
Statement- II : In humans we donot just have tall or short people as two distinct alternatives.
(1) Both statement-I and statement-II are correct
(2) Both statement- I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

32. Identify the correct statement
(1) Mutations are the only phenomenon that can leads to variation in DNA
(2) UV radiations can cause mutations in organisms so it is a mutagen
(3) Protein is a carrier of genetic information
(4) Cystic fibrosis is a autosomal dominant disorder

33. **Statement- I** : Mutation is a phenomenon which result in alteration of DNA sequences of an organism.
Statement- II : Chromosomal aberrations are commonly observed in cancer cells.
(1) Both statement-I and statement-II are correct
(2) Both statement- I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

34. **Statement- I** : Failure of segregation of chromatids during cells division cycle results in the gain or loss of a chromosomes called polyploidy.
Statement- II : Polyploidy is often seen in plants.
(1) Both statement-I and statement-II are correct
(2) Both statement- I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

35. Match the following wrt Allosomes

a.	*Drosophilla*	(i)	Haplo-diploid
b.	Fowl	(ii)	XX-XO
c.	Grasshopper	(iii)	XX-XY
d.	Honey bee	(iv)	ZZ-ZW

(1) a–(iii); b–(iv); c–(ii); d–(i)
(2) a–(i); b–(iv); c–(iii); d–(ii)
(3) a–(iv); b–(iii); c–(ii); d–(i)
(4) a–(ii); b–(i); c–(iii); d–(iv)

36. **Statement- I** : In Klinefelter's syndrome, one X-chromosome is missing.
Statement- II : In Turner's syndrome, the condition is XXY, which can be easily studied by analysis of karyotypes.
(1) Both statement-I and statement-II are correct
(2) Both statement- I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

37. Identify the incorrect statement
(1) In a polygenic trait, effect of each allele is additive
(2) In pleiotropy, a single gene can exhibit multiple phenotypic expression
(3) 'X body' of Henking was infact a chromosome
(4) Z and W chromosome of birds are autosomes

38. **Assertion**: In humans, the genotype with all the dominant alleles (AABBCC) will have the darkest skin colour.
Reason: In humans, the number of each type of alleles in the genotype would determine the darkness or lightness of the skin.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

39. **Assertion**: In Birds, Females determine the sex of the offsprings.
Reason: In Birds, females show heterogameity.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

40. Identify the correct statement
(1) Colour blindness occurs in about 8percent of females
(2) The son of a colourblind male is always colourblind
(3) Queen victoria shows a number of haemophilic descendants
(4) Sickle cell anaemia is also known as bleeders disease

41. **Assertion**: Chromosomal disorders are mainly determined by alternation or mutation in the single gene.
Reason: Human genetic disorders may be grouped into 2 categories -Mendelian and chromosomal.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

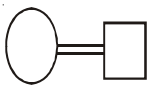
42. Identify the incorrect statement
(1) In humans, number of chromosomes are same in males and females
(2) During spermatogenesis among human males, two types of gametes are produced
(3) In case of honey bees, males donot have father and sons
(4) In case of honeys bees, females develops from unfertilized eggs

43. **Assertion**: In human genetics. pedigree study provides a strong tool to trace the inheritance of a specific trait.
Reason: Control crosses are not possible in case of human beings.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

44. Identify the correct match
(1) Colour Blindness – Sex-linked recessive
(2) Haemophilia – Y-linked recessive
(3) Sickle cell anaemia – X - linked dominant
(4) Phenylketonuria – Autosomal dominant

45. Identify the incorrect match
(1) Down's syndrome – Trisomy of 21st chromosome
(2) Klinefelter's syndrome – Trisomy of sex chromosome
(3) Turner's syndrome – Monosomy of X chromosomes
(4) Thalassemia – Trisomy of Y chromosome

46. **Assertion**: A classical examples of point mutation is sickle cell anaemia.
Reason: Mutations may arise due to change in the single base pair of DNA.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

47. Identify the incorrect match w.r.t pedigree symbols
(1) Affected individual – 
(2) Sex unspecified – 
(3) Consanguineous mating – 
(4) Unaffected Male – 

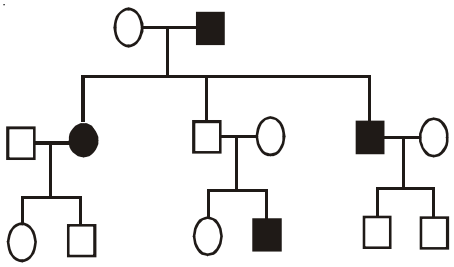
48. **Statement- I** : X-chromosome is designated as sex-chromosome due to its involvement in the determination of sex.
Statement- II : In *Drosophila,* males have a pair of X-chromosomes besides autosomes.
(1) Both statement-I and statement-II are correct
(2) Both statement- I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

49. How many of the following statements are correct?
a. Phenylketonuria is a inborn error of metabolism
b. Thalassemia leads to mental retardation
c. Thalassemia is a qualitative problem of synthesising an incorrectly functioning globin
d. In Sickle cell anaemia the cascade of proteins involved in the clotting of blood is affected
e. Myotonic dystrophy is an autosomal dominant disorder
(1) 2 (2) 3
(3) 4 (4) 5

50. Identify the pair of incorrect statements
a. Down's syndrome was first described by Langdon Down
b. Gynaecomastia is also expressed in Klinefelter's syndrome
c. Females with Turner's syndrome are fertile
d. Males with Down's syndrome show feminine development
(1) c & d (2) b & c
(3) a & b (4) c & a

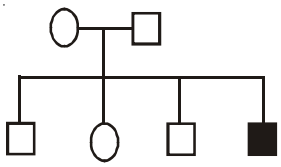
Pedigree Analysis

51. In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree



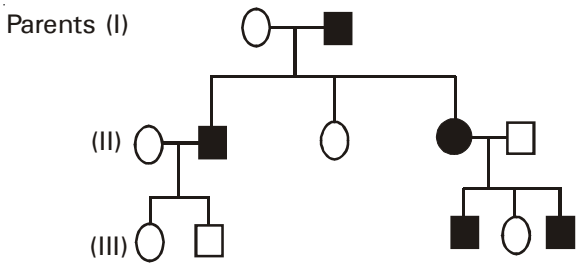
(1) autosomal recessive
(2) X-linked recessive
(3) X-linked dominant
(4) autosomal dominant

52. Following pedigree shows the inheritance of attached ear lobes (autosomal recessive trait). Which of the following condition can be drawn?



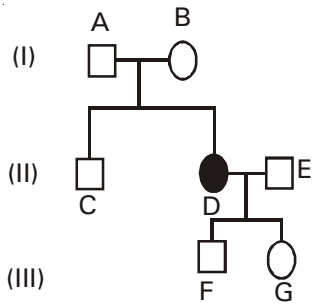
(1) Only one parent is heterozygous
(2) Atleast one parent is homozygous
(3) Both parent are homozygous
(4) Both parents are heterozygous

53. In the following human pedigree, the filled symbols represent the affected individuals. Assume that the diseased allele is rare and therefore individuals marrying into the family in **IInd** generation are unlikely to have defective allele. The mode of inheritance can be



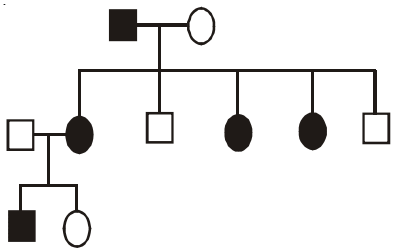
(1) X-linked recessive (2) X-linked dominant
(3) Y-linked (4) Data deficient

54. The pedigree shows the occurrence of phenylketonuria (autosomal recessive trait) If individual 'D' is homozygous, the carrier for the trait is



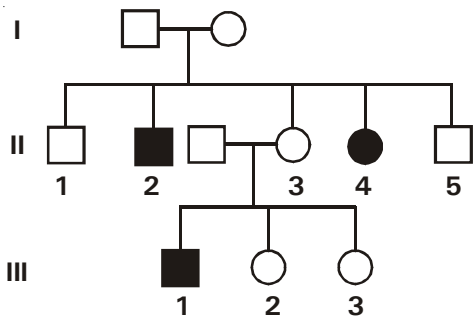
(1) E, A & B (2) A, B, F & G
(3) A & B only (4) A, B, C , E, F & G

55. Following pedigree shows the inheritance of a sex-linked trait in humans. What is the most likely mode of inheritance for this pedigree?



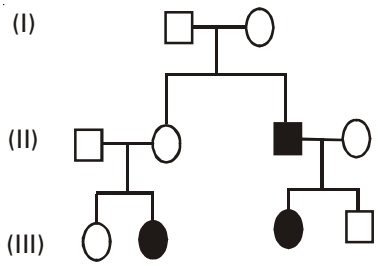
(1) X-linked recessive (2) X-linked dominant
(3) Y-linked recessive (4) Y-linked dominant

56. Following pedigree is for sickle cell anaemia.What is probability that II-I is homozygous?



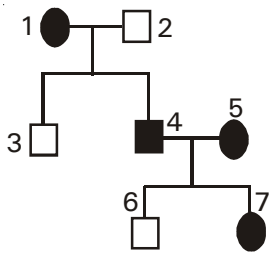
(1) $\frac{1}{3}$ (2) $\frac{2}{3}$
(3) $\frac{1}{4}$ (4) $\frac{1}{2}$

57. Find the genotype of Ist generation in the given pedigree



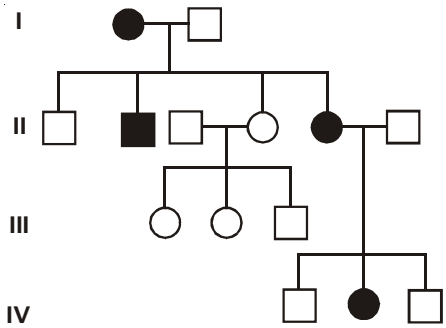
(1) Aa, Aa (2) AA, aa
(3) Aa, aa (4) AA, Aa

58. Find the genotype of individuals 4, 5 & 6 in the given pedigree



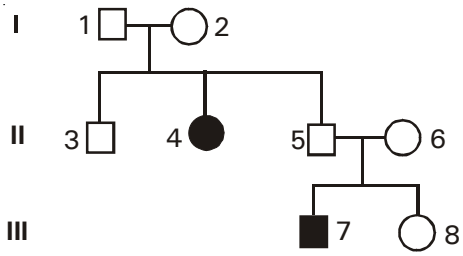
(1) 4 – Aa; 5 – Aa; 6 – AA
(2) 4 – Aa; 5 – Aa; 6 – aa
(3) 4 – AA; 5 – Aa; 6 – aa
(4) 4 – AA; 5 – AA; 6 – aa

59. Following pedigree is for myotonic dystrophy (autosomal dominant trait). The genetic make up of Ist generation is



(1) Aa, aa (2) aa, aa
(3) Aa, Aa (4) Aa, Aa

60. Which of the following conclusion can be drawn w.r.t. given pedigree?



It shows the inheritance of
(1) sex-linked recessive disease like haemophilia
(2) autosomal dominant trait like myotonic dystrophy
(3) a recessive trait for which I-1 is a carrier
(4) an autosomal recessive trait for which II-6 lacks the diseased allele.

Answer

1.	(2)	13.	(3)	25.	(4)	37.	(4)	49.	(2)
2.	(1)	14.	(4)	26.	(1)	38.	(1)	50.	(1)
3.	(2)	15.	(1)	27.	(1)	39.	(1)	51.	(1)
4.	(1)	16.	(1)	28.	(3)	40.	(3)	52.	(4)
5.	(2)	17.	(2)	29.	(2)	41.	(4)	53.	(1)
6.	(2)	18.	(1)	30.	(1)	42.	(4)	54.	(2)
7.	(1)	19.	(3)	31.	(1)	43.	(1)	55.	(2)
8.	(2)	20.	(1)	32.	(2)	44.	(1)	56.	(1)
9.	(2)	21.	(3)	33.	(1)	45.	(4)	57.	(1)
10.	(2)	22.	(3)	34.	(4)	46.	(2)	58.	(2)
11.	(2)	23.	(2)	35.	(1)	47.	(4)	59.	(1)
12.	(1)	24.	(1)	36.	(2)	48.	(3)	60	(3)

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REPRDUCTIVE HEALTH

(TRUE & FALSE/AR/ STATEMENTS)

1. How many of the following techniques involve invivo fertilization ?
ICSI, IUI, GIFT, ZIFT, IUT
(1) Two (2) Three
(3) Four (4) Five

2. Which of the following are correct statements?
a. All IUDs inhibit the release of gonadotropins
b. Diaphragms and cervical caps donot protect from STDs.
c. Periodic abstinence is a method in which couples avoid coitus all through the luteal phase of menstrual cycle
d. Barrier methods of contraception prevent physical meeting of ovum and sperms
(1) a and b (2) b and c
(3) b and d (4) a, c and d

3. How many of these contraceptives contain natural or synthetic steroids?
Oral pills, LNG-20, Implants, Saheli, Multiload 375
(1) 2 (2) 3
(3) 4 (4) 5

4. A women took the oral contraceptive pills on the 25th day of the menstrual cycle. After 21 days, she discontinues the pill but there is no withdrawl bleeding/menstruation. This could be because
(1) She may have been pregnant by the time she started taking the pills
(2) Discontinuation of the pill usually does not cause withdrawl bleeding
(3) She took the pill for double the number of days
(4) none of these

5. 
Which of the following statements are correct w.r.t. above figure?
a. Showing vasectomy
b. Showing tubectomy
c. Transport of gametes blocked
d. Surgical method
e. Prevent ovulation
(1) a, c and d (2) b, c, d and e
(3) b, c and d (4) a, c, and e

6. Which of the following the is correct?
(1) Introduction of sex education in schools should not be encouraged
(2) An ideal contraceptive should be user-friendly, easily available, effective and irreversible with no or least side-effects
(3) Natural methods of contraception work on the principle of avoiding chances of ovum and sperms meeting
(4) MTP has a significant role in decreasing the population and it is meant for this purpose

7. **Statement- I** : Female who has undergone hystrectomy can give birth to her own genetic baby.
Statement- II : Female after hystrectomy can produce ova.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

8. Choose the correct statement
a. Spermicidal creams are used along with IUDs
b. Nirodh is a popular brand of condom
c. Lactational amenorrhoea is barrier method
d. Surgical methods are also called sterilization methods
(1) a, b, c (2) b, c, d
(3) b and c (4) b and d

9. Which is the correct explanation of the particular device?
(1) Condoms – barrier that cover penis in male & ovary in female
(2) Diaphragms – reusable, used in females and males
(3) IUDs – self-inserted, intra-uterine devices
(4) Oral contraceptive pills – inhibit ovulation and implantation

10. **Assertion** : Contraception means sterility for birth control and CuT is one of the most ideal contraceptive used by females

Reason : CuT prevents implantation of blastocyst

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

11. Match the ARTs with their description

i. Collected gametes are made to form zygote in the lab	a. ZIFT
ii. Transfer of ovum from donor to the oviduct of the recipient	b. GIFT
iii. Sperm is injected into the ovum in vitro.	c. ICSI
	d. AI
	e. IVF

(1) i–e, ii–c, iii–d (2) i–e, ii–d, iii–b

(3) i–b, ii–a, iii–d (4) i–e, ii–b, iii–c

12. Which of the following statements are correct?

a. IUDs needs surgery

b. Tubectomy can also be done through abdomen

c. For vasectomy, a small cut can be given in scrotum or testes

d. Condoms give protection from STDs

(1) b, d (2) a, b, d

(3) b,c,d (4) a, b, c

13. Which of these is an indicator of improved reproductive health of a society?

a. Reduced infant mortality rate.

b. Reduced maternal mortality rate.

c. Reduced number of couples with small families.

d. Strong infrastructural facilities for sex-related problems.

e. Decreasing number of females

(1) b, c & d (2) a, c & e

(3) a, b & e (4) a, b & d

14. IUDs work by

(1) increasing phagocytosis of sperms

(2) suppressing sperm motility

(3) reduces fertilising capacity of sperms by altering its structure

(4) all of these

15. Contraceptive pills have to be taken daily for a period of _____ days starting preferably within the first _____ days of menstrual cycle. After a gap of _____ days it has to be repeated in the same pattern till the female desires to prevent conception.

(1) 14, 5, 7 (2) 17, 4, 4

(3) 21, 5, 4 (4) 21, 5, 7

16. What is true for an ideal contraceptive?

a. It should be user-friendly

b. It should be easily available

c. It should be ineffective and reversible with least side effects

d. It should be effective and reversible with least side effects

e. It should interfere with the sexual act of the user

(1) a, b, c, d, e (2) a, b, c

(3) a, b, d (4) a, b, d, e

17. **Assertion** : There is no ejaculation in a male who has undergone vasectomy.

Reason : A small part of vas deferens is removed through a small cut on abdomen during vasectomy.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

18. Which of the following contraceptive methods cannot be used exclusively by females?

(1) Condoms

(2) Diaphragms

(3) Progestasert

(4) All of these can be used

19. **Assertion** : Oral contraceptive pills have high contraceptive value and are popular with females.

Reason : Contraceptive pills inhibit ovulation and implantation as well as alter quality of cervical mucus to retard sperm entry.

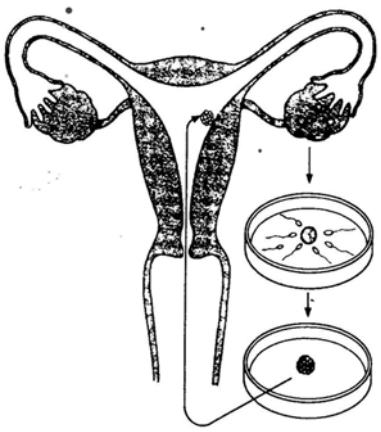
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

20. The following figure is diagrammatic representation of



(1) intracytoplasmic sperm injection & embryo transfer
(2) in vitro fertilization and embryo transfer
(3) in vitro fertilization and ZIFT
(4) in vivo fertilization and embryo transfer

21. **Statement- I** : In embryo transfer, zygote or upto 8 blastomere stage is implanted in uterus.
Statement- II : Uterus has developed thick endometrium during pregnancy.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

22. All is true about IUDs except for
(1) these are ideal contraceptives for the females who want to delay pregnancy or space children
(2) It is one of the most widely accepted methods of contraception in India
(3) It is the terminal method to prevent pregnancy and has very poor reversibility
(4) IUD's work by either increasing phagocytosis of sperms, suppressing sperm motility or by making the uterus unsuitable for implantation

23. Which of the following is the group that include male contraceptive measures
(1) vasectomy, diaphragm, coitus interruptus
(2) condoms, vaults, coitus interruptus
(3) condoms, vasectomy, coitus interruptus
(4) all of these

24. **Assertion** : Amniocentesis is a process to grow endometrial cells and foetal skin cells on culture medium.
Reason : Aminocentesis helps to determine any hereditary disease of the embryo.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

25. **Statement- I** : In vitro fertilization involves fertilization outside the body followed by embryo transfer.
Statement- II : Gametes from the donor are collected and induced to form zygote under simulated conditions in the laboratory.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

26. **Assertion** :Certain contraceptives are planted under the skin of the upper arm to prevent pregnancy.
Reason :These have to be replaced every month to avoid pregnancy.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

27. **Statement- I** : All barrier methods protect the users from STDs.
Statement- II : Barrier methods prevent physical meeting of male and female gametes.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

28. A couple realised that the condom used during coitus got broken. What method would help them prevent getting pregnant ?
(1) Use of spermicidal jellies
(2) Use of an emergency contraceptive pill within 72 hours
(3) Use of an abortion pill after seventh day of coitus
(4) All of these

29. **Statement- I** : In Lactational Amenorrhoea, ovulation & menstruation does not occur.
Statement- II : GnRH release is suppressed preventing the release of FSH & LH.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

30. Choose the incorrect statement
(1) ICSI, IUI, IVF are all included under ART
(2) RTI may lead to problems like PID, ectopic pregnancies, still births if not treated early
(3) AI technique may be used in infertility cases where there is very low sperm count in the ejaculate
(4) Incidence of venereal diseases are quite high among persons in the age group of 10-15 years.

31. **Assertion** : Determination of foetal sex is legally banned.
Reason : Amniocentesis is technique that can determine sex of foetus.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

32. Which of the following is incorrect w.r.t. Amniocentesis?
(1) It is test based on chromosomal pattern in cells obtained from amniotic fluid
(2) Detects all types of defects in foetus like cleft palate
(3) Detects enzymatic and biochemical abnormalities
(4) Legally banned for sex determination in India

33. **Statement- I** : Oral contraceptive pills prevent ovulation and implantation.
Statement- II : Constituents in pills alter the quality of cervical mucus to retard the movement of sperms.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is corrrect

34. Which of the following is an incorrect statement?
(1) Number of MTPs in a year in the world accounts for 20% of total number of pregnancies
(2) MTP is safe upto first trimester
(3) MTPs involve social, emotional, ethical and religious issues
(4) Govt of India legalized MTP in 1871

35. **Statement- I** : IuDs are ideal contraceptives used by females who want to delay pregnancy.
Statement- II :IuDs increase phagocytosis of sperms.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is

36. Find the correct option to fill in the blanks
a. In vitro-fertilization followed by ____ is one of the ART method
b. IVF–ET is popularly known as _____
c. In ZIFT, egg from wife and sperms from husband are induced to form zygote in _____
(1) IUT, test tube body programme, fallopian tube
(2) ET, test tube baby programme, in lab conditions
(3) ZIFT, ART, in fallopian tube
(4) IUI, ART, in lab conditions.

37. The contraceptive 'SAHELI'
(1) blocks estrogen receptors in the uterus, preventing eggs from getting implanted
(2) increases the concentration of estrogen and prevents ovulation in females
(3) is a post-coital contraceptive.
(4) is an IUD

38. Consider the statements given below regarding contraception and answer as directed thereafter
    a. Medical termination is generally safe in first trimester
    b. Generally chances of conception are nil until mother breast feed the infant upto two years
    c. Intrauterine devices like copper-T are effective contraceptive
    d. Contraception pills may be taken upto one week after coitus to prevent conception

    Which two of the above statements are correct
    (1) a,c (2) a, b
    (3) b, c (4) c, d

39. **Assertion** : Removal of gonads is a terminal method of contraception.
    Reason : Gonadectomy will result in stoppage of gamete production on permanent basis and no other contraception will be over required.
    (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
    (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
    (3) Assertion is true statement but Reason is false
    (4) Assertion is false

40. Venereal diseases can spread through
    a. using sterile needles
    b. Transfusion of blood from infected person
    c. Infected mother to foetus
    d. Kissing
    e. Inheritance

    Choose the correct answer from the options given below :
    (1) a, b & c only (2) b, c & d only
    (3) b & c only (4) a & c only

41. One of the legal methods of birth control is:
    (1) abortion by taking an appropriate medicine
    (2) by abstaining from coitus from day 10 to 17 of the menstrual cycle
    (3) by having coitus at the time of day break
    (4) by a premature ejaculation during coitus

42. **Statement- I** : Surgical methods of contracetpion do not prevent gamete formation
    Statement- II : Only duct system is blocked while the gonads are working normally
    (1) Both statement -I and statement- II are correct
    (2) Both statement-I and statement-II are incorrect
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement- II is correct

Answer

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

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MICROBES IN HUMAN WELFARE
(TRUE & FALSE/AR/ STATEMENTS)

1. Ampicillin and Amoxycillin are antibiotics that are
   a. direct product of secondary metabolism
   b. isolated from a prokaryote
   c. broad spectrum
   (1) a, b and c (2) a and c
   (3) a and b (4) only c

2. How many among the following are of bacterial origin ?
   Citiric acid, Griseofulvin, Tetracycline, Statins, Cyclosporin A, Cephalosporin, Erythromycin, Butyric acid, Wine, Streptomycin, Bread,
   (1) Five (2) Seven
   (3) Six (4) Four

3. Biofertilizers are organisms that enrich the nutrient quality of the soil. Match the source of biofertilizer with its examples

	Column-I	Column-II
a.	Symbiotic bactria	i. *Azospirillium*
b.	Free living bacteria	ii. *Rhizobium*
c.	Fungi	iii. *Nostoc*
d.	Cyanobacteria	iv. *Glomus*

   (1) a–ii, b–i, c–iv, d–iii (2) a–i, b–ii, c–iii, d–iv
   (3) a–ii, b–iv, c–iii, d–i (4) a–ii, b–iv, c–i, d–iii

4. Which among the following is incorrect?

	Chemicals enzymes/ Bioactive molecules	Source	Use/Features
(1)	Statins	*Monascus purpureus* (Fungus)	Blood cholesterol lowering agent
(2)	Cyclosporin	*Trichoderma polysporum* (fungus)	Immuno suppressant
(3)	Streptokinase	*Streptococcus* Bacteria	Clot buster modified by genetic engineering
(4)	Lactic acid	*Lactobacillus*	Clears bottled fruit juices

5. What is true for sewage treatment process ?
   (1) Treatment of waste water in sewage treatment plant is done by autotrophic microbes naturally present in the sewage.
   (2) Floating debris is removed by sequential filteration and soil and pebbles are removed by sedimentation.
   (3) BOD of waste water is inversely propotional to polluting potential of the water.
   (4) All of these

6. Which of the following are advantages of fermented foods?
   a. Enhanced nutritive value
   b. increased digestibility
   c. Improved flavour and texture
   d. serve as supplements in preparing several dishes
   (1) a and c only (2) c only
   (3) a, c and d only (4) a, b, c and d

7. Antibiotics are used to treat diseases like
   (1) Plague, Leprosy, measles
   (2) Diptheria, Leprosy, hepatitis
   (3) Diptheria, Swine flu, hepatitis
   (4) Leprosy, Whooping cough, Diptheria

8. Match the column-I and column-II and choose the correct options

	Column-I	**Column-I**
a.	*Aspergillus niger*	i. Ethanol
b.	*Clostridium butylicum*	ii. Statins
c.	*Monascus purpureus*	iii. Citric acid
d.	*Saccharomyces cerevisiae*	iv. Butyric acid

   (1) a–ii, b–iv, c–iii, d–i (2) a–iii, b–ii, c–iv, d–i
   (3) a–iii, b–iv, c–ii, d–i (4) a–iii, b–iv, c–i, d–ii

9. Greater the BOD of waste water
   (1) lesser is it's polluting potential
   (2) more is it's polluting potential
   (3) more is organic matter in it
   (4) more than one option is true

10. Read following statements regarding STP
   a. involves physical removal of particles large in size
   b. primary effluent is constantly agitated mechanically and air is pumped into it
   Statements above are related to
   (1) a–1° treatment, b–cause breakage of flocs
   (2) a–2° treatment, b–causes breakage of flocs
   (3) a–1° treatment, b–causes formation of flocs
   (4) a–2° treatment, b–causes formation of flocs

11. When large amount of sewage is drained into a river, mortality of fishes and other aquatic creatures increases due to
   (1) slight decrease in BOD
   (2) sharp decline in dissolved oxygen
   (3) slight increase in dissolved CO_2
   (4) decrease in aerobic heterotrophic microbes

12. Which of the following statement is incorrect?
(1) *Aspergillus niger* bacteria is good producer of citric acid.
(2) Bottled fruit juices bought from the market are clearer as compared to those made at home due to use of pectinases and proteases.
(3) The technology of biogas production was developed in India mainly due to efforts of IARI and KVIC.
(4) *Saccharomyces cerevsiae* used to prepared bread is cultured on molasses

13. Read the statements carefully & identify them as true (T) or false (F)
a. large amount of CO_2 released by *Propionibacterium* is responsible for large holes present in swiss cheese
b. proteases & lipases both are used to remove stains from the laundary
c. most yeast cannot reproduce at very high level of alcohol
(1) a-T, b-F, c-T (2) a-F, b-T, c-F
(3) a-T, b-T, c-F (4) a-T, b-T, c-T

14. Choose the incorrect pair:

	Product		Source / Character
a.	Curd	(i)	Ripened by a specific fungi
b.	Swiss cheese	(ii)	Fermentation product from palm sap
c.	Toddy	(iii)	*Lactobacillus*
d.	Roquefort cheese	(iv)	*Propionibacterium sharmanii*

(1) a–(ii),b–(i),c–(iii),d–(iv)
(2) a–(i),b–(ii),c–(iv),d–(iii)
(3) a–(iii),b–(iv),c–(ii),d–(i)
(4) a–(vi),b–(iii),c–(ii),d–(i)

15. Which of the following species of fungi are used to form antibiotic; chemical (acid), bioactive molecule to supress immunity and to decrease cholesterol respectively
(1) *Trichoderma, Monascus, Saccharomyces* and *Penicillium*
(2) *Penicillium, Aspergillus, Saccharomyces* and *Monascus*
(3) *Penicillium, Acetobacter, Trichoderma* and *Monascus*
(4) *Penicillium, Aspergillus, Trichoderma* and *Monascus*

16. Find correct statement among the following
(1) BOD is amount of oxygen that would be consumed if all organic matter in one litre of water were oxidised by anaerobic bacteria
(2) The sewage water is treated till BOD is increased
(3) The greater the BOD of waste water, more is its polluting potential
(4) Both (1) & (3)

17. Major part of activated sludge is pumped into
(1) anaerobic sludge digesters
(2) aeration tanks
(3) primary tanks
(4) secondary tanks

18. LAB produces acids which
(1) completely digest the milk proteins
(2) coagulate and partially digest milk proteins
(3) do not act on milk proteins
(4) only coagulate milk proteins

19. Find the incorrect match
(1) Statins – *Monascus purpureus*
(2) Rum – distillation
(3) *Pencillium notatum* – bacteria
(4) *Clostridium* – Butyric acid

20. **Assertion** : The primary effluent is passed into large aeration tanks where it is constantly agitated mechanically and air is pumped into it.
Reason : This allows vigorous growth of useful aerobic microbes into flocs which consume the major part of the inorganic matter in effluent .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

21. **Assertion** : In continous fermentation process cells are maintained at exponential growth phase.
Reason : During continuous fermentation no nutrients or culture are added .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Assertion is true statement but Reason is false
(3) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(4) Assertion is false

22. **Assertion** : During secondary treatment the BOD of effluent significantly decreases in aeration.
Reason : While growing flocs in aeration tank consume the major part of organic matter in the effluent..
(1) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(2) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

23. **Assertion** : The organic farmer works to create a system where the insects are not eradicated but instead kept at manageable level by a complex systems of checks and balances within living and vibrant ecosystem.
Reason : The organic farmer holds the view that eradication of pest completely is desirable without use of insecticicle so that yield is not affected .
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

24. **Statement-I** : LAB produce ethanol that coagulates and partially digest the milk proteins.
Statement-II : LAB plays beneficial role in checking disease causing microbe and increases amount of vitamin B12.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

25. **Statement-I** : *Saccharomyces cerevisiae* is used for bread making and fermenting malted cereals and fruit juices to produce ethanol.
Statement-II : Alexander Fleming while working on *Streptococcus* bacteria observed a mould growing in one of his unwashed culture.
(1) Both statement-I and statement-II are correct
(2) Statement-I is correct but statement-II is incorrect
(3) Both statement-I and statement-II are incorrect
(4) Statement-I is incorrect but statement-II is correct

26. **Statement-I** : *Aspergillus niger* bacteria is good producer of citric acid.
Statement-II : *Clostridium butylicum* and *Lactobacillus* yield butyric acid and lactic acid respectively.
(1) Both statement-I and statement-II are correct
(2) Statement-I is incorrect but statement-II is correct
(3) Both statement-I and statement-II are incorrect
(4) Statement-I is correct but statement-II is incorrect

27. **Statement-I** : *Trichoderma polysporum* produces bioactive molecule cyclosporin A which is used as immunosuppressive agent in organ transplant patients.
Statement-II : *Monascus purpureus* yields streptokinase which is used as blood cholesterol lowering agent.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

28. **Statement-I** : The type of gas produced by the microbe depends upon the type of the microbe and organic substrate utilized by them.
Statement-II : *Methanobacterium* present in rumen of cattle digests cellulose material present in food of the cattle.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

29. How many following statements are true?
a. Toddy, a traditional drink of south India is made by fermenting sap from palms with the help of *lactobacillus*.
b. Roquefort cheese is ripened by growing a specific fungi *Propionibacterium sharmanii* on them.
c. Bottled fruit juices bought from the market are clearer as compared to those made at home due to use of pectinases and proteases.
d. *Saccharomyces* has been modified by genetic engineering and its product is used as a clot buster.
e. The technology of biogas production was developed in India mainly due to efforts of IARI and KVIC
(1) Four (2) Two
(3) Three (4) Five

30. **Statement-I** : Microbes like bacteria, fungi and viruses can be grown on nutritive media to form colonies.
Statement-II : Wine and beer are produced with distillation wherease brandy and rum are produced without distillation.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

31. How many following statements are true?

a. Nucleopolyhedrovirus are excellent candidates as biocontrol agents as they are broad spectrum and have wider insecticidal applications

b. *Anabaena, Nostoc* and *Oscillatoria* can fix organic form of nitrogen into nitrogen to make it available to plants

c. *Trichoderma* species are free living fungi common in root eco-system and effective biocontrol agents of several plant pathogens

d. Biogas plant contain concrete tank, digester, sequential filters and settling tanks

e. *Bacillus thuringensis* is available in sachets as dried spores and mixed with water and sprayed onto vulnerable plants like *Brassicas* and fruit trees

(1) One (2) Four

(3) Two (4) Five

32. **Assertion** :Baculoviruses are used as biological control agents in the genus Nucleopoly hedro virus.

Reason : Baculoviruses are pathogens that do not attack insects and other arthropods .

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

33. **Statement-I** : In biological farming, the approach is to become familiar with various life forms that inhabit the field, predators and pest relationship, life cycles and patterns of feeding of insects.

Statement-II : *Bacillus thuringiensis* has been used to prevent growth of *Trichoderms* in roots of plants.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is incorrect but statement-II is correct

(4) Statement-I is correct but statement-II is incorrect

Answer

1.	(4)	10.	(3)	19.	(3)	28.	(1)
2.	(4)	11.	(2)	20.	(3)	29.	(2)
3.	(1)	12.	(1)	21.	(2)	30.	(2)
4.	(4)	13.	(4)	22.	(2)	31.	(3)
5.	(2)	14.	(3)	23.	(3)	32.	(3)
6.	(4)	15.	(4)	24.	(4)	33.	(4)
7.	(4)	16.	(3)	25.	(2)		
8.	(3)	17.	(1)	26.	(2)		
9.	(4)	18.	(2)	27.	(3)		

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IMMUNE SYSTEM
(TRUE & FALSE/AR/ STATEMENTS)

1. The first vaccine developed by Louis Pasteur was against
   (1) hepatitis virus (2) rabies
   (3) small pox virus (4) tetanus virus

2. **Assertion :** The most important function of neutrophils and macrophages is phagocytosis.
   Reason : Neutrophils and macrophages contain large number of lysosomes filled with hydrolytic enzymes to digest microbes
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

3. Which of the following statement are **True**?
   a. The overall ability of host to fight the disease causing organism is conferred by immune system.
   b. Innate immunity is a specific type of defence present at the time of birth.
   c. Skin is main anatomical or physical barrier preventing the entry of microorganisms.
   d. PMNL, monocytes & macrophages are cytokine barriers.
   e. Mucous coating lining of respiratory & urinogenital tract is an example of physiological barrier.
   (1) a & c (2) b & d
   (3) a, c & e (4) a, b & d

4. **Assertion :** Resistance against diseases reduces with advancing age.
   Reason : Size of thymus reduces with age.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

5. Injection of which of these is likely to provide immediate protection to body
   (1) antivenom, antisera, toxoids
   (2) antivenom, immunoglobulins, antitoxins
   (3) cellular fractions, toxoids, antibodies
   (4) recombinant proteins, immunoglobulins, capsular polysaccharide of bacteria

6. Which among the following is incorrect w.r.t. allergy?
   (1) It is an exaggerated response of body towards foreign substance
   (2) Degranulation of mast cells cause vasodilation of peripheral blood vessels
   (3) Histamine released decreases permeability of blood capillaries
   (4) Anti-histaminic drugs quickly reduce symptoms of allergy

7. **Assertion :** Acidity of stomach and fever are physiological barriers of Innate immunity
   Reason : Acidity of stomach kills most of the ingested pathogens, while during fever the growth of certain pathogens is inhibited in our body
   (1) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (2) Assertion is true statement but Reason is false
   (3) Assertion is false
   (4) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

8. Which of the following statement are **false**?
   a. Acid in stomach and saliva in the mouth are included in first line of defence.
   b. Interferons are proteins which protect noninfected cells from further viral infection.
   c. Innate immunity is characterised by memory.
   d. T-cells themselves donot secrete antibodies but help B-cells to produce them.
   e. T-lymphocytes produce an army of proteins in response to pathogen to fight with them.
   (1) a & d (2) c & e
   (3) a, c & e (4) a, b & d

9. **Assertion :** Viral infection of human cells are inhibited by human interferons.
Reason : Interferons are not virus specific but host specific.
(1) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(2) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

10. Choose the correct option

	Barrier type	Examples	Exception
(1)	Physiological barriers	Saliva, tears, HCl in stomach	Tears
(2)	Cellular barriers	Neutrophils monocytes, NK cells	NK cells
(3)	Physical barriers	Skin,mucous coating in GIT, interferons	Interferons
(4)	Cytokine barriers	Interferons, complement system, antibodies	Interferons

11. **Statement-I** : Humoral immune response is called so as it is shown by different defence proteins present in blood.
Statement-II : The response due to antibodies is called cell mediated response.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

12. How many of the following statement are **incorrect**?
a. Antibody mediated immune response is responsible for graft rejection.
b. Each antibody is made up 2 longer light chains and 2 short heavy polypeptides.
c. The body is able to differentiate 'self' and 'nonself' and AMIS is responsible for graft rejection.
d. Active immunity is slow and takes time to give its full effective response.
e. Interferons inhibit viral replication inside host cells.
(1) 2 (2) 5
(3) 3 (4) 4

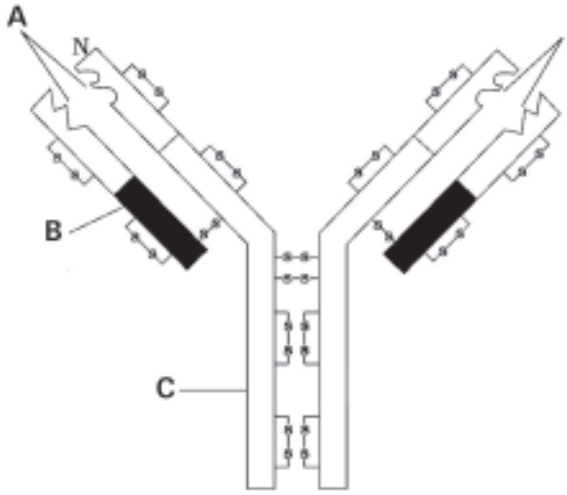
13. **Assertion :** We rarely suffer twice from diseases such as measles, mumps, whooping cough etc.
Reason : The first contact with an infectious organism imparts some memory, so that the body is effectively prepared to fight any later invasion by that organism.
(1) Assertion is true statement but Reason is false
(2) Assertion is false
(3) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(4) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

14. Match the component of the immune system given in column I with the phenomenon listed in column II

	Column I		**Column II**
a.	Histamines	i.	Allergy
b.	Complement protein	ii.	Processing of antigen
c.	IgE	iii.	Inflammatory response
d.	T cytotoxic cells	iv.	Pore formation
e.	Antigen presenting cells	v.	Graft rejection

(1) a - iii, b - iv, c - i, d - v, e - ii
(2) a - ii, b - iii, c - iv, d - v, e - i
(3) a - i, b - iii, c - iv, d - v, e - ii
(4) a - iii, b - ii, c - i, d - iv, e - v

15. From the given structure of antibody, identify A, B & C respectively



(1) Antigen binding site, heavy chain, light chain
(2) Antigen binding site, light chain, heavy chain
(3) Heavy chain, light chain, antigen binding site
(4) Light chain, heavy chain, antigen binding site

16. **Statement-I** : Vaccination is based on property of 'memory' of immune system.

Statement-II : If a person is infected with some deadly microbes, then giving Ag in vaccination for the same can save his life..

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

17. A novel virus emerges as a pandemic, making it difficult to control the infection. Probable cause(s) could be

a. Lack of vaccination

b. Improperly understood mode of transmission

c. Time taken for origin of antigen specific lymphocytes

d. Improperly understood line of treatment

(1) a, b, c & d (2) a, b & d

(3) a, c & d (4) b, c & d

18. **Statement-I** : Encountering of organism for the first time by the body is called anamestic response.

Statement-II : Anamnestic or secondary response due to subsequent encounter with pathogen is highly intensified.

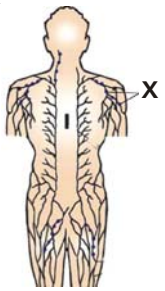
(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

19. What is true about the part marked 'X' in the given diagram?



(1) It provides site for the development and maturation of T-lymphocytes

(2) It traps the antigens present in tissue which activates lymphocytes and cause the immune response

(3) It serves as the site where immature lymphocytes differentiate into antigen sensitive lymphocytes

(4) These act as a filter of the blood by trapping blood borne micro-organisms

20. **Statement-I** : Antigens trapped in lymph nodes are responsible for the activation of lymphocytes present there & cause immune response.

Statement-II : The micro environment for the development and maturation of T-lymphocytes is provided by thymus only.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and statement-II are incorrect

(3) Statement-I is correct but statement-II is incorrect

(4) Statement-I is incorrect but statement-II is correct

21. What is common to PMNL-neutrophils, macrophages in tissues and monocytes in blood?

(1) Component of specific immunity

(2) Can differentiate between pathogens

(3) Can phagocytose and destroy microbes

(4) Cause lysis of microbes

22. How many of the following statement are **correct**?

a. Rheumatoid arthiritis is an example of auto immune disease.

b. Spleen, lymph nodes and peyer's patches are secondary lymphoid organs.

c. Spleen is the main lymphoid organ where all blood cells including lymphocytes are produced.

d. Thymus is a lobed organ located near heart, beneath the breast bone.

e. Mucosal associated lymphoid tissue constitutes about 80% of the lymphoid tissue in human body.

(1) 2 (2) 4

(3) 3 (4) 5

23. **Assertion :** Contact of a stem cell with an antigen causes formation of specific B– and T–lymphocytes.

Reason : Antigen binds to the membrane of a stem cell due to which antigen-specific receptors are formed.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false.

24. Which of the following correctly describes mucosa associated lymphoid tissue?
(1) It is a minor component of immune system represented by peyer's patches only
(2) It comprise lymphocytes, phagocytes, plasma cells etc.
(3) It is aggregation of lymphoid tissue in bone marrow
(4) It is site where immature lymphocytes differentiate into antigen sensitive lymphocytes.

25. **Statement-I** : The foetus receiving antibodies from the mother through placenta during pregnancy is example of passive immunity.
Statement-II : When ready made antibodies are directly given to patient, it is called passive immunity.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

26. Match the following structures with the function each performs
a. A foreign macromolecule that may endanger the body
b. Long-lived cells that help the body respond quickly to previously encountered antigens
c. Macromolecules that agglutinate foreign molecules in the blood stream

i.	lymph node	ii.	B-lymphocyte
iii.	thymus gland	iv.	antibody
v.	antigen	vi.	memory cells

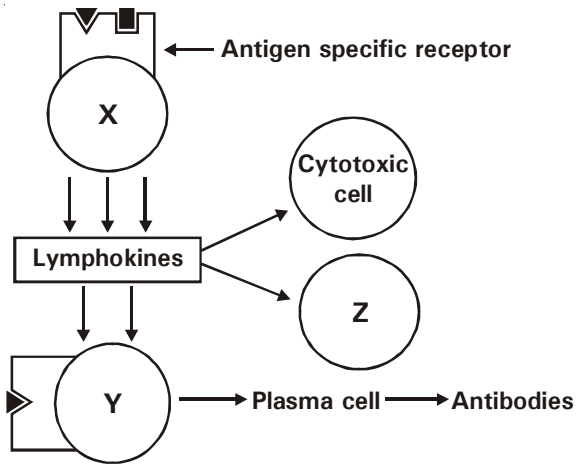
Which of the following set is correct?
(1) a–v, b–vi, c–iv (2) a–iv, b–i, c–ii
(3) a–iii, b–v, c–ii (4) a–v, b–iv, c–vi

27. **Statement-I** : For the determination of cause of allergy, the patient is exposed to very large possible doses of allergens and the reactions are studied.
Statement-II : Drugs like steroids, adrenalin & antihistamine quickly reduce the symptoms of allergy.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

28. It is noted that the body acquires life long immunity against a certain viral disease 'X' when it is infected with the virus responsible for another viral disease 'Y'. Most likely explanation for this is
(1) Virus Y functions as antibody for virus X
(2) Virus X and Y share some antigenic determinants
(3) Passive immunisation done against Y helps against X also
(4) NK cells get activated to destroy the virus infected cells after first exposure to the virus in the body.

29. **Assertion :** Human colostrum provides natural active immunity to foetus.
Reason : Colostrum contain mainly Ig M and can provide protection against intestinal infection.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

30. Identify X, Y & Z in the following diagram.



	X	Y	Z
(1)	B-cells,	T-helper cells,	T-suppressor cells
(2)	T-helper-cells	B-cells,	T-suppressor
(3)	APC,	T-helper cells,	B-cells
(4)	T-helper cell,	APC,	B-cells

IMMUNE SYSTEM
(TRUE & FALSE/AR/ STATEMENTS)

ANSWERS

1.	(2)	6.	(3)	11.	(3)	16.	(3)	21.	(3)	26.	(1)
2.	(1)	7.	(4)	12.	(4)	17.	(2)	22.	(3)	27.	(4)
3.	(1)	8.	(2)	13.	(3)	18.	(4)	23.	(4)	28.	(2)
4.	(1)	9.	(2)	14.	(1)	19.	(2)	24.	(2)	29.	(4)
5.	(2)	10.	(3)	15.	(2)	20.	(3)	25.	(1)	30.	(2)

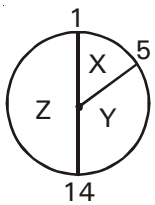
HUMAN REPRODUCTION

(TRUE & FALSE/AR/ STATEMENTS)

1. Arrange the following events in correct sequence
   a. Formation of blastocyst
   b. Fertilization and formation of zygote
   c. Formation of 2–, 4–, 8– celled stage
   d. Attachment of trophoblast cells with endometrium
   e. Morula decends into uterus
   f. Uterine cells divide rapidly and covers blastocyst
   (1) b → c → e → a → d → f
   (2) b → c → a → e → d → f
   (3) b → e → c → a → f → d
   (4) b → c → e → d → f → a

2. **Assertion :** The estrogen stimulated proliferated endometrium is maintained by progesterone.
   Reason : Progesterone prepares the endometrium for implantation of Morula.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

3. In the given representation of 28 days menstrual cycle (with phases X,Y and Z), the events given as A,B and C match with which given phases of menstrual cycle ?



   A. cervical mucus becomes thin
   B. uterine glands become more secretory
   C. level of gonadotropins increase gradually
   (1) A–X, B–Y, C–Z (2) A–Y, B–Z, C–Y
   (3) A–Y, B–Z, C–X (4) A–Y, B–X, C–Z

4. Choose the correct difference between sperm & ova in humans ?

	Character	Sperm	Ova
(1)	Shape	Oval	Knobbed thread
(2)	Motility	Flagellar movement	Non motile
(3)	Size	Large	Small
(4)	Ploidy	Diploid	Haploid

5. How many of the following structures have 2n, 2c condition in female body ?
   Primary oocyte, Secondary oocyte, Ovum, Secondary spermatocyte, Follicular cell, Somatic cell, 1st polar body, Spermatogonium
   (1) Five (2) Six
   (3) Two (4) Three

6. **Statement A** : Spermatogenesis starts at the age of puberty due to significant increase in the level of GnRH from anterior lobe of pituitary
   Statement B: LH acts on leydig cells & stimulates synthesis & secretion of androgens
   (1) Both statements A & B are correct
   (2) Both statements A & B are incorrect
   (3) Only statement A is correct
   (4) Only statement B is correct

7. Choose true or false statements amongst the following
   a. During labour there is a positive feed back between cervical stretching and oxytocin release from pituitary gland
   b. Cleavage occurs till the end of gastrulation
   c. At the time of implantation blastocoel of blastocyst is towards uterine lumen
   d. Parturition is induced by a complex neuro-endocrine mechanism involving cortisol, progesterone and oxytocin
   (1) a-F, b-F, c-T, d-T (2) a-T, b-F, c-T, d-F
   (3) a-T, b-F, c-F, d-T (4) a-F, b-F, c-F, d-F

8. How many of the following steroidal hormones help in parturition?
   Estrogen, relaxin, cortisol, oxytocin, prolactin, ACTH
   (1) 4 (2) 3
   (3) 2 (4) 5

9. How many of the given hormones are produced only in a pregnant female in first trimester?
Cortisol, Relaxin, Progesterone, Estrogen, Thyroxine, Thymosin, Parathormone, Calcitonin, Aldosterone, ADH, hCG
(1) Five (2) Ten
(3) Eight (4) One

10. The placenta is known to produce a number of hormones with typical function. Mark the statement which is correct for the hormones secreted during pregnancy?
a. hPL is produced only during pregnancy
b. hCG, and relaxin are produced in women only during pregnancy
c. Estrogen, progesterone, cortisol, prolactin are increased several folds in maternal blood
d. Relaxin causes relaxation of the ligaments of the pubic symphysis
(1) a & b are correct (2) c & d are correct
(3) a & c are correct (4) all of these

11. What is the number of incorrect statement?
a. Inner cell mass contains certain stem cells which have the potency to give rise to all tissues and organs
b. Uterine contractions trigger oxytocin release
c. Placenta is expelled just before the delivery of child
d. Estrogens and progestogens are steroid hormones.
e. Parturition is induced by a neuroendocrine mechanism.
f. Gestation period in humans is divided into four trimesters.
(1) one (2) two
(3) three (4) four

12. **Assertion** : First three months of gestation is the period of major differentiation and specialization.
Reason : Basic structure of body is generally formed in the first trimester and developing foetus acquires rudiments of all systems.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

13. **Assertion** : A pregnant female exposed to an X-ray chest at 6 weeks of pregnancy has increased risk of malformation of fetus.
Reason : By the end of twelve weeks most major organ systems, limbs and external genitalia are formed.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

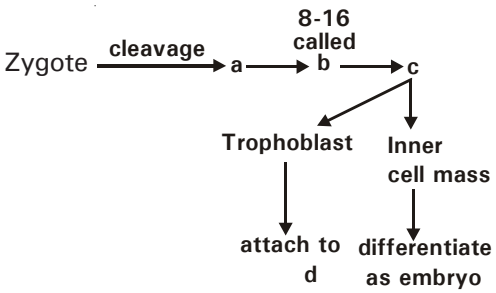
14. Choose the correct pair

	Category	Examples	Exception
(1)	Hormones released only during pregnancy	hPL, relaxin, hCG, estrogen	Relaxin
(2)	Stage formed after cleavage in zygote	Morula, inner cell mass, blastocyst, polar body	Inner cell mass
(3)	Hormones that support foetal growth	Cortisol, progestogens, prolactin, thyroxine	Thyroxine
(4)	Structures that develop in foetus by the end of first trimester	External genital organs, heart, limbs, eyelashes	Eye lashes

15. A correct difference between cleavage (A) and mitosis (B) is

(A)		(B)
(1) Size of daughter cells remains same	–	Size of blastomeres decreases
(2) DNA synthesis slower	–	DNA synthesis faster
(3) Short interphase	–	Interphase is of long duration
(4) Nucleo-cytoplasmic ratio remains same	–	Nucleo-cytoplasmic ratio increases

16. Complete the following



(1) Blastocyst, Blastomeres, Gastrula, Perimetrium
(2) Blastocyst, Morula, Gastrula, Endometrium
(3) Blastomeres, Morula, Blastocyst, Endometrium
(4) Blastomeres, Morula, Blastocyst, Perimetrium

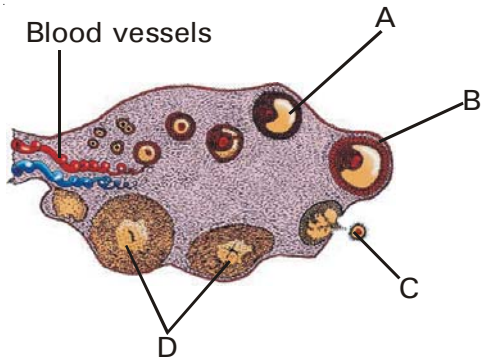
17. **Assertion** : Embedding of the blastocyst into the endometrium of the uterus is called implantation
Reason : Implantation may occur at any period between 6th –10th day after fertilisation
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

18. **Assertion** : Foetus is more sensitive to teratogens in first trimester of pregnancy.
Reason : Organ development in foetus occur during the first trimester.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

19. Fill in the blanks
A. By the end of ___(a)___ the body is covered with fine hair, eye lids separate and eyelashes are formed
B. The structural and functional unit between developing foetus and maternal body is ___(b)___ .
C. Immediately after implantation the ___(c)___ differentiates into an outer layer called ectoderm and an inner layer called endoderm.
D. By the end of ___(d)___ most of the major organs are formed
(1) a–5th month, b-umbilical cord, c-blastocyst, d-2nd trimester
(2) a–2nd trimester, b-placenta, c-inner cell mass, d-first trimester
(3) a–2nd trimester, b-umbilical cord, c-gastrula, d-5th month
(4) a–5th month, b-placenta, c-blastocyst, d-pregnancy

20. **Statement- I** : Foetal ejection reflex starts with mild contractions in the uterus.
Statement- II : The mild contractions lead to increased release of oxytocin from placenta which increases uterine contractions.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

21. **Statement- I** : It is disadvantageous to allow the foetal and maternal blood to mix.
Statement- II : Maternal and foetal blood may be incompatible.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

22. 

Which of the following is a correct match w.r.t. A, B, C and D in the above diagram?
(1) A–Tertiary follicle having 2° oocyte stage arrested at diplotene of prophase-I
(2) B–Graafian follicle having 2° oocyte which is arrested at metaphase-II
(3) C–Ovum with outer most covering corona radiata, the cells of which are glued by hyaluronidase
(4) D–Corpus luteum a temporary endocrine gland formed only during pregnancy

23. How many of the following statements are correct ?
a. Female sex accessory ducts are oviducts, uterus & vagina
b. Glandular layer that lines the uterine cavity is endometrium
c. Uterine fundus is upper dome like part of uterus
d. Steroidal ovarian hormones work through membrane bound receptors
e. Female primary sex organs are sites of gametogenesis and also assist in transport of gametes
(1) Two (2) Three
(3) Five (4) Four

24. Match the column & choose the correct option

a.	Infundibulum	(i)	Inverted pear shaped
b.	Ampulla of oviduct	(ii)	Finger like processes
c.	Fimbriae	(iii)	Site of fertilization
d.	Uterus	(iv)	Funnel shaped

(1) a–ii; b–iii; c–iv; d–i
(2) a–iii; b–ii; c–i; d–iv
(3) a–iv; b–iii; c–ii; d–i
(4) a–iii; b–iv; c–ii; d–i

25. How many of the following are components of seminal plasma ?

a. Calcium b. Sperms
c. Pentose sugar d. Enzymes
e. Mucus

(1) Four (2) Three
(3) Two (4) Five

26. **Statement- I** : The process of deposition of semen in the female reproductive tract is called insemination

Statement- II : Special tissue of penis helps in erection of penis to facilitate insemination

(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

27. What is common to ovaries & testes ?

a. Produce steroid hormones
b. Have cells that undergo meiosis
c. Are extra-abdominal
d. Tunica albuginea covers each

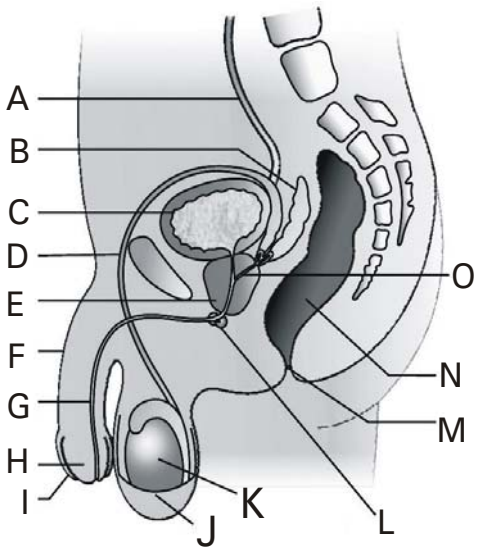
(1) a, b, c & d (2) b, c & d
(3) a, c & d (4) a, b, d

28. On disecting a human body, which of the following observation will be true for a female body ?

a. Ovary is ventral to rectum
b. Ovary is ventral to urinary bladder
c. Infundibulum is close to ovary
d. Seminal vesicle is dorsal to urinary bladder

(1) b, c & d (2) a, b & d
(3) a & c (4) a, c & d

29. For the following diagram, what is correct ?



(1) B & L are paired accesory glands
(2) Sperms are transported by A
(3) D carries fructose and calcium
(4) I is enlarged part of penis

30. If uterus is for pregnancy then oviduct is for 'X'

Identify 'X' and mark the site of oviduct where it occurs

(1) Infundibulum (2) Isthmus
(3) Ampulla (4) Fimbriae

31. Out of the given structures present in scrotum which are found inner to tunica albuginea in human testis

a. immunologically competent cells
b. male germ cells
c. tunica vaginalis
d. rete testis
e. epididymis

(1) a, b & c (2) a, b, c & d
(3) a, b & d (4) b, c, d & e

32. Which of the following peptide/proteins are produced by the testes ?

a. Testosterone
b. Inhibin
c. Estrogen
d. Androgen binding protein
e. Androgens

(1) a, b and d (2) a, b, d and e
(3) b and d (4) a, c and e

33. How many of the following are hormones released from gonads located abdominally?

Testosterone, Estrogen, Progesterone, ABP, FSH, LH

(1) 4 (2) 3
(3) 5 (4) 2

34. What is true about blastocyst?
a. consists of trophoectoderm
b. has inner cell mass
c. never without zona pellucida
d. size is same as morula always
e. has blastocoel
(1) a and b only (2) a, b and e
(3) c, b and e only (4) a,b, c and e

35. What is the effect of menopause on the levels of FSH, LH, estrogen and GnRH?
(1) FSH ↓, LH↓, estrogen↓, Gn RH↑
(2) FSH ↑, LH↑, estrogen↓, Gn RH↓
(3) FSH ↑, LH↑, estrogen↓, Gn RH↑
(4) FSH ↓, LH↓, estrogen↑, Gn RH↑

36. How many of the following are diploid structures? Granulosa cells, secondary spermatocyte, oogonia, polar body, sertoli cells, germ cells
(1) 3 (2) 2
(3) 4 (4) All of these

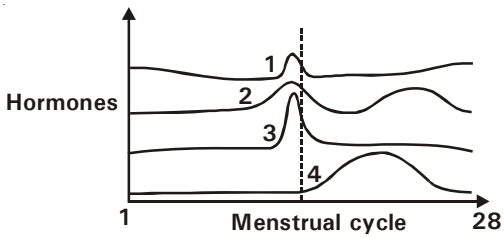
37. How many of the following statements are correct?
a. Basal body temperature can be raised by progesterone
b. After menopause gonadotrophins increase oestrogens decrease
c. Prgesterone is produced by stroma of ovary
d. Progesterone acts on uterus
e. Testosterone promotes anabolism and erythropoiesis
(1) two (2) three
(4) one (4) four

38. During the formation of zygote different components are contributed by sperm and ovum. Which of the following statements about their contribution are true?
a. Sperm contributes half the cytoplasm
b. Both sperm and egg contribute haploid nucleus
c. Most of the cytoplasm is contributed by ovum
d. Both sperm and egg contribute centrioles
(1) a, b, c & d (2) b & c
(3) a, c & d (4) a & b

39. What would be the number of gametes produced respectively from 20 primary oocytes, 10 secondary spermatocytes, 5 spermatids and 5 secondary oocytes?
(1) 40, 20, 5 & 10 (2) 20, 10, 5 & 5
(3) 20, 20, 5 & 5 (4) 40, 20, 10 & 5

40. **Assertion** :All hormones regulating development of mammary glands and milk production are produced only in females.
Reason : Pregnancy & lactation occur only in females.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

41. **Assertion** : Fall in pH of semen to less than 7 will affect fertilising capacity of sperm in the semen.
Reason : Acidic environment increases motility of the sperms.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

42.


In the diagram shown above, 1, 2, 3 and 4 are respectively.
(1) Estrogen, LH, FSH, Estrogen
(2) Progesterone, Estrogen, FSH, LH
(3) FSH, Estrogen, LH, Progesterone
(4) LH, FSH, Progesterone, Estrogen

43. **Assertion** : Steroid hormones regulating menstrual cycle give feedback for secretion of peptide/protein homones involved in menstrual cycle.
Reason : Steroid hormones being fat insoluble cannot cross the cel membrane.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

44. **Assertion** : During pregnancy analysis of ovaries reveals primary follicles but not secondary or tertiary follicles.
Reason : High levels of progesterone during pregnancy supress follicular growth.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

45. Which of the following is incorrectly matched to its function?
(1) Epididymis – Maturation and storage of sperm
(2) Penis – Insemination
(3) seminal vesicles – produce a monosaccharide sugar to nourish sperms
(4) Interstitial cells – produce LH and testosterone

46. Which statements of the following are correct?
(1) Hymen is a membrane which fully covers the vaginal opening
(2) Individual organisms may die without fail, but species continue to live through millions of years unless threatened by natural or anthropogenic extinction
(3) Epididymis leads to vas deferens, which descends into abdomen
(4) Vas deferens is highly coiled, tube which receives duct from seminal vesicle

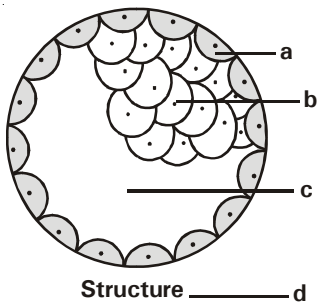
47. Identify statements as True (T) and False (F).
a. Androgens are produced by sertoli cells
b. Leydig cells synthesise androgens
c. Androgens stimulate process of spermatogenesis
d. Leydig cells produce protein hormones
(1) a, d–F; b, c–T (2) a, c–F; b, d–T
(3) b, c–F; a, d–T (4) b, d–F; a, c–T

48. **Assertion** : Erection of the penis is due to entry of blood in its erectile tissue
Reason : Flow of blood into the vascular spaces of the erectile tissue provides stiffness to penis.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

49. If the following phases are sequentially arranged during the embryonic development, third would be
Implantation, parturition, gametogenesis, gestation, insemination, fertilization
(1) Insemination (2) Gestation
(3) Fertilisation (4) Implantation

51. Which of the following is true w.r.t. stage of oocyte present in ovary of a newly born female child?
(1) Secondary oocyte with one polar body
(2) Secondary oocyte with no polar body
(3) Primary oocyte with one polar body
(4) Primary oocyte with no polar body

50. Identify the parts of the structure a, b & c and the structure 'd' respectively



(1) Inner cell mass, Blastocoel, Trophoblast, Blastocyst
(2) Trophoblast, Inner cell mass, Blastocoel, Blastocyst
(3) Blastocyst, Inner cell mass, Blastocoel, Trophoblast
(4) Blastocoel, Blastocyst, Trophoblast, Inner cell mass

52. How many of the following help in gamete transfer within females?
Female urethra, Uterus, Vagina, Seminiferous tubules, Leydig cells, Vas deferens, Oviduct
(1) 3 (2) 2
(3) 4 (4) 5

53. Find the correct match
(1) FSH – Preparation endometrium for implantation
(2) Progesterone – Development of female secondary sexual characters
(3) Estrogen – Development of corpus luteum
(4) hCG – Retains corpus luteum for maintenance of pregnancy

54. Which among the following is/are correct w.r.t. morula?
a. solid ball like structure
b. looks like mulberry
c. has intact zona pellucida
d. enters the uterus
(1) a, b, c (2) b, c, d
(3) a, b, d (4) a, b, c, d

55. Match coloumn-I and column-II and choose the right option

Column-I	Column-II
a. Heart sound	i. End of second trimester
b. First foetal movements	ii. 6th week of pregnancy
c. Separation of eyelids	iii. At the end of 12 weeks
d. Formation of limbs and external genitalia	iv. Fifth month

(1) a-ii, b-iv, c-i, d-iii (2) a-ii, b-i, c-iii, d-iv
(3) a-ii, b-iii, c-i, d-iv (4) a-iii, b-iv, c-ii, d-i

56. Match column-I and Column-II and select the correct option

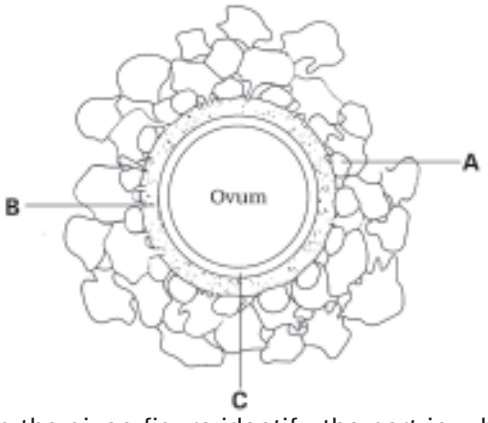
	Column-I		Column-II
a.	Hyaluronidase	i.	Acrosomal reaction
b.	Corpus luteum	ii.	Morphogenetic movements
c.	Gastrulation	iii.	Progesterone
d.	Capacitation	iv.	Mammary gland
e.	Colostrum	v.	Sperm activation

(1) a-v, b-iii, c-ii, d-i, e-iv
(2) a-i, b-iii, c-ii, d-v, e-iv
(3) a-i, b-v, c-iii, d-iv, e-iv
(4) a-i, b-ii, c-iii, d-iv, e-v

57. How many of the following statement are false?
a. Spermatogenesis begins at puberty due to increase in the secretion of GnRH.
b. Enzymes present in the acrosome provide energy which facilitate sperm motility.
c. Levels of FSH increase while that of LH decrease during the follicular phase of menstrual cycle.
d. Sperm entry induces completion of the meiotic division in the secondary oocyte.
e. Hormones like hCG and relaxin are produced by ovary and placenta both
(1) one (2) two
(3) three (4) four

58. Which of these is correctly characterised with one single exception in it?

	Category	Examples	Exception
(1)	Male reproductive system disorder	Impotence, dysmenorrhoea, prostatomegaly	Dysmeno-rrhoea
(2)	Composition of ovary	Granulosa cells, graafian follicle, leydig cells	Granulosa cells
(3)	Haploid cells	Secondary oocyte, spermatids, polar body	Polar body
(4)	Composition of colostrum	Casein, vitamin-C, lactose	Lactose

59. 

From the given figure identify the part in which cells are joined by hyaluronic acid
(1) A & B (2) B
(3) B & C (4) A

60. **Assertion** : Ovarian cycles stop during pregnancy.
Reason : High levels of progesterone keep follicular growth suspended and no ova are produced.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

61. **Statement- I** : Functions of gonads are controlled by hormone from pituitary gland while the functions of reproductive ducts are controlled by sex hormones.
Statement- II : Gonadotropins are released by hypothalamus which directly control the growth of reproductive organ.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

62. **Assertion** : Oogenesis is a discontinuous process.
Reason : 1st meiotic division in primary oocyte is completed after ovulation.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

63. **Assertion** : Zona pellucida and corona radiata are lost at the time of fertilisation.
Reason : Zona pellucida and corona radiata are lost after entry of sperm and before beginning of cleavage in zygote.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

64. **Statement- I** : Oxytocin is introduced by doctors to induce labour.
Statement- II : Oxytocin cause powerful uterine contractions
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

65. **Statement- I** : Removal of gonads cannot be considered as a contraceptive option.
Statement- II : Removal of gonads can lead to sterlity in both males and females.
(1) Both statement -I and statement- II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement- II is correct

Answer

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

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HUMAN HEALTH & DISEASE
(TRUE & FALSE/AR/STATEMENTS)

1. **Assertion :** Cancer patients are given substances called biological response modifiers such as interferon which activate immune system
   Reason : Tumour cells have shown to avoid detection and destruction by immune system
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
2. Which of the following statements are incorrect?
   a. Practice of yoga has recently started to achieve physical and mental health.
   b. Diseases which are easily transmitted from one person to another, are called infectious diseases.
   c Every one of us is not susceptable to the infectious diseases at sometime or other.
   d. Among non infectious diseases AIDS is major cause of death.
   e. The pathogens can not enter in our body by direct means, multiply and interfere with normal vital activities.
   (1) a, b & d (2) a, c & e
   (3) a & b (4) a, c, d & e
3. How many of the following statements are correct?
   a. Cancerous cells show the property of contact inhibition.
   b. Malignant tumors are masses of proliferating cells called tumor cells.
   c. Cellular oncogenes & proto-oncogenes are present only in cancerous cells.
   d. Metastasis is the most feared property of benign tumors.
   (1) One (2) Two
   (3) Three (4) Four
4. **Statement-I** : According to biology mind influences, through neural system and endocrine system, our immune system and that our immune system maintains our health.
   Statement-II : Mind and mental state have no direct effect on our health.
   (1) Both statement-I and statement-II are correct
   (2) Both statement-I and statement-II are incorrect
   (3) Statement-I is correct but statement-II is incorrect
   (4) Statement-I is incorrect but statement-II is correct
5. Which of the following set represents the viral diseases?
   (1) Influenza, Tuberculosis, Common cold, Mumps
   (2) Mumps, Dengue, Chickungunya, Measles
   (3) Measles, Pheumonia, Diphtheria, Rabies
   (4) Rabies, Polio, Flu, Enteric fever
6. **Assertion :** Monoclonal antibodies have diagnostic as well as therapeutic uses in cancer patients
   Reason : Monoclonal antibodies bound to radioisotopes can detect cancer specific antigens and also form a part of radioimmunotherapy
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false
7. Find incorrect match

	Mode of transmission	Diseases
(1)	Air borne	Common cold, pneumonia
(2)	Contaminated food & H_2O	Typhoid, Ascariasis
(3)	Vector borne protozoan diseases	Malaria, Dengue
(4)	Fomite borne	Influenza, common cold

8. **Assertion :** In severe cases of pneumonia, lips and nails of patient turn blue to grey.
Reason : Accumulation of mucous and fluids in alveoli lead to insufficient oxygenation of blood.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

9. Which of following is not correctly matched?
(1) *Aedes aegypti* – Dengue fever
(2) *Anopheles* – Chikungunya
(3) *Glossina palpalis* – Sleeping sickness
(4) *Culex sp.* – Filariasis

10. **Statement-I** : Cocaine is a psychotropic drug.
Statement-II : Psychotropic drug acts on CNS where it alters brain function, resulting in temporary changes in perception, mood, consciousness and behaviour.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

11. How many of the following statements are True?
a. *Salmonella typhi* is a pathogenic bacterium which causes typhoid fever in human beings.
b. Dengue fever could be confirmed by Widal test.
c. Mary Mallon was a cook by profession and was a typhoid carrier.
d. Intestinal perforation and death may occur in severe cases by the infection of *Salmonella typhi*.
e. Pneumonia in humans infects the alveoli (air filled sacs) of the lungs.
(1) Five (2) Two
(3) Three (4) Four

12. **Assertion :** Use of certain diuretics is banned in sports persons
Reason : Diuretics can help with weight loss and can prevent detection of prohibited drugs in urine
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

13. A correct pair of disease, causative pathogen and mode of infection is

	Disease	Pathogen	Mode of infection
(1)	Infantile paralysis	Entero virus	Contaminated food and water
(2)	Break bone fever	Myxovirus	Arthropod vector
(3)	Hepatitis B	Arbovirus	Droplet infection
(4)	Chickungunya	Rhinovirus	Blood transfusion

14. **Statement-I** : Computed tomography uses X-rays to generate a 3-D image of internals of an object.
Statement-II : Only some specific cancers are treated by combination of surgery, radiotherapy and chemotherapy.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

15. Which of these is not a probable consequence of infection by *Haemophilus influenzae*?
(1) Fever, chills, cough and headache
(2) Bluish lips and finger nails
(3) Reduced oxygenation of blood
(4) Abdominal cramps and constipation

16. **Assertion :** An injection of morphine can be given to a patient, who has recently undergone surgery and is crying with pain.
Reason : Morphine is a very effective sedative and can be used as analgesics.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

17. Read the following four statements (a-d)
    a. Edward Jenner disaproved the 'good humor' hypothesis of health.
    b. Deficiencies with which a child is born are included in genetic disorder.
    c. Health is affected by life style including food and water we take, rest, exercise etc.
    d. Mind and mental state can affect our health.

    How many of the above statements are right?
    (1) One (2) Two
    (3) Three (4) Four

18. **Assertion :** Female mosquito takes up gametes of malarial parasite with blood meal from human.
    Reason : Fertilization takes place in the mosquito's stomach whereas further development takes place in mosquito's salivary gland.
    (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
    (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
    (3) Assertion is true statement but Reason is false
    (4) Assertion is false

19. How many of the following are correct w.r.t. fungal disease?
    i. Many fungi belonging to the genera *Microsporum*, *Trichophyton* and *Epidermophyton* are responsible for ringworms which is one of the rare infectious diseases in man.
    ii. Appearance of dry, scaly lesions on various parts of the body such as skin, nails and scalp are the main symptoms of the fungal diseases.
    iii. Lesions in ringworms are accompanied by intense itching.
    iv. Hot and dry conditions help these fungi to grow, which makes them thrive in skin folds.
    v. It is generally air borne droplet borne fornite borne
    (1) Five (2) Two
    (3) Three (4) Four

20. Introduction of *Gambusia* in a pond would help in preventing how many of the following helminth diseases?
    Filariasis, Dengue, Poliomyelitis, Diphtheria, Malaria, Pneumonia, Chickungunya, Typhoid
    (1) 3 (2) 4
    (3) 2 (4) 1

21. What are (i–iv) respectively in the given table.

Parasite	Location in host	Phylum
Entamoeba	**(i)**	**(ii)**
Wuchereria	**(Iii)**	**(iv)**

    (1) Small intestine, protozoa, lymph vessel, Aschelminthes
    (2) Large intestine, Aschelminthes, small intestine, Platyhelminthes
    (3) Large intestine, Protozoa, lymph vessels, Aschelminthes
    (4) Small intestine, Platyhelminthes, liver, protozoa

22. **Statement-I** : Different species of *Plasmodium* (*P. vivax*, *P. malaria* and *P. falciparum*) are responsible for different types of malaria.
    Statement-II : *Plasmodium* enters the human body as sporozoites (non-infectious form) through the bite of infected male *Anopheles* mosquito.
    (1) Both statement-I and statement-II are correct
    (2) Both statement-I and statement-II are incorrect
    (3) Statement-I is correct but statement-II is incorrect
    (4) Statement-I is incorrect but statement-II is correct

23. Which one fo the following organisms is scientifically correctly named and correctly described?
    (1) *Plasmodium falciparum* – A protist pathogen causing benign tertian malaria
    (2) Rabies virus– virus causing incurable, nonfatal disease.
    (3) *Salmonella* – Bacteria causing enteric fever.
    (4) All are correctly described.

24. **Assertion :** Dysentery, cholera and typhoid are more common in overcrowded human settlements.
    Reason : Over-crowded areas do not have proper sanitation.
    (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
    (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
    (3) Assertion is true statement but Reason is false
    (4) Assertion is false

25. Choose the incorrect pair of a disease and its common name

	Disease		Common name
(1)	Leprosy	–	Kusht rog
(2)	Tetanus	–	Dhanustamba
(3)	Typhoid	–	Enteric fever
(4)	Pertussis	–	Gal ghotu

26. **Assertion :** Mast cells in the human body release inflammatory chemicals which cause allergic reactions.
Reason : Histamine is involved in allergic and inflammatory reactions.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

27. Which of the following statements is/are True?
(1) Infection of *Taenia* worm is generally acquired from soil or by using towels, clothes or even the comb of infected individuals.
(2) Maintenance of personal and public hygiene is very important for prevention and control of all infectious diseases.
(3) Measures for public hygiene include keeping the body clean; consumption of clean drinking water, food, vegetables, fruits, etc.
(4) Proper disposal of waste and excreta; periodic cleaning and disinfection of water reservoirs, pools, cesspools and tanks and observing standard practices of hygiene in public catering are some of the public hygiene measures.

28. **Assertion :** Sudden withdrawal of a drug may result in anxiety, nausea or shakiness.
Reason : The body becomes addicted to a drug when it is taken for long periods.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

29. Which of the following is not an aspect of universal prophylaxis?
(1) Immediate washing of hands and skin contaminated by blood and body fluids
(2) Disposal of stagnant water around houses
(3) Consumption of antibiotic before acquiring the infection
(4) Use of protective barriers to prevent exposure to blood and body fluids

30. **Assertion :** Malarial parasite requires two hosts - humans and mosquito to complete its life cycles.
Reason : Haemozoin is a toxic substance produced by the rupturing of liver cells during malarial infection.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

31. How many among the following are bacterial diseases
Pneumonia, Polio, Kali Khansi, Dengue, Dysentary, Gal ghotu, Break bone fever, Lock jaw, Plague, Flu, Enteric fever
(1) 6 (2) 7
(3) 5 (4) 8

32. **Assertion :** Both AIDS and hepatitis B infections are chronic infections and ultimately fatal
Reason : Both diseases are caused by viruses having RNA genome.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

33. Which one of the following characteristic is common in both *Ascaris* and *Entamoeba histolytica*?
a. Mosquitoes are mechanical carrier
b. Monogenetic
c. Infective stage is quadrinucteate cyst
d. both are parasites of small intestine
(1) a, b and c (2) b, c and d
(3) b and d (4) b only

34. **Statement-I** : *Ascaris*, the common round worm and *Wuchereria*, the filarial worm, are some of the helminths which are known to be pathogenic to man.
Statement-II : Symptoms of Ascariasis include external bleeding, muscular pain, fever, anemia and blockage of the intestinal passage.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

35. Consider the following statements concerning elephantiasis
a. It is also known as filariasis
b. The pathogen lives mainly in the lymphatics of the lower limbs
c. Genital organs and salivary glands are affected resulting in gross deformities
d. Pathogens are transmitted to a healthy person through the bite by the infected female mosquito
Which of the above statements are correct?
(1) a, b, c & d (2) a, b & c
(3) a, b & d (4) a, c & d

36. **Assertion :** Cancerous cells divide rapidly and do not show contact inhibition.
Reason : Cancerous cells starve the normal cells by competing for vital nutrients.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

37. Which of the following statements are False?
a. Transmission of HIV-infection can also occur from mother to her child through placenta.
b. The time lag between infection and appearance of AIDS symptoms may vary from few weeks to many months.
c. In AIDS there is progressive decrease in T-helper lymphocytes.
d. Treatment of AIDS with anti-retroviral drugs is found to be quite effective.
e. Due to HIV infection, the person starts suffering from infection which may be those of bacteria especially *Mycobacterium,* viruses, fungi & parasites like *Toxoplasma*.
(1) a, b & d (2) a, c & e
(3) b & d (4) a, c, d & e

38. **Assertion :** The fungal infections are common in groin and in between the toes.
Reason : Groin area and area between the toes are warm and humid.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

39. How many of the following features belong to pathogen causing elephantiasis?
Blockage of intestinal passage, acoelomate, sexual dimorphism, pseudocoelomate, hermaphrodite, acute inflammation of organs in which they live, contaminated food and water.
(1) 1 (2) 2
(3) 3 (4) 4

Human Health & Disease
(True & False/AR/Statements)

Answer

1.	(1)	9.	(2)	17.	(3)	25.	(4)	33.	(4)
2.	(4)	10.	(1)	18.	(4)	26.	(2)	34.	(3)
3.	(1)	11.	(4)	19.	(2)	27.	(4)	35.	(3)
4.	(3)	12.	(1)	20.	(4)	28.	(1)	36.	(2)
5.	(2)	13.	(1)	21.	(3)	29.	(3)	37.	(3)
6.	(1)	14.	(3)	22.	(3)	30.	(3)	38.	(1)
7.	(3)	15.	(4)	23.	(3)	31.	(2)	39.	(2)
8.	(4)	16.	(1)	24.	(1)	32.	(3)		