Exercise-1

Marked Questions are for Revision Questions.

ONLY ONE OPTION CORRECT TYPE

SECTION - A # NUCLEIC ACIDS
(THE SEARCH FOR GENETIC MATERIAL, DNA, RNA)

1. To prove that DNA is the genetic material, Griffith used
(1) Neurospora crassa (2) Drosophila melanogaster
(3) Diplococcus pneumoniae (4) Escherichia coli

2. Who experimently proved that DNA is the basic genetic material?
(1) J. D Watson (2) H.G. Khorana (3) Alfred Griffith (4) Hershey & Chase

3. Radioactive (^{35}S) was detected in?
(1) Supernatant (2) Sediment (3) Both 1 and 2 (4) None of these

4. DNA was first discovered by
(1) Beadle and Tatum (2) Watson and Crick (3) Friedrich Miescher (4) A. Kornberg

5. With respect to the bacteriophage, choose the correct sequence of Harshey-Chase experiment.
(1) (a) Blending, (b) Infection, (c) Centrifugation
(2) (a) Infection, (b) Centrifugation, (c) Blending
(3) (a) Infection, (b) Blending, (c) Centrifugation
(4) (a) Centrifugation, (b) Blending, (c) Infection

6. A nucleoside is
(1) purine / pyrimidine + phosphate (2) purine / pyrimidine + sugar
(3) pyrimidine + purine + phosphate (4) Purine + sugar + phosphate

7. A DNA molecule makes complete turn after every
(1) 3.4 Å (2) 20Å (3) 10 bases (4) 12 bases

8. The two stands of DNA are
(1) Similar in nature and complementary (2) Antiparallel and complementary
(3) Always single stranded (4) Rarely double stranded

9. The similarity between DNA & RNA is that both
(1) are double stranded (2) have simillar sugars
(3) are polymers (4) have similar pyrimidines

10. In which of the following, double stranded RNA is present?
(1) bacteria (2) ϕ x 174 (3) retrovirus (4) reovirus

11. Why does cytosine make pair with guanine and not with adenine?
(1) Polar nature of C and A
(2) C - A pair would not reach across the double helix
(3) C - A pair would be wider than double helix
(4) Hydrogen bond forming functional groups are not complementary between C and A

12. Regarding to features of double helix structure of DNA which of the following is wrong
(1) Two polynucleotide chains have antiparallel polarity
(2) The bases in two strands are paired through phosphodiester bonds
(3) Adenine form two hydrogen bonds with thymine
(4) The pitch of the helix is 3.4 nm

13. In the experiments on the chemistry of DNA Chargaff estimated the base composition of human sperms and found that adenine constituted 31% and guanine 19%. The quantity of cytosine in DNA of a human somatic cell is likely to be
(1) 19% (2) 38% (3) 31% (4) 62%

14. In a given sample of nucleic acid G + A content is not equal to C + T. This indicates that sample is
(1) GC rich (2) AT rich
(3) single-stranded DNA (4) double-stranded DNA

15. Nucleic acid was artificially synthesized in vitro by–
(1) Ochoa and Kornberg (2) Nirnberg and Ochoa
(3) Nirenberg and Ochoa (4) Kornberg and Nirenberg

16. The haploid content of human DNA is
(1) $3{\cdot}3 \times 10^9$ bp (2) $3{\cdot}3 \times 10^9$ kbp (3) $4{\cdot}6 \times 10^6$ bp (4) 48502 bp

17. Histone proteins are rich in
(1) Tryptophan, Lysine (2) Arginine, Lysine (3) Histidine, Arginine (4) Histidine, Tryptophan

18. Bacterial DNA is associated with
(1) Few polyamines or basic proteins (2) Histone proteins
(3) No proteins (4) Non histone acidic proteins

19. Which was first genetic material?
(1) RNA (2) DNA (3) Protein (4) Both (1) and (2)

20. Which RNA occurs abundantly in a cell?
(1) r RNA (2) t RNA (4) m RNA (3) Primer RNA

21. The length of DNA molecule greatly exceeds the dimensions of the nucleus in the eukaryotic cells. How is this DNA accomodated?
(1) Super coiling in nucleosomes (2) DNase digestion
(3) Through elimination of repetitive DNA (4) Deletion of non-essential genes

22. Which of the following is/are wrong regarding double helical structure of DNA
(a) DNA is made up of two polynucleotide chains
(b) Backbone of DNA is constituted by sugar & Nitrogenous base
(c) The two chain have anti parallel polarity
(d) The pitch of the helix is 3.4 Aº
(1) b & c (2) a & d (3) b only (4) b & d

23. Which of the following is not a criteria for determination of genetic material
(1) Ability of replication
(2) Chemically and structurally stable
(3) It should be non mutable
(4) Ability to expres itself in form of Mendelian characters

24. Choose the incorrect one:
(1) Nucleosomes in chromatin are seen as "beads on string structure"
(2) Nucleosome in a histone octamer
(3) Nucleosome is present in both prokaryotic & eukaryotic DNA
(4) A typical nucleosome contains 200 bp. of DNA helix

25. Number of Nucleosomes found in helical coil of 30 nm chromatin fibre is
(1) 6 (2) 10 (3) 12 (4) 15

26. Which is incorrect regarding nucleosome?
(a) A typical nucleosome contain 200 bp of DNA helix
(b) Histone are rich in the basic amino acid residue lysines & arginines
(c) The packaging of chromatin at higher level require additional set of proteins that collectively are referred to as Non-histone chromosomal (NHC) protein
(1) a only (2) a & c both (3) c only (4) None

27. Which is incorrect for t-RNA
(1) t-RNA has an anticodon loop that has bases complementary to the codon of m-RNA
(2) t-RNA are specific for each amino acid
(3) Three t-RNA are present for stop codon
(4) In actual structure, the t-RNA is a compact molecule which looks like inverted L.

28. Heat killed pathogenic bacterial cells and live nonpathogenic cells are mixed and injected into mice. The result would be
(1) Mice develop disease and die (2) Mice die without developing disease
(3) Mice remain healthy (4) 50% mice develop disease and die
(5) All mice remain healthy but lose vision.

29. Chargaff's rules are applicable to
(1) Single stranded RNA (2) Single stranded DNA and RNA
(3) Single stranded DNA (4) Double stranded DNA.

SECTION - B

DNA REPLICATION, TRANSCRIPTION, GENETIC CODE AND TRANSLATION

1. The experimental system used in the studies on the discovery of replication of DNA has been
(1) *Drosophila melanogaster* (2) *Pneumococcus*
(3) *Escherichia coli* (4) *Neurospora crassa*

2. DNA replication is
(1) Semiconservative and semi discontinous (2) Semiconservative and discontinous
(3) Conservative (4) Conservative and discontinous

3. DNA replication is aided by
(1) DNA polymerase only (2) DNA ligase only
(3) Both DNA polymerase and ligase (4) RNA polymerase

4. A DNA strand on which new strand is produced is called
(1) complementary (2) template
(3) primer (4) elongating

5. In DNA replication, primer strand is formed by
(1) A small piece of deoxyribonucleotide polymer
(2) A small piece of ribonucleotide polymer
(3) Deoxyribonucleotides + pyrophosphates
(4) DNA replicase + nucleotide + ATP

6. The enzyme which catalyses the formation of RNA from DNA template is known as
(1) Reverse transcriptase (2) RNA polymerase
(3) DNA polymerase (4) Nucleases

7. Ligase - an ezyme is used for
(1) joining bits of DNA (2) splitting DNA thread into small bits
(3) denaturation (4) none of the above

8. The protein which helps to unwind DNA double helix during replication is
(1) DNA polymerase (2) DNA gyrase (3) helicase (4) DNA topoisomerase

9. Small fragments of DNA synthesized during replication of DNA are called
(1) Nucleotides (2) Genes
(3) Okazaki fragements (4) Single stranded DNA

10. The strand of DNA which is synthesized continuously during replication is called
(1) leading strand (2) lagging strand (3) sense strand (4) antisense strand

11. DNA polymerase enzyme was discovered by
(1) Kornberg (2) Nirenberg (3) Khorana (4) Ochoa

12. The first codon discovered by Nirenberg and Mathaei was
(1) GGG (2) CCC (3) UUU (4) AAA

13. A codon is said to be degenerate because
(1) It degenerates soon after coding
(2) more than one amino acid can be coded by a single codon
(3) the same amino acid can have many codons
(4) all the above

14. Which of the following serves as a termination codon?
(1) AUG (2) CGC (3) UAG (4) GUG

15. In the genetic code dictionary, how many codons are used to code for all the 20 essential amino acids?
(1) 20 (2) 64 (3) 61 (4) 60

16. There are 64 codons in genetic code dictionary because
(1) There are 64 types of tRNA found in the cell
(2) There are 44 meaningless and 20 codons for amino acids
(3) There are 64 amino acids to be coded
(4) Genetic code is triplet

17. The DNA chain acting as template for mRNA synthesis has the following order of bases AGCTTCGA. What will be the order of bases in mRNA?
(1) TCGT AAGCT (2) UCTG AAG CU (3) UCG UAG CT (4) UCG AAG CU

18. Which of the following is Pribnow box?
(1) 5' AATAAT3' (2) 5' ATATTA3' (3) 5' TATAAT3' (4) 5TAATTA3'

19. During elongation occuring in translation, the enzyme which catalyses the synthesis of peptide bond is
(1) Peptidyl transferase (2) Peptidyl synthetase
(3) Protease (4) Amino acyl synthetase

20. Identify the characteristic which is not applicable to the genetic code
(1) Non-Polar (2) Non-overlapping (3) Commaless (4) Universal

21. In DNA replication, the role of RNA primer is to–
(1) Activate the DNA template
(2) Synthesize DNA nucleotides for the formation of new strand
(3) Initiate the formation of new strand on the template
(4) Perform all these functions

22. At the end of the process of DNA replication the newly formed lagging strand is also continuous due to the
(1) Okazaki fragements (2) Semiconservative method of replication
(3) DNA ligases (4) Double-stranded nature of DNA

23. Find out the correct matching

a	Helicase	i.	Joining of nucleotides
b	Gyrase	ii.	Opening of DNA
c	Primase	iii	Unwinding of DNA
d	DNA polymerase III	iv.	RNA priming

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

24. Transcriptionally active chromatin is called as ___(a)___and transcriptionally inactive chromatin is called as ____(b)_____. One strand of DNA, replication is continuous & it is called as ____(c)_____while on another strand of DNA replication is discontinuous & it is called as _____(d)_____ . Here (a), (b), (c) & (d) respectively:
(1) (a) Heterochromatin, (b) Euchromatin, (c) Lagging strand, (d) Leading strand
(2) (a) Euchromatin, (b) Heterochromatin, (c) Leading strand, (d) Lagging strand
(3) (a) Heterochromatin, (b) Euchromatin, (c) Leading strand, (d) Continuous strand
(4) (a) Euchromatin, (b) Heterochromatin, (c) Discontinuous strand, (d) Leading strand

25. Termination of the translation process occurs at the
(1) 5’ end of the DNA template (2) 3’ end of the mRNA
(3) 3’ end of t-RNA (4) 5’ end of mRNA

26. The amino acid valine is recognised by the triplets GUU, GUC, GUA and GUG and this character of the code is referred to as
(1) Degeneracy (2) Universality (3) Non-ambiguity (4) Commalessness

27. The wobble concept was proposed by
(1) Watson and Crick (2) Nirenberg and Lederberg
(3) Nirenberg and Matthaei (4) Crick

28. The m-RNA, AUGCAGGAUCGU recognises four amino acid and this character of the code referred to as
(1) Degeneracy (2) Universality (3) Non-amibiguity (4) Commalessness

29. Sigma factor is component of
(1) RNA polymerase (2) Dissociation factor (3) DNA ligase (4) DNA polymerase

30. After reaching into cytoplasm the m-RNA attaches itself to
(1) 40S particle (2) ER (3) 70 ribosomes (4) 60S particle

31. Functional unit of gene that specifies synthesis of one polypeptides is
(1) Recon (2) Cistron (3) Codon (4) Muton

32. Starting and stopping codons are
(1) AUG and UGA (2) GUA and AAA (3) UCA and UAA (4) GUC and AUG

33. The amino acids with a single code are
(1) Phenylalanine and glycine (2) Methionine and Tryptophan
(3) Glutamic acid and Arginine (4) Proline and Glycine

34. Given below sequence of the processed m–RNA ready for translation:
5'AUG CUA UACCUCCUUUAUCUGUGA–3' How many different t–RNA molecule require to translate this m–RNA–
(1) 8 (2) 7 (3) 6 (4) 5

35. Which of the following is exclusive property of transcription found in RNA-polymerase
(1) Initiation (2) Elongation (3) Termination (4) Processing

36. Which of the following mutation forms the genetic basis of proof that codon is a triplet and it is read in a contiguous manner
(1) Chromosomal structural mutations (2) Chromosomal numerical mutations
(3) Substitutional mutation (4) Frame shift insertion or deletion mutation

37. What is wroing about transcription?
(1) RNA polymerase is associated with initiation factor (σ) & termination factor
(2) There is only one RNA polymerase is present in eukaryotes.
(3) In eukaryotes, hn-RNA undergoes additional processing called as capping & tailing.
(4) Transcription is monocistronic in eukaryotes & polycistronic in prokaryotes.

38. Read the following statements.
(a) During protein synthesis formation of a peptide bonds do not require energy
(b) The UTRS are present at both 5' and at 3' end.
(c) The structural gene in a transcription unit could be said as monocstronic mostly in eucaryotes.
How many of above statement are correct.
(1) One (2) Two (3) Three (4) All are correct

39. Enzyme required for peptide formation is
(1) Peptidase (2) Peptidyl transferase (3) Protease (4) Nitrate reductase

40. cDNA is formed by
(1) DNA dependent DNA polymerase (2) RNA dependent DNA polymerase
(3) DNA dependent RNA polymerase (4) DNA ligase

41. Mode of DNA replication in Escherichia coli is
(1) Conservative and unidirectional (2) Semiconservative and unidirectional
(3) Conservative and bidirectional (4) Semiconservative and bidirectional.

42. Match the columns

Column I		Column II	
a.	Termination	1.	Aminoacyl tRNA synthetase
b.	Translation	2.	Okazaki fragments
c.	Transcription	3.	GTP dependent release factor
d.	DNA replication	4.	RNA polymerase

(1) a – 2, b – 3, c – 1, d – 4 (2) a – 1, b – 4, c – 2, d – 3
(3) a – 3, b – 1, c – 4, d – 2 (4) a – 2, b – 4, c – 1, d – 3
(5) a – 2, b – 4, c – 1, d – 3.

43. In Rous sarcoma virus, the flow of information is
(1) DNA → RNA → Proteins (2) DNA → Proteins → RNA
(3) RNA → DNA → RNA → proteins (4) RNA → DNA → proteins

44. While working on Neurospora crassa Beadle and Tatum proved
(1) Every gene is responsible for a specific enzyme
(2) Plant cells are totipotent
(3) DNA replication is semiconservative
(4) Viruses have genetic material.

45. The sequence of events mentioned below are symbolised by alphabets. Choose the correct answer where the alphabets are matched with the processes

RNA $\xrightarrow{a}$ **DNA** $\xrightarrow{b}$ **DNA** $\xrightarrow{c}$ **mRNA** $\xrightarrow{d}$ **Polypeptide**

(1) a = Reverse transcription. b= Replication, c = Transcription, d = Translation
(2) a = Replication, b = Transformation, c = Transcription, d = Translation
(3) a = Reverse transcription, b = Transformation c= Transcription, d = Translation
(4) a = Replication, b = Transduction. c = Translation, d = Transcription.

46. Match the column:

Column I		Column II	
a.	Transforming principle	i.	Watson & Crick
b.	Semiconservative replication	ii.	Gamow
c.	Lac operon model	iii.	Griffith
d.	Triplet codon	iv	Jacob & Monod

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

SECTION - C

REGULATION OF GENE EXPRESSION, HGP AND DNA FINGERPRINTING

1. Which of the following is/are the level of regulating of gene expression in eukaryotes
(a) Translational level
(b) Transport of mRNA from nucleus to the cytoplasm
(c) Processing level
(d) Transcriptional level
(1) a, b only (2) d, c, b only (3) d, c, a only (4) d, c, b, a all

2. Operon contains
(1) Operator and regulator genes
(2) Operator and structural gene
(3) Operator and regulator genes repressor
(4) Operator gene, regulator gene repressor, structural genes and promoter gene

3. Which one of the following is the correct sequence of structural gene in lac operon?
(1) z, a, y (2) z, y, a (3) a, z, y (4) y, a, z

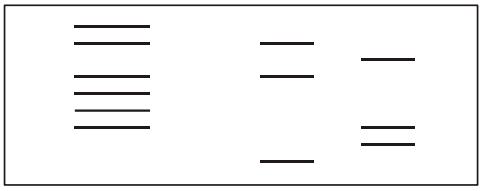
4. According to Operon concept a regulator gene forms
(1) A general inhibitor (2) A small peptide
(3) A repressor (4) An inducer

5. In lac operon, sturctural gene 'Z' synthesises
(1) β-galactosidase (2) Galactosidase permease
(3) Galactosidase transacetylase (4) None of the above.

6. The function of promoter in lac-operon is to
(1) Bind to gyrase (2) Bind to RNA polymerase
(3) Code for DNA polymerase (4) Process mRNA.

7. Due to high degree of polymorphism, size of VNTR varies from
(1) 0.1—2kb (2) 0.1—20 kb
(3) 0.01 — 20 kb (4) 0.1 — 200 kb

8. Which suspect would you charge with the crime
Crime scene sample
Victim Suspect 1 Suspect 2



(1) Both suspect 1 and 2 (2) Only suspect 1
(3) Only suspect 2 (4) Neither suspect 1 nor suspect 2

9. Match the column:

Column – I		Column – II	
a.	VNTR	**i.**	β–Galactosidase
b.	Lac operon	**ii.**	DNA ligase
c.	Genetic code	**iii.**	DNA finger printing
d.	Okazaki fragments	**iv.**	Unambiguous

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

10. The basis of DNA finger-printing is
(1) The double helix (2) Error in base sequence
(3) Polymorphism in sequence (4) DNA replication

11. Which of the following is not related with HGP
(1) BAC & YAC cloning vector (2) Bioinformatics
(3) VNTR (4) EST'S

12. Read the following sentence
(a) The technique of DNA finger printing was initially developed by Alec Jeffreys.
(b) Hybridisation using labelled VNTR probe is one of the step utilize in DNA finger printing
(c) 99.9% of base sequence among human is the same.
Pick up wrong statements-
(1) 'a' only (2) 'b' only (3) 'c' only (4) None

13. Best method to determine parternity is
(1) Protein analysis (2) Chromosome counting
(3) Gene counting (4) DNA finger printing

MISCELLANEOUS QUESTIONS

1. Which is true according to Chargaff's rule
(1) A + G = T + C (2) A = C (3) G = T (4) $\frac{A+T}{C+G} = 1$

2. DNA element with ability to change its position is
(1) Cistron (2) Transposon (3) Intron (4) Recon.

3. Intron is part of DNA which
(1) Codes for protein synthesis (2) Helps in joining pieces of DNA
(3) Does not code for protein synthesis (4) Initiates transcription.

4. In DNA replication, the leading strand is the one which replicates in
(1) 5' $\longrightarrow$ 3' direction continuously (2) 3' $\longrightarrow$ 5' direction continuously
(3) 5' $\longrightarrow$ 3' direction discontinuously (4) 3' $\longrightarrow$ 5' direction discontinuously.

5. Hargobind Khorana was awarded Nobel Prize for
(1) Deciphering genetic code (2) Artificial gene synthesis
(3) Nucleotide sequence of t RNA (4) Discovery of transposons.

6. t-RNA has the function of
(1) Transcription
(2) Adapter for attaching amino acids over mRNA template
(3) Transferring information to mRNA
(4) Carry genetic code to cytoplasm.

7. Length of mRNA that carries information for complete polypeptide synthesis is
(1) Muton (2) Codon (3) Operon (4) Cistron.

8. Codon AUG specifies
(1) Methionine (2) Valine (3) Tyrosine (4) Phenylalanine

9. Which one codes for an amino acid
(1) Cistron (2) Exon (3) Intron (4) Codon

10. Okazaki fragments are
(1) RNA primers (2) Short DNA fragments on leading strand
(3) Short DNA fragements on lagging strand (4) DNA fragements from dimerisation

11. Repressor binds to operator of lac operon
(1) Lactose is unable to remove the repressor (2) RNA polymerase is activated
(3) Galactosidase does not act on lactose (4) Structural genes z, y and a fail to transcribe.

12. Enzyme catalysing peptide formation is located in
(1) Smaller subunit of ribosome (2) Larger subunit of ribosome
(3) Central part of tRNA (4) None of the above

13. Who was awarded Nobel Prize for in vitro synthesis of polyribonucleotides?
(1) Kornberg (2) Tatum (3) Ochoa (4) Khorana

14. What is correct
(1) mRNA is polycistronic in eukaryotes and moncistronic in prokaryotes
(2) mRNA is polycistronic in both eukaryotes and prokaryotes
(3) mRNA is monocistronic in both eukaryotes and prokaryotes
(4) mRNA is polycistronic in prokaryotes and monocistronic in eukaryotes

15. VNTR is employed for
(1) Protoplasmic culture (2) DNA finger printing
(3) Regulation of plant growth hormones (4) Enhancing photosynthesis in desert plant.

16. Smallest part of DNA that can undergo recombination is
(1) Muton (2) Cistron (3) Replicon (4) Recon

17. DNA and RNA differs by
(1) Nitrogen bases and sugars (2) Nitrogen bases and phosphate groups
(3) Number of C- atoms in sugars (4) Sugar and phosphate groups.

18. DNA acts as a template for synthesis of
(1) RNA (2) DNA (3) Both (1) and (2) (4) Protein

19. Length of DNA with 23 base pairs is
(1) 78·4 Å (2) 78·2 Å (3) 78 Å (4) 74 ·8 Å

20. Find the correct match
(1) UUA – Valine (2) AUG – Cysteine (3) AAA – Lysine (4) CCC– Alanine

21. – CCA 3' end of t-RNA is called
(1) Anticodon loop (2) DHU loop (3) TψC (4) Amino acid binding site

22. Portion of gene which is transcribed but not translated is
(1) Exon (2) Intron (3) Cistron (4) Codon

23. The bond formed between phosphate and pentose sugars of DNA is
(1) Sulphide bond (2) Phosphodiester bond
(3) Hydrogen bond (4) Covalent bond

24. Unwinding due to release of coiling tension ahead of moving replication fork is due to
(1) Gyrase (2) Unwindase (3) Topoisomerase (4) All the above

25. Synthesis of RNA molecule is terminated by
(1) Alpha factor (2) Gamma factor (3) Delta factor (4) rho factor

26. Transcription
(1) Starts at initiations region and ends at stop region
(2) Starts at operator region and ends at telomeric end
(3) Starts at promoter region and ends are terminator region
(4) Starts at CCA box and ends at TATA box.

27. In ATG ACC AGG ACC CCA ACA sequence, the first base gets mutated. It will affect
(1) Change in types and sequence of amino acids
(2) Change in first amino acid only
(3) No change
(4) One amino acid less

28. Hn-RNA is
(1) Heteronuclear RNA (2) Homonuclear RNA
(3) Heterogeneous RNA (4) Useful RNA.

29. Continuously functional genes which are regulated on the tissue level are
(1) House keeping genes (2) Luxury genes
(3) Mild genes (4) Gene battery.

30. Which amino acid is specified by genetic codes ACU, ACC, ACA, ACG showing degeneracy?
(1) Leucine (2) Methionine (3) Glycine (4) Threonine

31. Transfer of DNA bands from agarose gel to nitrocellulose or nylon membrane is
(1) Southern transfer (2) Western transfer (3) Northern transfer (4) Eastern transfer

32. Complete turns in 45000 bp DNA would
(1) 45 (2) 450 (3) 4500 (4) 45, 000.

33. Teminious central dogma of protein synthesis is
(1) DNA $\rightarrow$ DNA $\rightarrow$ mRNA $\rightarrow$ protein (2) mRNA $\rightarrow$ gRNA $\rightarrow$ DNA $\rightarrow$ Protein
(3) gRNA $\rightarrow$ DNA $\rightarrow$ mRNA $\rightarrow$ Protein (4) DNA $\rightarrow$ gRNA $\rightarrow$ mRNA $\rightarrow$ Protein

34. DNA replication requires
(1) DNA polymerase (2) DNA ligase (3) RNA polymerase (4) All the above

35. The RNA primer is used in
(1) Translation (2) Replication (3) Conjugation (4) Transformation

36. In a DNA, percentage of thymine is 20% what is the percentage of guanine
(1) 20% (2) 40% (3) 30% (4) 60%

37. According to the lac-operon concept, which functional unit of the bacterial genetic material is responsible for suppressing the activity of the operator gene in the absence of lactose?
(1) Structural gene (2) Regulator gene (3) Repressor protein (4) Promoter gene.

38. During translation in eukaryotes the anticodon to be aligned with the initiation codon is
(1) 5' – UAC – 3' (2) 3' – UAC – 5' (3) 5' – UCA – 3' (4) 3' – CAU – 5'

39. In a DNA segment having six coils, there are 22 nitrogen base pairs linked by two hydrogen bonds. How many cytosine bases are found in that segment?

(1) 22 (2) 38 (3) 44 (4) 76

40. Identify the triplet codons which code for amino acids serine and proline.

(a) UCC (b) CCA (c) GGG (d) AAG

The correct answer is

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

41. The strand of DNA acting as template for m-RNA transcription is

(a) Coding strand (b) Noncoding strand (c) Sense strand (d) Antisense strand

The correct answer is

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

42. An eukaryotic gene contains two kinds of base sequences. Which of these plays an important role in protein synthesis

(1) Introns (2) Exons (3) Both (1) and (2) (4) None of these

Exercise-2

1. Restriction endonucleases are enzymes that cleave DNA molecules into smaller fragments. Which type of bond do they act on? **[KVPY_2010_SB]**

(1) N-glycosidic Bond (2) Phosphodiester bond

(3) Hydrogen bond (4) Disulfide bond

2. If the sequence of base in DNA is 5'- ATGTATCTCAAT- 3', then the sequence of bases in its transcript will be : **[KVPY_2011_SB]**

(1) 5' - TACATAGAGTTA - 3' (2) 5' - UACAUAGAGUUA - 3'

(3) 5' - AUGUAUCUCAAU - 3' (4) 5' - AUUGAGAUACAU - 3'

3. According to the original model of DNA as proposed by Watson & Crick 1953, DNA is a

(1) left handed helix **[KVPY_2011_SB]**

(2) helix that makes a full turn every 70 nm.

(3) helix where one turn of DNA contains 20 basepairs

(4) two stranded helix where each strand has opposite polarity.

4. The length of one complete turn of a DNA double helix is **[KVPY_2011_SB]**

(1) 34 Å (2) 34 nm (3) 3.4 Å (4) 3.4 μm

5. A baby is born with the normal number and distribution of rods, but no cones in his eyes. We would expect that the baby would be **[KVPY_2012_SA]**

(1) color blind (2) night blind (3) blind in both eyes (4) blind in one eye

6. Transfer RNA (tRNA) **[KVPY_2012_SB]**

(1) is present in the ribosomes and provides structural integrity

(2) usually has clover leaf-like structure

(3) carries genetic information from DNA to ribosomes

(4) codes for proteins

7. DNA mutations that do not cause any functional change in the protein product are known as **[KVPY_2012_SB]**

(1) nonsense mutations (2) missense mutations (3) deletion mutations (4) silent mutations

8. If the sequence of bases in sense strand of DNA is 5'-GTTCATCG-3, then the sequence of bases in its RNA transcript would be **[KVPY_2012_SB]**

(1) 5'-GTTCATCG-3' (2) 5'GUUCAUCG-3 (3) 5'CAAGTAGC-3' (4) 5'CAAGUAGC -3

9. In cattle, the coat colour red and white are two dominant traits, which express equally in F_1 to produce roan (red and white colour in equal proportion). If F_1 progeny are self-bred, the resulting progeny in F_2 will have phenotypic ratio (red : roan : white) is - **[KVPY_2012_SB]**

(1) 1 : 1 : 1 (2) 3 : 9 : 3 (3) 1 : 2 : 1 (4) 3 : 9 : 4

10. 'a' person with blood group "A" can (a) donate blood to,..... and 'b' receive blood from **[KVPY_2013_SA]**

(1) (a) persons with blood group "AB", and (b) persons with any blood group
(2) (a) person with blood group "A" or "AB", and (b) "A" or "O" blood groups
(3) (a) person with blood group "B" or "AB", and (b) "B" or "O" blood groups
(4) (a) person with any blood group, and (b) "O" blood group only

11. The sequences of four DNA molecules are given below: **[KVPY_2013_SB]**

i. TATATATATATATA ii. TTTCCCGGGAAA iii. TTGCGTTGCCC iv. GCCGGATCCGGC
ATATATATATATAT AAAGGGCCCTTT AACGCAACGGG CGGCCTAGGCCG

Which one of these DNA moelcules will have the highest melting temperature (T_m)?

(1) i (2) ii (3) iii (4) iv

12. If DNA codons are ATG GAA, insertion of thymine after the first codon results in, **[KVPY_2013_SB]**

(1) non-sense mutation (2) mis-sense mutation (3) frameshift mutation (4) silent mutation

13. According to Mendel, ... segregate and ..... assort independently. **[KVPY_2013_SB]**

(1) alleles of a gene; alleles of different genes (2) alleles of different genes; alleles of a gene
(3) dominanat traits; recessive traits (4) recessive traits; recessive traits

14. Watson and Crick model of DNA is **[KVPY_2013_SB]**

(1) B-form DNA with a spiral length of 34 Å and a diameter of 20 Å
(2) A-form DNA with a spiral length of 15 Å and a diameter of 20 Å
(3) Z-form DNA with a spiral length of 34 Å and a diameter of 20 Å
(4) B-form DNA with a spiral length of 28 Å and a diameter of 14 Å

15. In Griffith's experiments mice died when injected with: **[KVPY_2014_SB]**

(1) heat killed S-strain (2) heat killed S-strain combined with R-strain
(3) heat killed R-strain (4) live R-strain

16. Which of the following is the final product of a gene? **[KVPY_2014_SB]**

(1) a polypeptide (2) an RNA only
(3) either polypeptide or RNA (4) a nucleotide only

17. Which one of the following is the complementary sequence for the DNA with 5'-CGTACTA-3' **[KVPY_2014_SB]**

(1) 5'-TAGTACG-3' (2) 5'-ATCATGC-3' (3) 5'-UTCUTGC-3' (4) 5'-GCUAGCA-3'

Exercise-3

PART - I: NEET / AIPMT QUESTION (PREVIOUS YEARS)

1. Length of one coil of B-DNA helix is **(AIPMT-2000)**
(1) 0·34 nm (2) 3·4 nm (3) 10 nm (4) 20 nm

2. Three dimensional shape of tRNA is **(AIPMT-2000)**
(1) L-shaped (2) Clover leaf-like (3) X-shaped (4) Y- shaped

3. Similarity between DNA and RNA is that both have **(AIPMT-2000)**
(1) Similar sugars (2) Similar mode of replication
(3) Similar pyrimidines (4) Polymers of nucleotides.

4. Enzyme that catalyses union of DNA fragments is **(AIPMT-2002)**
(1) Ligase (2) Polymerase (3) Helicase (4) Endonuclease

5. Types of RNA polymerases operative in eukaryotes are **(AIPMT-2001)**
(1) Four (2) Three (3) Two (4) One

6. *Escherichia coli* is allowed to replicate once in medium having radioactive thymidine. Which one is correct
(1) Both strands of DNA become radioactive (2) One strand becomes radioactive **(AIPMT-2001)**
(3) Each strand is half radioactive (4) None is redioactive.

7. Evolution was termed RNA world due to discovery of **(AIPMT-2001)**
(1) Absence of RNAs in some cells (2) Genomic RNA
(3) RNA enzymes (4) Synthesis of proteins by mRNA, tRNA, and rRNA.

8. Jacob and Mond proposed operon concept on the basis of their study of lactose metabolism in Escherichia coli. The concept is applicable to **(AIPMT-2002)**
(1) All prokaryotes only (2) All prokaryotes and some eukaryotes
(3) All prokaryotes and all eukaryotes (4) All prokaryotes and some protozoans.

9. First transformation experiment on bacteria was performed on **(AIPMT-2002)**
(1) Escherichia coli (2) Salmonella typhimurium
(3) Pasteurella pestis (4) Diplococcus pneumoniae.

10. Out of 64 codons, 61 codes are for 20 types of amino acids. It is due to **(AIPMT-2002)**
(1) Overlapping genes (2) Degeneracy of genetic code
(3) Wobbling of codons (4) Universality of codons

11. Exon segments are reunited after splicing by **(AIPMT-2002)**
(1) RNA primase (2) RNA protease (3) RNA polymerase (4) RNA ligase

12. Which one is correctly matched with its specificity for an amino acid, start or stop in protein synthesis? **(AIPMT-2002)**
(1) UCG – start (2) UUU – stop (3) UGU – Leucine (4) UAC – Tyrosine.

13. A gene encoding for polypeptide of 50 amino acids get mutated at 25 codon UAU becoming UAA. The result would be **(AIPMT-2003)**

(1) Polypeptide of 24 amino acid
(2) Two polypeptides one with 24 amino acids and second with 25 amino acids
(3) A polypeptide with 49 amino acid
(4) A polypeptide of 25 amino acids

14. During transcription, RNA polymerase binds to DNA site **(AIPMT-2003)**

(1) Regulator (2) Promoter (3) Enhancer (4) Receptor.

15. Degeneration of genetic code is usually due to **(AIPMT-2003)**

(1) First member of codons (2) Second member of codons
(3) Third member of codons (4) Entire codons.

16. What does lac refer to in lac operon **(AIPMT-2003)**

(1) Lactase (2) 1,00,000 (3) Lac insect (4) Lactose

17. During translation, initiation in prokaryotes GTP is required for **(AIPMT-2003)**

(1) Formation of formyl met - tRNA
(2) Binding of 30 S subunit of ribosome with mRNA
(3) Association of 30S - mRNA with formyl - met - tRNA
(4) Association of 50 S subunit of ribosome with initiation complex.

18. In genetic code dictionary, codons used to code for all the 20 essential amino acids are **(AIPMT-2003)**

(1) 20 (2) 60 (3) 61 (4) 64

19. In gene mutation, adenine is replaced by guanine. It is **(AIPMT-2004)**

(1) Frame-shift mutation (2) Transcription (3) Transition (4) Transversion

20. The ratio constant for a species is **(AIPMT-2004)**

(1) A + G/C + T (2) T + C/G + A (3) A + C/T + G (4) G + C/A + T.

21. In bacterial DNA replication, synthesis starting from the site of origin of replication **(AIPMT-2004)**

(1) Involves RNA primers (2) Requires telomerase
(3) Proceeds unidirectionally (4) Moves bidirectionally

22. DNA finger printing is related to **(AIPMT-2004)**

(1) Molecular analysis of profiles of DNA samples
(2) Analysis of DNA samples using imprinting devices
(3) Techniques used for molecular analysis of different specimens of DNA
(4) Techniques used in identification of finger prints of different persons

23. On which organism Beadle and Tatum worked to propose one gene-one enzyme hypothesis **(AIPMT-2007)**

(1) Drosophila (2) Escherichia coli
(3) Neurospora crassa (4) Nostoc

24. During transcription, holoenzyme RNA polymerase binds to DNA sequence and DNA assumes a saddle like structure at that point. The sequence is called **(AIPMT-2007)**

(1) AAAT box (2) TATA box (3) GGTT box (4) CAAT box.

25. Amino acid sequence in protein synthesis is determined by sequence of **(AIPMT-2006)**

(1) rRNA (2) tRNA (3) mRNA (4) cDNA.

26. Antiparallel strands of DNA molecules means **(AIPMT-2006)**

(1) One strand turns clockwise

(2) One strand turns anticlockwise

(3) Phosphate groups of the two strands share the same position their ends

(4) Phosphate groups at the start of the DNA strands are in opposite position

27. A sequential expression of a set of human genes occurs when a steroid molecule binds to **(AIPMT-2007)**

(1) mRNA (2) DNA sequence (3) tRNA (4) Ribosome

28. The two polynucleotide chains of DNA are **(AIPMT-2007)**

(1) Discontinuous (2) Antiparallel (3) Parallel (4) Semiconservative

29. In the DNA molecule **(AIPMT-2008)**

(1) The proportion of adenine in relation of thymine varies with the organism

(2) There are two strands which run antiparallel one in 5' → 3' direction and other in 3' → 5'

(3) The total amount of purine nucleotides and pyrimidine nucleotides is not run always equal

(4) There are two strands which run paralled in the 5' → 3' direction.

30. Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid? **(AIPMT-2008)**

(1) AUG, ACG – start/methionine (2) UUA, UCA – Leucine

(3) GUU – Alanine (4) UAG, UGA – stop

31. What is antisense technology? **(AIPMT-2008)**

(1) When a piece of RNA that is complementary in sequence is used to stop expression of a specific gene

(2) RNA polymerase producing DNA

(3) A cell displaying a foreign antigen used for synthesis of antigens

(4) Production of somoclonal variants in tissue culture.

32. What is not for genetic code **(AIPMT-2009)**

(1) It is unambiguous

(2) A codon in mRNA is read in a non-contiguous fashion

(3) It is nearly universal

(4) It is degenerate

33. Semiconservative replication of DNA was first demonstrated in **(AIPMT-2009)**

(1) Salmonella typhimurium (2) Drosophila melangaster

(3) Escherichia coli (4) Streptococcus pneumoniae

34. Removal of introns and joining of exons in a defined order during transcription is called: **(AIPMT-2009)**

(1) Looping (2) Inducing (3) Slicing (4) Splicing

35. The one aspect which is not a salient feature of genetic code, is its being **(AIPMT-2010)**

(1) Ambiguous (2) Universal (3) Specific (4) Degenerate

36. Select the two correct statements out of the four (a-d) given below about lac operon. **(AIPMT-2010)**

(a) Glucose or galactose may bind with the repressor and inactivate it

(b) In the absence of lactose the repressor binds with the operator region

(c) The z-gene codes for permease

(d) This was elucidated by Francois Jacob and jacque Monod

The correct statements are

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

37. Satellite DNA is useful tool in **(AIPMT-2010)**

(1) Sex determination (2) Forensic science

(3) Genetic engineering (4) Organ transplantation

38. What are those structures that appear as beads - on - string in the chromosomes when viewed under electron microscope? **(AIPMT-2011)**

(1) Genes (2) Nucleotides (3) Nucleosomes (4) Base pairs

39. Removal of RNA polymerase III from nucleoplasm will affect the synthesis of: **(AIPMT Pre. 2012)**

(1) t-RNA (2) hn-RNA (3) m-RNA (4) r-RNA

40. Which one of the following is not a part of a transcription unit in DNA? **(AIPMT Pre. 2012)**

(1) The inducer (2) A terminator (3) A promoter (4) The structural gene

41. Which one of the following represents a palindromic sequence in DNA? **(AIPMT Mains 2012)**

(1) 5' - GAATTC - 3'
3' - CTTAAG - 5'

(2) 5' - CCAATG - 3'
3' - GAATCC - 5'

(3) 5' - CATTAG - 3'
3' - GATAAC - 5'

(4) 5' - GATACC - 3'
3' - CCTAAG - 5'

42. What is it that forms the basis of DNA Fingerprinting? **(AIPMT Mains 2012)**

(1) The relative proportions of purines and pyrimidines in DNA

(2) The relative difference in the DNA occurrence in blood, skin and saliva

(3) The relative amount of DNA in the ridges and grooves of the fingerprints.

(4) Satellite DNA occurring as highly repeated short DNA segments

43. Read the following four statements (A-D): **(AIPMT Mains 2012)**

(A) In transcription, adenosine pairs with uracil.

(B) Regulation of *lac* operon by repressor is referred to as positive regulation.

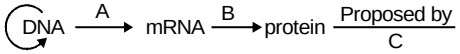
(C) The human genome has approximately 50,000 genes.

(D) Haemophilia is a sex-linked recessive disease.

How many of the above statements are right?

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

44. The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C.



(NEET- 2013)

(1) A - translation B - transcription C - Erevin Chargaff

(2) A -transcription B - translation C - Francis Crick

(3) A - translation B - extension C - Rosalind Franklin

(4) A - transcription B - replication C - James Watson

45. Which one of the following is wrongly matched? **(AIPMT-2014)**

(1) Transscription - Writing information from DNA to - RNA

(2) Transscription - Using information in m - RNA to make protein

(3) Repressor protein - Binds to a operature to stop enzme synthes

(4) Operon - Structural genes, operator and promoter.

46. Transformation was discovered by: **(AIPMT-2014)**

(1) Meseson and stahl (2) Hershey and chase

(3) Griffith (4) Waston and crick

47. Select the correct option: **(AIPMT-2014)**

	Directionof RNA synthesis	Direction of reading of the template DNA strand
(1)	5' - 3'	3' - 5'
(2)	3' - 5'	5' - 3'
(3)	5' - 3'	5' - 3'
(4)	3' - 5'	3' - 5'

48. Commonly used vectors for human genome sequencing are: **(AIPMT-2014)**

(1) T - DNA (2) BAC and YAC

(3) Expression Vectors (4) T/A Cloning Vectors

49. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are: **(AIPMT-2015)**

(1) G 17%, A 16.5%, T32.5% (2) G 17%, A 33%,T 33%

(3) G8.5%,A50%, T24.5% (4) G 34%,A 24.5%,T 24.5%

50. A somatic cell that has just completed the S-phase of its cell cycle, as compared to gamete of the same species, has : **(AIPMT-2015)**

(1) same number of chromosomes but twice the amount of DNA

(2) twice the number of chromosomes and four times the amount of DNA

(3) four time the number of chromosomes and twice the amount of DNA

(4) twice the number of chromosomes and twice the amount of DNA

51. Satelliete DNA is important because it: **(Re-AIPMT-2015)**

(1) shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable form parents to children.

(2) does not code for proteins and is same in all members of the population

(3) codes for enzymes needed for DNA replication

(4) codes for proteins needed in cell cycle.

52. Which of the following is required as inducer(s) for the expression of Lac operon? **(NEET-1-2016)**
(1) lactose and galactose (2) glucose
(3) galactose (4) lactose

53. A complex of ribosomes attached to a single strand of RNA is known as: **(NEET-1-2016)**
(1) Okazaki fragment (2) Polysome (3) Polymer (4) Polypeptide

54. Which of the following is not required for any of the techniques of DNA fingerprinting available at present? **(NEET-1-2016)**
(1) DNA -DNA hybridization (2) Polymerase chain reaction
(3) Zinc finger analysis (4) Restriction enzymes

55. Which one of the following is the starte codon? **(NEET-1-2016)**
(1) UAG (2) AUG (3) UGA (4) UAA

56. Taylor conducted the experiments to prove semiconservative mode of chromosome replication on **(NEET-2-2016)**
(1) *E. coli* (2) *Vinca rosea* (3) *Vicia faba* (4) *Drosophila melanogaster*

57. The equivalent of a structural gene is A true breeding plant is **(NEET-2-2016)**
(1) Recon (2) Muton (3) Cistron (4) Operon

58. DNA- dependent RNA polymerase catalyzes transcription on the strand of the DNA which is called the **(NEET-2-2016)**
(1) Antistrand (2) Template strand (3) Coding strand (4) Alpha strand

59. If there are 999 bases in RNA that codes for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered? **(NEET-2017)**
(1) 1 (2) 11 (3) 33 (4) 333

60. DNA fragments are: **(NEET-2017)**
(1) Positively charged
(2) Negatively charged
(3) Neutral
(4) Either positively or negatively charged depending on their size

61. During DNA replication, Okazaki fragments are used to elongte **(NEET-2017)**
(1) The leading strand towards replication fork.
(2) The lagging strand towards replication fork.
(3) The leading strand away form replication fork
(4) The lagging strand away form the replication fork

62. Spliceosomes are not found in cells of **(NEET-2017)**
(1) Plants (2) Fungi (3) Animals (4) Bacteria

63. The final proof for DNA as the genetic material came from the experiments of **(NEET-2017)**
(1) Griffith (2) Hershey and Chase
(3) Avery, Mcleod and McCarty (4) Hargobind Khorana

64. AGGTATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding sequence of the transcribed mRNA? **(NEET-2018)**

(1) AGGUAUCGCAU (2) UCCAUAGCGUA

(3) ACCUAUGCGAU (4) UGGTUTCGCAT

65. All of the following are part of an operon *except* **(NEET-2018)**

(1) an operator (2) a promoter (3) an enhancer (4) structural genes

66. Select the *correct* match: **(NEET-2018)**

(1) Ribozyme – Nucleic acid (2) G. Mendel – Transformation

(3) T.H. Morgan – Transduction (4) F_2 x Recessive parent – Dihybrid cross

67. Select the ***correct*** match: **(NEET-2018)**

(1) Alec Jeffreys – *Streptococcus pneumoniae*

(2) Francois Jacob and Jacques Monod – *Lac* operon

(3) Matthew Meselson and F. Stahl – *Pisum sativum*

(4) Alfred Hershey and Martha Chase – TMV

68. Select the ***correct*** statement: **(NEET-2018)**

(1) Franklin Stahl coined the term "linkage".

(2) Transduction was discovered by S. Altman.

(3) Spliceosomes take part in translation.

(4) Punnett square was developed by a British scientist.

69. The experimental proof for semiconservative replication of DNA was first shown in a **(NEET-2018)**

(1) Fungus (2) Virus (3) Plant (4) Bacterium

70. Match the following genes of the Lac operon with their respective products **(NEET-1-2019)**

(a) i gene (i) β-galactosidase

(b) z gene (ii) Permease

(c) a gene (iii) Repressor

(d) y gene (iv) Transacetylase

Select the correct option.

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

71. Under which of the following conditions there will be no change in the reading frame of following mRNA? **(NEET-1-2019)**

5' AACAGCGGUGCUAUU 3'

(1) Deletion of GGU from 7^{th}, 8^{th} and 9^{th} positions

(2) Insertion of G at 5^{th} position

(3) Deletion of G from 5^{th} position

(4) Insertion of A and G at 4^{th} and 5^{th} position respectively

72. Expressed Sequence Tags (ESfs) refers to : **(NEET-1-2019)**
(1) Novel DNAsequences (2) Genes expressed as RNA
(3) Polypeptide expression (4) DNA polymorphism

73. What will be the sequence of mRNA produced by the following stretch of DNA? **(NEET-2-2019)**
3' ATGCATGCATGCATG 5' TEMPLATE STRAND
5' TACGTACGTACGTAC 3' CODING STRAND
(1) 3' AUGCAUGCAUGCAUG 5' (2) 5' UACGUACGUACGUAC 3'
(3) 3' UACGUACGUACGUAC 5' (4) 5' AUGCAUGCAUGCAUG 3'

74. From the following, identify the correct combination of salient features of Genetic Code **(NEET-2-2019)**
(1) Universal, Non-ambiguous, Overlapping (2) Degenerate, Overlapping, Commaless
(3) Universal, Ambiguous, Degenerate (4) Degenerate, Non-overlapping, Non ambiguous

75. Which scientist experimentally proved that DNA is the sole genetic material in bacteriophage? **(NEET-2-2019)**
(1) Beadle and Tautum (2) Messelson and Stahl
(3) Hershey and Chase (4) Jacob and Monod

76. In the process of transcription in Eukaryotes, the RNA polymerase I transcribes – **(NEET-2-2019)**
(1) mRNA with additional processing, capping and tailing
(2) tRNA, 5 S rRNA and snRNAs
(3) rRNAs - 28 S, 18 S and 5.8 S
(4) Precursor of mRNA, hnRNA

77. "Ramachandran plot" is used to confirm the structure of **(NEET-2-2019)**
(1) RNA (2) Proteins (3) Triacylglycerides (4) DNA

78. In RNAi, the genes are silenced using: **(NEET-2-2019)**
(1) ds – RNA (2) ss – DNA (3) ss – RNA (4) ds – DNA

79. What initiation and termination factors are involved in transcription in Eukaryotes? **(NEET-2-2019)**
(1) σ and ρ, respectively (2) α and β, respectively
(3) β and γ, respectively (4) α and σ, respectively

PART - II : AIIMS QUESTION (PREVIOUS YEARS)

1. Proteins are synthesised by the process **(AIIMS-1999)**
(1) Transcription (2) Translation (3) Transduction (4) Translocation

2. Correct sequence of code transfer during polypeptide formation is **(AIIMS-1999)**
(1) DNA, mRNA, tRNA and amino acids (2) DNA, tRNA, rDNA and mRNA
(3) mRNA, tRNA, DNA and amino acids (4) rRNA, DNA, mRNA and tRNA.

3. A point mutation comprising substitution of purine with pyrimidine is **(AIIMS-2002)**
(1) Transition (2) Transversion (3) Deletion (4) Translocation.

4. Frame shift mutation occurs when **(AIIMS-2002)**

(1) Base is deleted or added (2) Base is added

(3) Base is deleted (4) Anticodons are not present.

5. Which is important for transcription **(AIIMS-2002)**

(1) CAAT Box (2) Promoter

(3) DNA polymerase (4) DNA methylase

6. What is true of tRNA **(AIIMS-2003)**

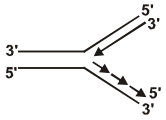
(1) It binds with an amino acid at its 3' end

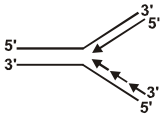
(2) It has five double stranded regions

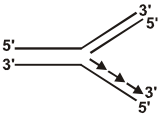
(3) It has a codon at one end which recognises anticodon of mRNA

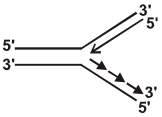
(4) It looks like clover leaf in 3-dimensional structure

7. Which one represents the correct manner of DNA replication **(AIIMS-2003)**

(1) 

(2) 

(3) 

(4) 

8. Which one of the following codons codes for the same information as UGC **(AIIMS-2003)**

(1) UGU (2) UGA (3) UAG (4) UGG

9. cDNA is copied from mRNA molecule with the help of **(AIIMS-2005)**

(1) Restriction enzyme (2) Reverse transcriptase

(3) DNA polymerase (4) Adenosine deaminase.

10. E.coli about to replicate was placed in a medium containing radioactive thymidine for five minutes. Then it was made to replicate in a normal medium. Which of the following observation will be correct.

(1) Each strand half radioactive **(AIIMS-2007)**

(2) Both the strands of DNA will be radioactive

(3) One strand radioactive

(4) None is radioactive

11. During translation initiation in prokaryotes, a GTP molecule is needed in **(AIIMS-2007)**

(1) Association of 50 S subunit of ribosome with initiation complex

(2) Formation of formyl-met-RNA

(3) Association of 30S m-RNA with formyl-met-tRNA

(4) Binding of 30S subuit of ribosome with mRNA

12. The telomeres of eukaryotic chromosomes consists of short sequences of **(AIIMS-2007)**

(1) Cytosine rich repeats (2) Thymine rich repeats

(3) Adenine rich repeats (4) Guanine rich repeats

13. Match the following **(AIIMS-2007)**

(a) tRNA	1. Linking of amino acids
(b) mRNA	2. Transfer of gentic Information
(c) rRNA	3. Nucleolar organising region
(d) Peptidyl transferse	4. Transfer of amino acid from cytoplasm to ribosome

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

(3) a – 1, b – 2, c –3, d – 4 (4) a – 4, b – 3, c –2, d –4.

14. The total number of nitrogenous bases in human genome is estimated to be about **(AIIMS-2008)**
(1) 3·5 million (2) 35 million (3) 35 thousand (4) 3·1 billion

15. Which one of the following pairs is correctly matched with regard to the codon and the amino acid coded by it? **(AIIMS-2008)**
(1) UUA-valine (2) AUG-cysteine (3) CCC-alanine (4) AAA-lysine

16. Which one of the following represents palindromic sequence in DNA? **(AIIMS-2012)**
(1) 5'-GAATTC-3'
3'-CTTAAG-5'
(2) 5'- CCAATG - 3'
3' - GAATCC - 5'
(3) 5' - CATTAG - 3'
3'-GATAAC - 5'
(4) 5' - GATACC - 3'
3' - CCTAAG - 5'

17. Human Genome Project (HGP) is closely associated with the rapid development of a new area in biology called as **(AIIMS-2013)**
(1) biotechnology (2) bioinformatics (3) biogeography (4) bioscience

18. DNA and RNA comprise of **(AIIMS-2014)**
(1) sugar, phosphate, base (2) sugar, phosphate
(3) base, phosphate (4) sugar, base.

19. Select the correct option: **(AIIMS-2014)**

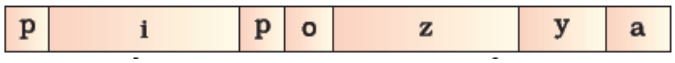
Direction of RNA synthesis	Direction of reading of the template DNA strand
(1) 5'-3'	3'-5'
(2) 3'-5'	5'-3'
(3) 5'-3'	5'-3'
(4) 3'-5'	3'-5'

20. Thirty percent of the bases in a sample of DNA extracted from eukaryotic cells is adenine. What percentage of cytosine is present in this DNA? **(AIIMS-2015)**
(1) 10% (2) 20% (3) 30% (4) 40%

21. Which one of the following group of codons is called as nonsense codons? **(AIIMS-2016)**
(1) UAA, UAG and UGA (2) GUA, GUU GCA, GCG and GAA
(3) UUC,UUU, CCU,CAA and CUG (4) UUA, UUU, CUU, CUC, CUA and CUG

22. Select the wrong pair **(AIIMS-2018-I)**
(1) RNA polymerase I – Sn RNA 5S rRNA, r-RNA
(2) RNA polymerase I – r-RNA
(3) RNA polymerase II – hnRNA
(4) RNA polymerase III – tRNA

23. In the Diagram given figure of Lac operon **(AIIMS-2018-I)**



(1) i – Repressor, z – β-galactosidase, y– Permease, a– Transacetylase
(2) i – Inhibitor, z – Repressor, y– Transacetylase, a– Permease
(3) i – Inducer, z – β-galactosidase, y– Permease, a– Repressor
(4) i – β-galactosidase, z – Repressor, y– Permease, a– Transacetylase

24. Which of the following is codons codes for proline. **(AIIMS-2018-I)**
(1) CCC, CCU, CCG (2) UCC, UGU, CCU
(3) CUG, CUU, CUA (4) CGC, CGG, CCA

25. Match column-I to the column-II and select the option having correct matching – **(AIIMS-2018-II)**

Column-I		Column-II	
A	Bacteriophage λ	i	5386 nucleotides
B	*E. coli*	ii	3.3×10^9 bp
C	Human genome	iii	4.6×10^6 bp
D	ϕ x 174	iv	48502 bp

(1) A - (iv), B - (iii), C- (ii), D - (i) (2) A - (iii), B - (ii), C- (i), D - (iv)
(3) A - (iv), B - (iii), C- (i), D - (ii) (4) A - (iv), B - (i), C- (ii), D - (iii)

26. Which of the following correctly assigns the codons for glycine? **(AIIMS-2018-II)**
(1) GGG, GGC, GGA (2) AAA, AAG, AAC (3) AUG, AUA, AUC (4) CCC, CCG, CGA

27. Which of the following statement is wrong about transcription in bacteria. **(AIIMS-2018-III)**
(1) Splicing is not required
(2) Single RNA polymerase controls all DNA polymerases
(3) This process required more/less energy
(4) None

28. Which among the following is true for protein synthesis in bacteria? **(AIIMS-2018-III)**
(1) It involves all the three types of RNAs (m-RNA, t-RNA and r-RNA)
(2) It involves 3 types of RNA polymerases
(3) It involves single type of RNA polymerase
(4) It involves RNA processing

29. Codons of alanine **(AIIMS-2018-IV)**
(1) CUC, CUA, CUG (2) GGG, GGU, GGA
(3) GUG, GUC, GUA (4) GCU, GCC, GCG

30. Which of the following can synthesize all types of RNA **(AIIMS-2018-IV)**
(1) r-RNA (2) t-RNA (3) m-RNA (4) DNA

Answers

EXERCISE - 1

SECTION - A

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

SECTION - B

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

SECTION - C

1.	(4)	**2.**	(4)	**3.**	(2)	**4.**	(3)	**5.**	(1)	**6.**	(2)	**7.**	(2)
8.	(2)	**9.**	(2)	**10.**	(3)	**11.**	(3)	**12.**	(4)	**13.**	(4)		

Miscellaneous Questions

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

EXERCISE - 2

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

EXERCISE - 3

PART- I

1.	(2)	**2.**	(1)	**3.**	(4)	**4.**	(1)	**5.**	(2)	**6.**	(2)	**7.**	(3)
8.	(2)	**9.**	(4)	**10.**	(2)	**11.**	(4)	**12.**	(4)	**13.**	(1)	**14.**	(2)
15.	(3)	**16.**	(4)	**17.**	(3)	**18.**	(3)	**19.**	(3)	**20.**	(4)	**21.**	(4)
22.	(1)	**23.**	(3)	**24.**	(2)	**25.**	(3)	**26.**	(4)	**27.**	(2)	**28.**	(2)
29.	(2)	**30.**	(4)	**31.**	(1)	**32.**	(2)	**33.**	(3)	**34.**	(4)	**35.**	(1)
36.	(2)	**37.**	(2)	**38.**	(3)	**39.**	(1)	**40.**	(1)	**41.**	(1)	**42.**	(4)
43.	(1)	**44.**	(2)	**45.**	(1)	**46.**	(3)	**47.**	(1)	**48.**	(2)	**49.**	(2)
50.	(2)	**51.**	(1)	**52.**	(4)	**53.**	(2)	**54.**	(3)	**55.**	(2)	**56.**	(3)
57.	(3)	**58.**	(2)	**59.**	(3)	**60.**	(2)	**61.**	(4)	**62.**	(4)	**63.**	(2)
64.	(1)	**65.**	(3)	**66.**	(1)	**67.**	(2)	**68.**	(4)	**69.**	(4)	**70.**	(4)
71.	(1)	**72.**	(2)	**73.**	(2)	**74.**	(4)	**75.**	(3)	**76.**	(3)	**77.**	(2)
78.	(1)	**79.**	(1/bonus)										

PART- II

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

Self Practice Paper (SPP)

1. How many character of pea pod were chosen by Mendel

(1) 7 (2) 2 (3) 4 (4) 3

2. In a dihybrid cross between AABB and aabb the ratio of AABB, AABb, aaBb, aabb in F_2 generation is

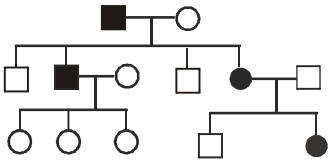
(1) 9 : 3 : 3 : 1 (2) 1 : 1: 1 : 1 (3) 1 : 2 : 2 : 1 (4) 1 : 1: 2 : 2

3. The tRNA binds to specific aminoacid at one and pair through.....with codes on mRNA through its anticodons.

(1) Covalent bond (2) Phosphodiester bond

(3) H-bond (4) ionic bond

4.



Above pedigree chart show

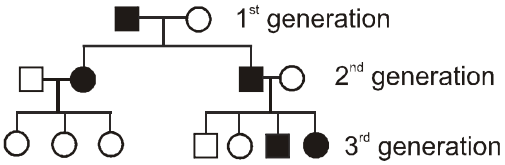
(1) Autosomal dominant trait (2) Sexlinked recessive trait

(3) Autosomal recessive trait (4) Sex linked dominant trait

5. In second division segregation the arrangment of ascospores of Neurospora is -

(1) 4 : 4 (2) 2 : 1 : 2 : 1 (3) 2 : 2 : 2 : 2 (4) All of these

6.



In above pedigree chart the genotype of first generation parent will be -

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

7. Down's syndrome is due to

(1) Linkage (2) Crossing over

(3) Non-disjunction of chromosome (4) Sex linked inheritance

8. A normal girl has colour blind brother which statement is true

(1) Mother of them may be colour blind (2) Father of them should be normal

(3) Mother of them should be normal (4) Father of them should be colour blind

9. 2A + ZW $^{♀}$– ZZ$^{♂}$ genotype is a type of sex determination found in

(1) Reptilians (2) Birds (3) Some fishes (4) All of the above

10. Which of the following is extensively used as starting point in the sequence of whole genomes in HGP.

(1) Genetic engineering (2) Linkage (3) Geneticmaps (4) PCR

11. In dihybrid cross of pea plant what will be the ratio of recombinant types in F_2 generation

(1) 9 : 3 : 3 : 1 (2) 3 : 1 (3) 1 : 1 (4) 5 : 3

12. A cross between black and white bird's results in blue birds in F_1 generation and then cross between blue in F_1 generation would result in

(1) 3 blue : 1 white (2) 1 blue : 1 black : 1 white

(3) 9 blue : 3 back : 3 white (4) 1 black : 1 white : 2 blue

13. In monohybrid cross what is the ratio of homozygous dominant and homozyguos recessive individuals in F_2– generation

(1) 1 : 2 : 1 (2) 2 : 1 / 1 : 2 (3) 3 : 1 / 1 : 3 (4) 1 : 1

14. A normal man marries with a normal female. But the father of both of them were haemophilic which of the following statement is correct about their offsprings

(1) 50% dayghters normal & 50% son are haemophilic

(2) All the daughters are normal & 50% sons are haemophilic

(3) 50% daughters may haemophilic & 50% sons are normal.

(4) All the daughters are normal and all the son's are haemophilic

15. Which of the following has monosomic condition

(1) Klinefelter syndrome (2) Down's syndrome

(3) Turner syndrome (4) Cry-du-chat syndrome

16. Match the column

Column I	**Column II**
(a) Grasshopper	(i) Palmer crease in hand
(b) Turner's syndrome	(ii) Mental retardation & accumulation of phenylpyruvic acid
(c) Phenylketonuria	(iii) Barr body absent
(d) Sickle cell anaemia	(iv) XX ♀ – XO ♂
(e) Down's syndrome	(v) Pleiotropic gene

Select the correct option

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

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

17. Inheritance of human blood group is controlled by three alleles I^A, I^B and i or I^0 . How many possible genotypes and phenotypes can be produced respective by these alleles in humans.

(1) 4, 6 (2) 3, 4 (3) 9, 3 (4) 6, 4

18. If one parent has blood group A and the other parent has blood group B. The offspring have which blood group

(1) AB (2) O (3) BO (4) A, B, AB, O

19. The red flowered plants (RR) of Antirrhinum crossed with white flowered plant (rr) F_1 generation produced bearing pink- flowered plants on selfing of F_1 generation F_2 generation obtained. In which the ratio of pink and red flowered plants will be.

(1) 1 : 2 (2) 1 : 1 (3) 2 : 1 (4) 3 :1

20. In dihybrid cross of pea plant, the ratio of pure heterozygous for both yellow round and green wrinkled seeded plants in F_2 generation will be

(1) $\frac{1}{16}$ (2) $\frac{1}{4}$ (3) $\frac{1}{8}$ (4) $\frac{3}{16}$

21. Most cell organelle duplication occur during which phase of cell cycle
(1) G_1 (2) G_2 (3) S-phase (4) M-phase

22. Find out the incorrect statement about RNA molecule
(1) It shows high rate of mutation than DNA (2) It is genetic material in some viruses
(3) Some reactions are catalyzed by RNA (4) RNA follows chargaff rule

23. Exon segments are reunited after splicing by
(1) DNA ligase (2) RNA primase (3) RNA polymerase (4) RNA ligase

24. During elongation of polypeptide chain sigma factor is
(1) Functionless (2) Retained for specific function
(3) Released for re-use (4) Required during closing of chain

25. Deletion or insertion of base pairs produces frame shift mutation unless the number of deleted or inserted base pairs is.....
(1) Ten (2) One (3) Two (4) Three

26. Which type of DNA is found in bacteria.
(1) Straight DNA (2) Helical DNA
(3) Membrane bound DNA (4) Circular free DNA

27. DNA segment ,3′TAC ATG GGT CCG 5′ transcribes one mRNA. Four tRNA with anticodons (a) AUG (b) UAC (c) CCG and (D) GGU are required for translation .What is the order of tRNAs.
(1) abdc (2) badc (3) abcd (4) bacd

28. A variety of pea plant with round yellow seeds and violet flowers (*RRYYCC*) was crossed with a plant having wrinkled green seeds and white flowers (*rryycc*). The frequency of plants with genotype *RrYyCc* in the F_2 generation would be:
(1) 1/2 (2) 1/8 (3) 27/64 (4) 9/64

29. Transcriptional unit consists of
(1) Template strand, α- factor & ρ-factor
(2) Promoter, structural gene, Terminator
(3) Regulator gene, promoter gene, operator gene & structural gene
(4) DNA template, RNA polymerase, Nitrogenous bases.

30. Triplet codon concept can be proved by
(1) Wobble hypothesis (2) Transition
(3) Transversion (4) Frame shift mutation

31. If the length of E. coli DNA is 1.36 mm. the no. of Base pairs in E.coli may be
(1) 48502 bp (2) 6.6×10^6 bp (3) 4×10^6 bp (4) 3.3×10^6 bp

32. Which of the following also confers additional stability to DNA
(1) Adenine (2) Guanine (3) Thymine (4) Cytosine

33. The RNA is more reactive and also known to be catalytic due to presence of
(1) 3' - OH group at every nucleotide (2) 3' - CCA group at every nucleotide
(3) 2' - C = O group at every nucleotide (4) 2'- OH group at every nucleotide

34. If E.coli labelled by N^{15} allowed to grow for 60 minutes in a medium containing N^{14} H_4Cl. What would be the proportion of light and hybrid densities DNA molecules?
(1) 12· 5% N^{14} N^{14} , 87·5% $N^{15}N^{14}$ (2) 75% N^{14} N^{14} , 25% $N^{15}N^{14}$
(3) 50% N^{14} N^{14} , 50% $N^{15}N^{14}$ (4) 93· 25% N^{14} N^{14} , 6·75% $N^{15}N^{14}$

35. Which of the following difference between S-strain and R-Strain of Streptococcus pneumoniae bacteria is not correct
(1) S-Strain is virulent while R- strain is non virulent
(2) R-strain bears mucous (polysacharide) coat while S-strain does not
(3) S- strain bears smooth surface while R-strain bears rough surface.
(4) None of the above

36. The negative charge of DNA is due to
(1) Nitrogen bases (2) Pentose sugar (3) Phosphate group (4) All of the above

37. Replication of DNA in procaryotes is
(1) Semiconservative, Bidirectional, discontinuous
(2) Bidrectional, semidiscontinuous, conservative
(3) Unidirectional, discontinuous, conservative
(4) Semidiscontinuous, bidirectional, semiconservative

38. Who proposed central dogma?
(1) Crick (2) Watson and Crick (3) Klug (4) Beadle and Tatum

39. In long DNA molecule, the two strands of DNA cannot be separated in its entire length due to
(1) Strong Hydrogen bonds betⁿ Nitrogenous bases
(2) Strong Phosphodiester bonds between nucleotides
(3) Very high energy requirement
(4) None of the above

40. The length of DNA with 46 base pairs is
(1) 156·8Aº (2) 156·4Aº (3) 156Aº (4) 149·6Aº

41. In DNA genetic information is carried by
(1) Nitrogenous bases (2) sugar (3) phosphoric acid (4) all of them

42. The distance between 2 strands of DNA is
(1) 3.4 Å (2) 34 Å (3) 20Å (4) 10 Å

43. A segment of DNA that reads the same in forward and backward is called
(1) palindromic DNA (2) plasminic DNA
(3) complementary DNA (4) copy DNA

44. m-RNA directs the building of proteins through a sequenc of
(1) Exons (2) Codons (3) anticodons (4) Introns

45. Addition of adenylate residues (200-300) at 3'-end in a template of hnRNA is called
(1) Splicing (2) Capping (3) Tailing (4) Termination

SPP Answers

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