MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF CLINICAL RESEARCH OFFICER UNDER HEALTH & FAMILY WELFARE DEPARTMENT GOVERNMENT OF MIZORAM, AUGUST, 2022

PAPER - IV

Time Allowed : 3 hours Full Marks : 200

All questions carry equal mark of 2 each.
Attempt all questions.

1. In Elisa technique, the antibodies are labeled by**:**

(a) Acridine orange (b) Alkaline phosphate
(c) Neutral red (d) Bromothymol blue

2. The suitable assay method for antibiotics is**:**

(a) Enzymatic assay (b) Turbidometric assay
(c) End point determination assay (d) Metabolic assay

3. Which of the following test is specific for Brucellosis?

(a) Frei (b) Weil
(c) Castaneda strip (d) Rose water

4. Biological false reaction in VDRL is related to

(a) Lepra bacilli (b) Corynebacterium diphtheria
(c) Cl.welchi (d) None of these

5. How many phases are involved in a clinical trial?

(a) 2 (b) 3
(c) 4 (d) 5

6. Which of the following is not correct on the basis of clinical trials?

(a) Biomedical research studies (b) Behavioral research studies
(c) Studies on human subjects (d) Study based only on animals

7. What is meant by a blind subject?

(a) The subjects do not know which study treatment they receive
(b) Patients injected with placebo and active doses
(c) Fake treatment
(d) Signed document of the recruited patient for the clinical trial procedures

8. Which one of the following describes “double dummy”?

(a) The subjects do not know which study treatment they receive
(b) Patients injected with placebo and active doses
(c) Fake treatment
(d) Signed document of the recruited patient for the clinical trial procedures

9. What is informed consent in a clinical trial?
- (a) The subjects do not know which study treatment they receive
- (b) Patients injected with placebo and active doses
- (c) Fake treatment
- (d) Signed document of the recruited patient for the clinical trial procedures

10. What is meant by "compliance" in a randomized clinical trial?
- (a) Flexibility in assignment to treatment groups.
- (b) The degree to which study subjects adhere to an assigned treatment protocol.
- (c) An inter-institutional agreement for a multi-center study.
- (d) Benefits for people who enroll in the study.

11. Which of the following is the best explanation regarding the relationship between compliance and "bias toward the null" in a clinical trial?
- (a) Noncompliance will make the groups appear to be MORE similar, and the apparent strength of association will be diminished.
- (b) Noncompliance will make the groups appear to be LESS similar, and the apparent strength of association will appear to be stronger than it really is.
- (c) Noncompliance has no effect (a null effect) on the relative risk.
- (d) None of the above.

12. The fact that certain types of people agree to participate in clinical trials may affect which of the following?
- (a) Validity
- (b) Generalizability
- (c) Randomization
- (d) Sub-group analysis

13. The function of b subunit of polymerase is
- (a) Template binding
- (b) Catalytic binding
- (c) Promoter binding
- (d) Cation binding

14. True replication of DNA is due to
- (a) Phosphate backbone
- (b) Hydrogen bonding
- (c) Complementary base pairing rule
- (d) None

15. Mode of DNA replication is
- (a) Conservative and bidirectional
- (b) Semiconservative and unidirectional
- (c) Semiconservative and bidirectional
- (d) Conservative and unidirectional

16. Which of the following processes does not occur in prokaryotes?
- (a) Transcription
- (b) Splicing
- (c) Translation
- (d) Replication

17. cDNA is synthesised from RNA by the enzyme
- (a) DNA polymerase
- (b) DNA synthetase
- (c) DNA convertase
- (d) Reverse transcriptase

18. Which of the following base-pairing rule is correct?
- (a) Adenine with guanine and thymine with cytosine
- (b) DNA base pairing is non-specific
- (c) Adenine with cytosine and guanine with thymine
- (d) Adenine with thymine and guanine with cytosine

19. DNA synthesis can be measured by estimating the incorporation of radiolabelled
(a) Thymine (b) Guanine
(c) Cytosine (d) Adenine

20. How many RNA polymerases are present in a bacterial system?
(a) 4 (b) 2
(c) 1 (d) 3

21. During DNA replication the synthesis of the leading strand of DNA results in fragments known as
(a) Okazaki fragments (b) Satellite segments
(c) Kornberg segment (d) Double-helix segment

22. Which of the following proteins is most useful in detecting rejection of transplanted kidneys?
(a) b2 –microglobulin (b) a2 -macroglobulin
(c) Lysozyme (d) C-reactive protein

23. Hypothesis of Biomarker research by proteomics is based on all,except**:**
(a) Proteins are differentially expressed from their genes during a disease process
(b) Proteins are subject to differential post-translational modifications due to disease-specific changes in the activity of enzymes
(c) Proteins are NOT detectable in different amounts due to altered production, degradation or release from cells by the disease process.
(d) All of the above.

24. Hormone status in breast cancer is established by**:**
(a) ER (b) PR
(c) Her-2-neu (d) All of the above

25. All are tumour markers except**:**
(a) Alfa-feto protein (b) Prostate specific antigen
(c) Myoglobin (d) CEA

26. Exfoliative cytology is used in the diagnosis of which cancers**:**
(a) Buccal mucosa (b) Cervix
(c) Lung (d) All of the above.

27. Tumour suppressor genes are all except**:**
(a) Rb (b) APC
(c) p53 (d) cyclin D1

28. Types of Proteomics are all except**:**
(a) Translational proteomics. (b) Expression proteomics
(c) Functional proteomics (d) Structural proteomics

29. Cancerous cells are more easily damaged by radiation than normal cells as they
(a) Differ in structure (b) Undergo rapid division
(c) Are nutrition-starved (d) None of these

30. The nucleus of cancerous cells becomes
(a) Unchanged (b) Degenerated
(c) Abnormally large (d) Hypertrophied

31. What is the origin of the cancerous cells?

(a) Monoclonal (b) Polyclonal

(c) Stem cells (d) Mesodermal cells

32. Which of the following is NOT an example of proto-oncogenes?

(a) Rb (b) Src

(c) Myc (d) Abl

33. Which of the following mutation causes Burkitt's lymphoma?

(a) Point mutation (b) Chromosomal translocation

(c) Deletion (d) Duplication

34. Which of the following chromosomal alteration causes retinoblastoma?

(a) Deletion in chromosome 11

(b) Translocation between chromosome 9 and 22

(c) Deletion in chromosome 13

(d) Translocation between chromosome 8 and 21

35. If DNA is damaged, which of the following gene arrest cell cycle?

(a) Rb (b) p53

(c) Hedgehog receptor (d) p16

36. Name the chemical carcinogen which causes prostate cancer.

(a) Radon (b) Arsenic

(c) Cadmium (d) Asbestos

37. Which enzymes convert pro carcinogens into ultimate carcinogens?

(a) Acetylases (b) Cytochrome P 650

(c) Cytochrome P 450 enzyme system (d) Hydrolases

38. Aflatoxin is a _____

(a) Natural carcinogen (b) Man-made carcinogen

(c) Synthesized carcinogens (d) None of these

39. Philadelphia chromosome is**:**

(a) t(9;22)(q34;q11) (b) t(22;9)(q34;q11)

(c) t(9**:**22)(q11;q34) (d) t(9**:**22)(p34;q11)

40. All are examples of Paraneoplastic syndromes except**:**

(a) Cushing syndrome (b) Red cell aplasia

(c) Hypercalcemia (d) Osteoporosis

41. FIGO Staging is done for**:**

(a) Gynaecologic cancers (b) Testicular tumours

(c) Breast cancers (d) ENT cancers.

42. Which of the following statements is true about the ends of the chromosome?

(a) The ends of the chromosome are called Satellites

(b) The ends of the chromosome are called Centromeres

(c) The ends of the chromosome are called Telomeres

(d) The ends of the chromosome are called Kinetochore

43. Radiogenic therapy is a method of radiation used to stimulate the formation of cell killing agents known as _____ agents.

(a) Toxic
(b) Poisonous
(c) Cytotoxic
(d) Intratoxic

44. Which of the following is least often considered a factor influencing the type of radiation chosen?

(a) Type and size of tumor
(b) Location of tumor
(c) Proximity to normal tissues that are sensitive to radiation
(d) Gender of patient receiving the treatment

45. In human studies, which of these events were not accompanied by stressful experiences?

(a) Early death following stem cell transplants
(b) Progression of cancer
(c) Cancer related mortality
(d) Development of cancer

46. Which of these is an action through which stressful events can influence the growth of existing tumors?

(a) Hormones
(b) Neurotransmitter
(c) Immune changes
(d) All of the above.

47. Which of these 'superfoods' have been associated with a reduction in cancer risk?

(a) Kale
(b) Goji berries
(c) Garlic
(d) There is generally no scientific evidence to support 'superfoods' and reduced cancer risk

48. For frozen section, tissue should be sent in**:**

(a) 10 % formalin
(b) Carnay's solution
(c) Normal saline
(d) Fresh unfixed.

49. Stem cell research consists of**:**

(a) Human cells grown in vitro
(b) Plant cells grown in vitro
(c) Synonymous with PCR
(d) gene Therapy

50. Bacteria implicated in Gastric cancers**:**

(a) Salmonella
(b) H. Pylori
(c) Mycobacterium
(d) Streptococcus

51. CA 125 is a marker for**:**

(a) Ovarian Carcinoma
(b) Breast Carcinoma
(c) Soft tissue sarcoma
(d) Malanoma

52. All of the following are true for Thyroid stimulating hormone (TSH) except**:**

(a) It functions in iodine uptake and thyroxine metabolism
(b) High TSH values are observed in primary hypothyroidism
(c) High TSH values are observed in primary hyperthyroidism
(d) Its determination aids in avoiding under treatment of hypothyroidism and over treatment of hyperthyroidism

53. A substance present in or produced by a tumor or by the tumor's host in response to the tumor and used to determine the presence of a tumor based on its measurement in the blood or serum is known as**:**

(a) Tumor Markers
(b) Carcinogens
(c) Chemokines
(d) Oncoproteins

54. Jendrassik – Grof Method is used for
(a) Hormonal Assay
(b) Determination of serum bilirubin on autoanalysers
(c) Determination of Thyroid profile on autoanalysers
(d) Plasma glucose determination

55. Urine specific gravity test is used to determine the**:**
(a) Concentrating power of the kidneys
(b) Acid-base balance
(c) Concentration of free particles in urine
(d) Glomerular filtration rate(GFR)

56. In hemolytic jaundice, van der Bergh reaction is**:**
(a) Indirect positive
(b) Direct positive
(c) Biphasic
(d) Negative

57. The exogenous substance used to measure glomerular filtration rate (GFR) is
(a) Hippuric acid
(b) Inulin
(c) Creatinine
(d) AzureA-resin

58. The compound implicated in the development of cataract in diabetic patients is**:**
(a) Phosphofructokinase
(b) Glucagon
(c) Sorbitol
(d) Glucosamine

59. Factors responsible for the multiplication of pathogens include all except**:**
(a) Capsule secretion
(b) Possession of pili
(c) Endotoxin production
(d) Plasmids

60. The Laminar flow Workstations operate by**:**
(a) Drawing ambient air, under negative pressure into the top of unit
(b) Drawing ambient air, under positive pressure into the bottom of unit
(c) Use of a fan mounted under the cabinet to draw a curtain of sterile air over the products handled
(d) Fractional sterilization procedure

61. Electron microscopy can resolve viruses with diameter of
(a) 0.01mm to 0.2 mm
(b) 0.001mm to 0.02 mm
(c) 0.01 to 0.002 mm
(d) infinite

62. The Lac Operon consists of following genes
(a) Regulatory gene and promoter gene
(b) Regulatory gene, promoter gene and two structural genes
(c) Regulatory gene, promoter gene and operator gene
(d) Regulatory gene, promoter gene, operator gene and three structural genes

63. The PCR protocol includes all except
(a) Ligase chain reaction
(b) DNA extraction from a specific source
(c) Denaturation of DNA
(d) Annealing the primers to the DNA

64. Bioinformatics tools are used to
(a) To confirm delirious nature of a non-sense mutation
(b) To confirm delirious nature of a mis-sense mutation
(c) To confirm delirious nature of a polymorphism
(d) To confirm delirious nature of large deletions

65. In Gene cloning, DNA molecule under test is fragmented by using

(a) Enzyme restriction endonucleases
(b) Annealing enzymes
(c) DNA polymerase enzyme
(d) RNAase enzyme

66. R-banding technique is used to

(a) Determine if a chromosome has two centromeres
(b) Rapid identification of Y chromosome
(c) Evaluate constitutive heterochromatin
(d) Detect telomeres as dark bands

67. Dedifferentiation of normal cells during tumorigenesis is known as

(a) Anaplasia
(b) Dysplasia
(c) Metaplasia
(d) Tumor lysis

68. What nucleic acid does *in situ* hybridization stain?

(a) Protein
(b) DNA
(c) RNA
(d) Both RNA and DNA

69. When used in in situ hybridization, RNA probes are _____ to the sample's RNA.

(a) Complementary
(b) Identical
(c) Supplementary
(d) Similar

70. The function of genes can be determined by

(a) Exon trapping
(b) Northern analysis
(c) Homology search
(d) Zoo-blotting

71. Fluoresence in situ hybridization (FISH)

(a) Requires a labelled probe
(b) Is used in genetic mapping of genomes
(c) Requires deoxynucleotides
(d) Requires DNA polymerase

72. Chromosome walking

(a) Can be done by PCR
(b) Is used in genetic mapping
(c) Occurs in mitosis
(d) Can be used to close physical sequence gaps

73. Phase 1 of a clinical research is designed to assess

(a) Safety, tolerability, pharmacokinetics and pharmacodynamics of a drug
(b) To demonstrate the clinical efficacy of a drug
(c) Effectiveness of the drug and its value in clinical practice
(d) Involve the drug safety surveillance (pharmacovigilance)

74. A type of clinical trial that studies the side effects caused over time by a new treatment after it has been approved and is on market

(a) Phase 1 clinical trial
(b) Phase 4 clinical trial
(c) Phase 2 clinical trial
(d) Phase 3 clinical trial

75. A study in which neither the research team nor the participants are aware of which group patients were assigned to is

(a) Single- blinded study
(b) Open-label study
(c) Double- blinded study
(d) Cross-over trial

76. The utility of immunohistochemistry includes all except
(a) Categorization of undifferentiated tumors
(b) Screening of cancer
(c) Determination of site of origin of metastatic tumors
(d) Detection of molecules that have prognostic or therapeutic significance

77. HPV types most commonly associated with cervical carcinoma are
(a) 16 and 18 (b) 6 and 11
(c) 12 and 11 (d) 6 and 17

78. Examination of all chromosomes in a single experiment can be done by
(a) RT-PCR (b) FISH
(c) Mass Spectroscopy (d) Spectral Karyotyping

79. The use of drugs to target specific genes and proteins that are involved in the growth and survival of cancer cells is known as**:**
(a) Chemoprophylaxis (b) Neo-adjuvant therapy
(c) Targeted therapy (d) Palliative therapy

80. The basic cancer treatment modalities include all except**:**
(a) Stem cell transplant (b) Chemotherapy
(c) Radiation Therapy (d) Targeted therapy

81. All are tumour suppressor genes involved in human neoplasm except
(a) PTEN gene (b) BRCA 1 and 2 gene
(c) RB gene (d) KRAS gene

82. All are oncogenic viruses except
(a) Human Papillomavirus (b) Epstein-Barr virus
(c) Varicella-Zoster virus (d) Human herpesvirus 8

83. The epigenetic inheritance system has been described as
(a) Genotype inheritance (b) Soft inheritance
(c) RNA inheritance (d) Hard inheritance

84. Reversible, heritable changes in gene expression that occur without mutation is known as
(a) Epigenetics (b) Genetic engineering
(c) Gene amplification (d) Microsatellite instability

85. What does a viral DNA becomes after being associated with a bacterial chromosome
(a) Plasmid (b) Plaque
(c) Prophage (d) Gene

86. The bacterium that is most commonly used in genetic engineering is
(a) Escherichia (b) Klebsiella
(c) Proteus (d) Serratia

87. Mc Fadyean reaction is used to detect
(a) Bacillus anthracis (b) Brucella
(c) Corynaebacterium (d) Mycobacterium

88. The extracellular infectious form of a virus is called

(a) Capsid (b) Nucleocapsid

(c) Prion (d) Virion

89. A mutation causing a substitution of one amino acid is called

(a) Point mutation (b) Silent mutation

(c) Missense mutation (d) Driver mutation

90. DNA finger printing is based on

(a) Repetitive sequences (b) Unique sequences

(c) Amplified sequences (d) Non-coding sequences

91. All are variants of SARS-CoV-2 except

(a) B.1.1.7 (b) B.1.617.2

(c) B.1.1.529 (d) B.1.214

92. Which of the following is a non-reducing sugar

(a) Maltose (b) Lactulose

(c) Trehalose (d) Cellobiose

93. First discovered amino acid is

(a) Asparagine (b) Aspartate

(c) Glutamate (d) Glutamine

94. In anion exchange chromatography,

(a) The column contains negatively charged beads where positively charged proteins bind

(b) The column contains both positive and negatively charged beads where protein bind depending on their net charge

(c) The column contains positively charged beads where negatively charged proteins binds

(d) All of the above

95. Blastoma is a cancer involving which tissue

(a) Bones (b) Embryonic tissue

(c) Connective tissue (d) Epithelial tissue

96. Which is the most reliable type of observational study for investigating the link between diet and cancer

(a) Randomized controlled trial (b) Prospective study

(c) Ecological study (d) Case-control study

97. Arrange the following sequences of tumor development in the correct order

(1) Metastasis (2) Progression

(3) Promotion (4) Initiation

(a) 2,3,4,1 (b) 4,3,2,1

(c) 1,2,3,4 (d) 1,3,4,2

98. If DNA is damaged, which of the following gene arrest cell cycle

(a) p53 (b) Rb

(c) Hedgehog receptor (d) p16

99. Progressive loss of body fat and lean body mass in individuals with cancer is known as

(a) Cachexia (b) Paraneoplastic syndrome

(c) Myasthenia (d) Hypertrophic osteoarthropathy

100. SARS –CoV-2 is a

(a) Single stranded DNA virus
(b) Single stranded RNA virus
(c) Double stranded DNA virus
(d) Double stranded RNA virus

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