Medical Biotechnology

Instructions / Note:

1. Answer all the questions. Each question carries one mark.
2. No negative marks for wrong answers.
3. Read each question carefully and answer in the OMR sheet provided for each question with only blue/ black pen to fill the circles in the OMR Sheet.
4. Return the question paper along with the OMR sheet.

Time: 90 Minutes
Venue: _____.

PART - B [35X1=35]

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1. Severe combined immunodeficiency (SCID) can be treated with:
   A. Intravenous immunoglobulin (IvIg)
   B. Haemopoetic stem cell transplants (HSCT)
   C. Immunotherapy
   D. Thymic transplantation

2. Which antibodies are most diagnostic for rheumatoid arthritis?
   A. Anti-nuclear antibodies
   B. Anti-phospholipid antibodies
   C. Anti-myeloperoxidase antibodies
   D. Anti-citrullinated peptide antibodies

3. Which type of hypersensitivity is characterised by a rapid 'wheal and flare' following introduction of the antigen under the skin?
   A. I
   B. II
   C. III
   D. IV

4. The transplantation of tissue from one part of the body to another is called an:
   A. autograft
   B. isograft
   C. allograft
   D. xenograft
5. The type of immunity seen in a successful tumour is:
   A. Pro-inflammatory
   B. Anti-inflammatory
   C. Anti-angiogenic
   D. Cytotoxic

6. Which of the following is false about the wavelengths of electromagnetic radiation?
   A. Radiation with short wavelengths have high energies
   B. Energy does not depend on wavelength
   C. Radiation with long wavelengths have low energies
   D. Energy depends on wavelength

7. Which of the following is not a property or parameter of electromagnetic radiation?
   A. Wavelength
   B. Voltage
   C. Wave number
   D. Amplitude

8. In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure?
   A. Column chromatography
   B. Planar chromatography
   C. Liquid chromatography
   D. Gas chromatography

9. Which of the following is the value of hydrogen ion concentration of pure water?
   A. 1×10^{5} moles/litre
   B. 1×10^{6} moles/litre
   C. 1×10^{7} moles/litre
   D. 1×10^{8} moles/litre

10. Which of the following are highly effective in producing ion pairs when they pass through the matter?
    A. X-ray particles
    B. Alpha particles
    C. Beta particles
    D. Gamma particles

11. Which of the following is an example of amphoteric molecule?
    A. Acetic acid
    B. Malic acid
    C. Sugars
    D. Water
12. What is the concentration of pure water?
    A. 55.51 M
    B. 25.51 M
    C. 55 M
    D. 25 M

13. Food poisoning is caused by
    A. Clostridum tetani
    B. Clostridum welchi
    C. Clostridium botulinum
    D. Diptheria

14. Causative organism of whooping cough is
    A. Bordetella pertussis
    B. Bordetella parapertussis
    C. Bordetella bronchiseptica
    D. Bordetella bronchitisis

15. Size, shape and mode of arrangements is typical of certain microorganisms. Match them correctly :

1. *Streptococci*	A. Comma and S shaped form
2. *Sarcina*	B. Gram positive arranged in chains
3. *Bacillus anthracis*	C. Multiples of eight
4. *Vibrios* and *Spirilla*	D. Large bacilli, rectangular and gram positive
	E. Gram negative cocci

    A. 1.d, 2.b, 3.c, 4.a
    B. 1.c, 2.a, 3.b, 4.d
    C. 1.b, 2.c, 3.d, 4.a
    D. d.1.b, 2.a, 3.d, 4.c

16. The “Bond length” off H-bond between O and H in water is
    A. 0.175 nm
    B. 0.177 nm
    C. 0.215 nm
    D. 0.104 nm

17. Which of the following amino acid are responsible for absorption of UV and wavelength of 280 nm:
    A. Proline, Tryptophan, Tyrosine
    B. Tyrosine, Histidine, Proline
    C. Tryptophan, Tyrosin, Phenylalanine
    D. Phenylalanine, Histidine, Proline

18. Trypsin cleaves the bond between
    A. Arginine - Tryptophan
    B. Lysine - Tryptophan
    C. Lysine - Arginine
    D. Lysine – Glutamate

19. Tau protein associated with neurofibre tangles usually found in brain cells of neurodegenerative disorder patients is a form of
    A. Microtubule associated protein
    B. Neurofilaments
    C. Actin associate protein
    D. Kinesin

20. Arrestins in endosomal signalling, competes with which of the following molecules and desensitize the cellular signalling:
    A. Acetyl cyclase
    B. G-Protein
    C. Phospho lipase C
    D. cAMP

21. The neurotransmitters are secreted by nerve cell in response to the external stimuli, which type of endomembrane secretion occurs in nerve cells?
    A. Non-membrane bound
    B. Constitutive
    C. Intermittent
    D. Regulatory

22. The transmembrane protein extends on both side of the membrane. The protein structure present in the membrane spanning region of these transmembrane protein comprises of
    A. α-helix
    B. parallel β-sheets
    C. antiparallel β-sheets
    D. mixture of both α-helix and β-sheets

23. which of the following statement(s) to animal cell extracellular matrix related to its structure and function:
    A. They are rigid/ inflexible structures that form base.
    B. They contain fibre structures in a matrix.
    C. The protein components of these matrices are synthesised by RER of the cell.
    D. They form barrier to diffusion and transport of small molecules across them

    A. option B & C
    B. option C & A
    C. option A & B
    D. option B alone

24. Human red blood cells contain no mitochondria. What is the main pathway for ATP production in these cells?
    A. Aerobic glycolysis
    B. Anaerobic glycolysis
    C. Oxidative phosphorylation
    D. Creatine kinase reaction

25. Untrained people often have muscle pain after sprints as a result of lactate accumulation. This can be caused by intensification of the following biochemical process:
    A. Pentose phosphate pathway
    B. Gluconeogenesis
    C. Glycolysis
    D. Lipogenesis

26. The enzyme pyruvate kinase catalyses the transfer of high energy phosphate from phosphoenol pyruvate to ADP. Pyruvate kinase requires __ ions for maximum activity:
    A. Br
    B. Ba^{2+}
    C. Fe^{2+}
    D. Mg^{2+}

27. Streptomycin and other aminoglycosides prevent the joining of formyl methionyl-tRNA by bonding with the 30S ribosomal subunit. This effect leads to disruption of the following process:
    A. Translation initiation in procaryotes
    B. Translation initiation in eucaryotes
    C. Transcription initiation in procaryotes
    D. Transcription initiation in eucaryotes

28. Students study the stages of gametogenesis. They analyze a cell with haploid number of chromosomes, with each chromosome consisting of two chromatids. The chromosomes are located in the equatorial plane of the cell. Such situation is typical of the following stage of meiosis:
    A. Metaphase of the first division
    B. Anaphase of the first division
    C. Metaphase of the second division
    D. Anaphase of the second division

29. Examination of newborns in one of the Ukrainian cities revealed a baby with phenylketonuria. The baby's parents don't suffer from this disease and have two other healthy children. Specify the most likely parents' genotype with phenylketonuria gene:
    A. Aa x Aa
    B. AA x aa
    C. aa x aa
    D. Aa x aa

30. Which of the following is a heteroglycan?
    A. Inulin
    B. Agar
    C. Dextrins
    D. Chitin

31. The concentration of glucose in the blood plasma of a healthy man varies within the following limits:
    A. 3.3-5.5 mM/L
    B. 1.0-2.0 mM/L
    C. 6.0-9.5 mM/L
    D. 10.0-25.0 mM/L

32. You are studying functioning of a bacteria operon. The operator gene has been released from the repressor gene. Immediately after this the following process will start in the cell:
    A. Replication
    B. Translation
    C. Transcription
    D. Processing

33. Genetic information is stored in DNA, which does not participate directly in protein synthesis in the cell. What process provides the transformation of genetic information into amino acid sequence of polypeptide chain?
    A. Translation
    B. Translocation
    C. Transcription
    D. Replication

34. In Watson-Crick model, the Helix diameter of the double stranded DNA is
    A. 33.2 Å
    B. 3.32 Å
    C. 20 Å
    D. 23 Å

35. An equimolar mixture of D- and L- amino acid will rotate the plane polarized light towards
    A. Right
    B. Left
    C. Does not rotate
    D. Both Right and Left