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FOR KSET PREPARATION

KSET 2024 Life Sciences Question Paper

EXAM	YEAR	TYPE
KSET	2024	Question Paper

A1

VERSION CODE

ELIGIBILITY/COMPETITIVE EXAM 2024
PAPER-2
Total Number of Questions: 100
Maximum Marks : 200

MENTION YOUR REGISTER NUMBER

Serial Number :

Subject: LIFE SCIENCE

INSTRUCTIONS FOR CANDIDATES

DOs:

1. This question booklet is issued to you at **9.55 a.m.** by the room invigilator.
2. Check whether the Register Number has been entered and shaded in the respective circles on the OMR answer sheet.
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1. In case of usage of signs and symbols in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains **100** questions and each question will have one statement and four different options / responses & out of which you have to choose one correct answer.
3. At **10.00 a.m.** remove the paper seal of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet within **5** minutes of the commencement of exam. Read each item and start answering on the OMR answer sheet.
4. Completely **darken / shade** the relevant circle with a **blue or black ink ballpoint pen against the question number on the OMR answer sheet.**

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①	●	③	④	⊗ ② ③ ④	① ② ③ ④	① ● ● ④					
				● ② ③ ④	① ● ③ ④	① ② ③ ④					

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8. After separating the top sheet (Office copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you.
9. All questions carry equal marks.
10. Use of Mobile Phones, Calculators and other Electronic / Communication gadgets of any kind is prohibited inside the Examination venue.

1. Who was the proposer of atomic theory?

(1) Rutherford

(2) John Dalton

(3) Neils Bohr

(4) James Chadwick

2. Non-polar molecules or non-polar portion of molecules tend to aggregate in water owing to a phenomenon called

(1) Hydrophilic effect

(2) Hydrophobic effect

(3) Van der Waals forces

(4) Hydrogen Bonding

3. In enzyme activity, the K_m value denotes

(1) Substrate concentration to reach $^1/_2$ V_{max}

(2) Substrate concentration to reach V_{max}

(3) Enzyme activity at minimum substrate concentration

(4) Substrate concentration to inactivate the enzyme

4. Among the following proteins, which one needs quaternary structure for its functional activity?

(1) G-Protein

(2) Haemoglobin

(3) Trypsin

(4) Collagen

5. Isopropanol is used to precipitate DNA from aqueous sample because

(1) DNA is more soluble in isopropanol

(2) Isopropanol is water soluble

(3) Isopropanol displaces the water molecules involved in solvation of DNA

(4) Isopropanol increases solvation of DNA in water

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6. When any two atoms approach each other closely, they create a weak, non-specific attractive force called

(1) Covalent Bonding

(2) Hydrogen Bonding

(3) Ionic Bonding

(4) Van der Waals interaction

7. By which of the following, can the linking number of a covalently closed circular DNA be changed?

(1) By creating phosphodiester bonds in only one strand

(2) By breaking phosphodiester bonds in one or both strands

(3) By increasing the ionic strength of the buffer

(4) By creating phosphodiester bonds in one or both strands

8. Resting membrane potential of plasma membrane is maintained by which of the following channels?

(1) Ca^{++} and H^{+} channels

(2) K^{+} and H^{+} channels

(3) Ca^{++} and Na^{+} channels

(4) Na^{+} and K^{+} channels

9. Fluidity of biological membrane may be enhanced by

(1) Increasing the concentration of saturated fatty acids

(2) Decreasing the concentration of saturated fatty acids

(3) Increasing the concentration of unsaturated fatty acids

(4) Increasing the concentration of cholesterol

10. During photosynthesis, electrons released from H_2O are transferred to

(1) Chlorophyll P_{680} via chloride

(2) Chlorophyll P_{680} via manganese

(3) Chlorophyll P_{700} via calcium

(4) Chlorophyll P_{700} via chloride

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11. Match the following:

a)	Vacuoles	i.	Detoxification
b)	Peroxisomes	ii.	Glycosylation
c)	Golgi bodies	iii.	Electron transfer
d)	Plastids	iv.	Storage house

(1) a – iv, b – i, c – ii, d – iii

(2) a – iv, b – iii, c – ii, d – i

(3) a – iv, b – ii, c – i, d – iii

(4) a – iv, b – iii, c – i, d – ii

12. Minus-strand RNA viruses are non-infective because

(1) They do not code for DNA polymerase

(2) They have reverse transcriptase to copy RNA

(3) Negative-strand RNA is not translated

(4) Host enzymes are inactivated

13. In cell division, separation of poles in Anaphase is achieved by

(1) Lengthening of Kinetochore microtubules at their (+) ends

(2) Shortening of polar microtubules at their (+) ends

(3) Kinesin-mediated sliding of polar microtubules

(4) Lengthening of Kinetochore microtubules at (–) ends

14. Which of the following is NOT a symbiotic bacteria?

(1) *Rhizobium*

(2) *Azospirillum*

(3) *E-coli*

(4) *Bradyrhizobium*

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15. What is the main purpose of the RecA protein in bacterial recombination?

(1) Catalyzing the formation of phosphodiester bonds between DNA strands

(2) Initiating DNA replication at the origin of replication

(3) Pairing single-stranded DNA with complementary sequences in double-stranded DNA

(4) Removing thymine dimers caused by UV radiation

16. If a sample of DNA is found to have the base composition (mole ratios) of Adenine – 40, Thymine – 22, Guanine – 19 and Cytosine – 19, what conclusion can be drawn?

(1) The DNA is a circular duplex

(2) The DNA is a linear duplex

(3) The DNA is single-stranded

(4) The DNA has highly repetitive sequences

17. Which of the following statements is FALSE?

(1) tRNA binds to amino acids

(2) tRNA has many modified bases

(3) tRNA is present only in eukaryotic cells

(4) tRNA carries anticodon

18. Transcription termination of mRNA in eukaryotes occurs

(1) at polyadenylation sites by the action of a terminator factor

(2) by the formation of a strong hairpin structure in the vicinity of polyadenylation sites

(3) at pause sites following the polyadenylation sites

(4) by termination factor bound to the termination site in the vicinity of polyadenylation sites

19. Which among the following molecular roles, does the 'signal peptide' play in directing proteins for secretion or to a specific subcellular localization?

(1) Directing the folding of proteins

(2) Assisting in proper folding

(3) Guiding the transport of proteins to the endoplasmic reticulum

(4) Inhibiting transcription

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20. Which one of the following is an example of a non-covalent interaction in proteins?

(1) Disulfide bridges

(2) Peptide bond

(3) Salt bridges

(4) Phosphodiester bond

21. The type of chromatin that undergoes decondensation process early in the cell cycle is

(1) Euchromatin

(2) Heterochromatin

(3) Centromeres

(4) Telomeres

22. The biochemical change that occurs in cells infected with cytocidal viruses is

(1) Shutdown of host cell's protein synthesis

(2) Destruction of cilia in respiratory epithelium

(3) Interfering with secretion of immunoglobulin

(4) Interfering with secretion of hormones

23. Which of the following statements about Decoy receptors is correct?

(1) They bind to the hormones irreversibly

(2) They continuously transduce signal through ion channel

(3) They do not transduce signal after binding to hormones

(4) They facilitate the binding of hormones to signaling receptors

24. Which of the following is NOT involved in Quorum sensing systems in bacteria?

(1) LuxI/LuxR

(2) Acyl-homoserine lactone autoinducers

(3) Oligopeptides

(4) Monomeric sugars

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25. Match the following:

a)	Collagen I	i.	Cartilage
b)	Hyaluronan	ii.	Wound healing
c)	Fibronectin	iii.	Basal lamina
d)	Collagen IV	iv.	Tendon

(1) a – iv, b – iii, c – ii, d – i

(2) a – iii, b – iv, c – ii, d – i

(3) a – ii, b – iii, c – iv, d – i

(4) a – iv, b – i, c – ii, d – iii

26. Tumor induction is done by which of the following RNA virus?

(1) Epstein-Barr virus

(2) Hepatitis C virus

(3) Kaposi's Sarcoma-Associated Herpesvirus

(4) Hepatitis B virus

27. Toll-like receptors (TLR) are NOT expressed in

(1) Dendritic cells

(2) Macrophages

(3) Basophils

(4) Fibroblast cells

28. Immunity against malarial disease denotes antibodies against

(1) Sporozoites

(2) Oocytes

(3) Macrogametocyte

(4) Microgamete

29. A technique in which a high-voltage pulse pushes the DNA into the cells is

(1) Vector

(2) Electroporation

(3) Transfection

(4) Micro injection

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30. Secondary spermatocytes undergo second division of meiosis to form

(1) Sperm
(2) Spermatid
(3) Sertoli cells
(4) Seminiferous tubules

31. The dimple formed during gastrulation in a frog on the embryo surface roughly 180° opposite the point of sperm entry is called

(1) Neural tube
(2) Somites
(3) Neurula
(4) Blastopore

32. What emerges from the seed first to enhance water uptake?

(1) Shoot
(2) Stem
(3) Axillary bud
(4) Radicle

33. The metamorphic changes of a frog's development are brought about by

(1) Testosterone
(2) Thyroid hormone
(3) Estrogen
(4) Insulin

34. The enzyme which converts testosterone into estrogen that plays a crucial role in sex determination is called

(1) Aromatase
(2) Decarboxylase
(3) Helicase
(4) Lipase

35. Caspases are strong proteases, which when activated they cause _____.

(1) Replication of DNA
(2) Cell death
(3) Transcription
(4) Translation

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36. The agents responsible for developmental disruptions are called

(1) Carcinogen
(2) Teratogen
(3) Morphogen
(4) Organizers

37. Which of the combinations of metabolites listed below is involved in feedback inhibition of pyruvate dehydrogenase?

(i) NADH
(ii) FAD
(iii) Acetyl-CoA
(iv) Acetaldehyde

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

38. Which one of the following combinations of secondary metabolite biosynthetic pathway results in the biosynthesis of terpenes?

(1) Shikimic and mevalonic acid pathways
(2) Malonic acid and MEP pathways
(3) Mevalonic acid and MEP pathways
(4) Shikimic acid and Malonic acid pathways

39. Which of the following is NOT the moist tropical forest?

(1) Wet evergreen forest
(2) Littoral swamp forest
(3) Sub-alphine forest
(4) Moist deciduous forest

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40. Which of the following wavelengths of light is responsible for stomatal movements in leaves of well-watered plants growing in natural environment?

(1) 620 – 750 nm (2) 450 – 495 nm

(3) 495 – 570 nm (4) 700 – 800 nm

41. Match the plant metabolites in Column A with their corresponding detection tests in the Column B:

	Column A		Column B
a)	Alkaloids	i.	Horizon test
b)	Flavonoids	ii.	Mayer's test
c)	Terpenoids	iii.	Salkowski test
d)	Triterpenoids	iv.	Shinoda's test

(1) a – i, b – ii, c – iii, d – iv

(2) a – ii, b – i, c – iii, d – iv

(3) a – ii, b – iv, c – iii, d – i

(4) a – iv, b – iii, c – i, d – ii

42. The photons captured by green plants are used in

(i) Photosynthesis

(ii) Production of toxic products such as superoxide, singlet oxygen, etc.

(iii) Generation of heat

(iv) Damage to D1 protein of PSII

Based on the above facts, photoinhibition occurs when the

(1) Excess photon intensity is completely used for heat generation

(2) Entire photon intensity is used for photosynthesis

(3) Excess photon intensity leads to the damage of D1 proteins

(4) Excess photon intensity is used for heat generation and formation of toxic products

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43. $^{12}CO_2$ and $^{13}CO_2$ are used for which of the following physiological studies?

(1) The ratio of C3 and C4 pathways of CO_2 fixation

(2) Estimate the rate of ATP production

(3) Determine the rate of photorespiration

(4) The ratio of C4 and CAM pathways of CO_2 fixation

44. Which of the following combination of statements is correct for secondary metabolite?

(i) They protect plants against being eaten by herbivores and against being infected by microbial pathogens

(ii) Terpenes, the largest class of secondary metabolites, are synthesized by methylerythritol phosphate

(iii) The most abundant classes of phenolic compounds in plants are derived from phenylalanine

(iv) Alkaloids are nickel containing secondary metabolites in plants

(1) (i), (iii) and (iv)

(2) (ii), (iii) and (iv)

(3) (i), (ii) and (iii)

(4) (i), (ii) and (iv)

45. The animals which excrete ammonia are called

(1) Ureotelic animals

(2) Uricotelic animals

(3) Ammonotelic animals

(4) Euryhaline animals

46. The single cell layer of granulosa surrounding the oocyte is called

(1) Corona radiata

(2) Corpus albicans

(3) Corpus luteum

(4) Antrum

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47. _____ hormone increases appetite in humans and rats.

(1) Leptin
(2) Motilin
(3) Ghrelin
(4) Gastrin

48. The opening of bile duct into the duodenum is guarded by

(1) Gall bladder
(2) Sinusoids
(3) Sphincter of Oddi
(4) Bile Canaliculus

49. Animals that depend on external sources for body heat are

(1) Ectotherms
(2) Homeotherms
(3) Endotherms
(4) Heterotherms

50. Megakaryocytes are increased in bone marrow by the hormone thrombopoietin which is secreted from

(1) Hepatocytes
(2) Adipocytes
(3) Cardiomyocytes
(4) Erythrocytes

51. Heart rate increases due to the release of _____

(1) Cytokines
(2) Epinephrine
(3) Interleukin
(4) Thromboplastin

52. The _____ serves as a "relay station" and a synaptic integrating centre for preliminary processing of all sensory inputs on its way to the cortex.

(1) Thalamus
(2) Basal nuclei
(3) Skeletal muscle
(4) Cortex

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53. The phenomenon of masking the effect of one dominant gene by another gene is called

(1) Pleiotropy

(2) Co-dominance

(3) Epistasis

(4) Supplementary gene interaction

54. Which of the following statements about phenocopy is correct?

(1) It is caused due to mutation

(2) It is induced by environmental factors

(3) It is induced by multiple copies of genes

(4) It is a heritable change

55. Who discovered linkage and crossing over?

(1) Ron Davis and Janet Mertz

(2) David Botstein and Ron Davis

(3) William Bateson and Reginald Punnett

(4) Arthur Kornberg and Joseph Banks

56. Which of the following statements is NOT correct with regard to extra chromosomal inheritance?

(1) It is a non-Mendelian inheritance

(2) Shows uniparental inheritance

(3) It involves RNA in replicating cytoplasmic organelles such as mitochondria and chloroplasts

(4) Shows reduced recombination

57. Shell coiling in the snail *Limnaea peregra* is an example for

(1) Maternal inheritance

(2) Sex-limited inheritance

(3) Incomplete dominance

(4) Autosomal inheritance

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58. Which of the following statements is incorrect about haemophilia?

(1) It is a sex-linked disease

(2) Male can be a carrier

(3) It is inheritable

(4) There is no cure for haemophilia

59. Select the intercalating agent from the following chemicals:

(1) Nitrous acid

(2) 2-Aminopurine

(3) Acridine orange

(4) Nitrosoguanidine

60. Who introduced the term 'gene' for the first time?

(1) Wilhelm Johannsen

(2) Friedrich Miescher

(3) Rosalind Franklin

(4) Carl Correns

61. To which of the following zoogeographic realms does the Indian subcontinent belong?

(1) Neotropical (2) Oriental

(3) Palearctic (4) Afrotropical

62. Stated below are the properties related to botanical and zoological nomenclature. Select a combination of two properties which best describe botanical nomenclature.

(i) Presence of only holotype and neotype

(ii) Absence of principle of coordination

(iii) Presence of genus and species ranks only

(iv) Absence of tautonyms

(1) (i) and (iii) (2) (ii) and (iv)

(3) (iii) and (iv) (4) (ii) and (iii)

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63. Choose the correct statement for the phylogeny of primates.
(1) Orangutans are closer to lorises than gibbons
(2) Humans are closer to new world monkeys than organutans
(3) Lemurs are more closely related to lorises than to gibbons
(4) Tarsiers are same as old world monkeys

64. The influenza H1N1 virus that causes swine flu in humans is a combination of viruses that affect
(1) Pigs-Birds-Humans
(2) Pigs-Rodents-Humans
(3) Pigs-Birds-Rodents
(4) Pigs-Reptiles-Humans

65. Which of the following is not an ex-situ conservation of germ plasm?
(1) Botanical garden
(2) DNA gene bank
(3) Biosphere Reserve
(4) Seed gene bank

66. Match the organism in Column A with their action in Column B:

Column-A	Column-B
(a) *Lactobacillus*	(i) Nitrogen fixation
(b) Protozoan	(ii) AIDS
(c) *Rhizobium*	(iii) Malaria
(d) Virus	(iv) Curd formation

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

67. Prawns and butterflies belong to the same phylum because of the presence of
(1) Bilateral symmetry
(2) Jointed legs
(3) Antennae
(4) Segmented body

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68. Animals that migrate over long distances between continents are termed as

(1) Local migrators

(2) Transoceanic migrators

(3) Transcontinental migrators

(4) Long-haul migrators

69. Which of the following is NOT a direct threat to loss of species diversity?

(1) Alien species

(2) Habitat loss

(3) Over exploitation

(4) Greenhouse gases

70. Which of the following is NOT a cause of ecological succession?

(1) Climatic and biotic factors

(2) Ecesis

(3) Synthetic causes

(4) Stabilizing causes

71. Edge effect is observed in

(1) Ecozone

(2) Ecotone

(3) Ecosphere

(4) Biotope

72. Which of the following statements about nutrient cycling in an ecosystem is NOT correct?

(1) The quantity of materials required for life are unlimited

(2) The gain of nutrients is through rainfall, nitrogen fixation

(3) The loss of nutrients is through soil erosion, denitrification

(4) The movement of nutrients between organisms and soil is through absorption, assimilation and decomposition

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73. Which of the following organisms do not fix atmospheric nitrogen?

(1) Azotobacter

(2) Anabaena

(3) Nostoc

(4) Gelidium

74. Which of the following is not a reason for small local population going extinct?

(1) Loss of genetic variation

(2) Environmental stochasticity

(3) Demographic stochasticity

(4) Dispersal stochasticity

75. What do you mean by carrying capacity of a population?

(1) The population size that can be supported by humans in a particular area

(2) The population size that can be supported by the environment in a particular area

(3) The population size that can be supported by available resources for a particular species in a habitat

(4) The population size in a particular habitat

76. The marine environmental event "Red tide" is due to the presence of

(1) Diatoms

(2) Red algae

(3) Cyanobacteria

(4) *Karenia brevis*

77. Lamarckism states that

(1) every offspring is similar to its parents

(2) every offspring inherits characters acquired by the parental generation

(3) every offspring shows struggle for existence

(4) every offspring that repeats phylogeny in its Ontogeny

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78. The nuclear region in prokaryotic organisms is not surrounded by membrane. This undefined nuclear area is known as

(1) Nucleic acid

(2) Nucleolus

(3) Nucleosome

(4) Nucleoid

79. Which biomolecule is more broadly dispersed in a cell?

(1) RNA

(2) DNA

(3) Chloroplast

(4) Spherosomes

80. The pigment largely responsible for collecting light energy during photosynthesis is

(1) Rhodopsin

(2) Xanthophyll

(3) Erythrocin

(4) Chlorophyll

81. The synthesis of various organic compounds from inorganic molecule was postulated by

(1) Miller

(2) Oparin and Haldane

(3) Darwin

(4) None of the above

82. Which of the following findings was discovered by Miller's experiments?

(1) Simple sugars

(2) Amino acids

(3) Peptides

(4) Nucleotides

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83. Paleontology is the study of

(1) rocks and minerals

(2) ancient languages

(3) prehistoric life through fossils

(4) weather patterns

84. Which of the following is a fundamental unit of heredity?

(1) Gene

(2) Cell

(3) Organ

(4) Species

85. Which of the following is a parasitic antibiotic?

(1) Erythromycin

(2) Albendazole

(3) Neomycin

(4) Tetracycline

86. Which of the following components needs to be immobilized on the surface of polystyrene plates to perform ELISA test to detect malarial infections?

(1) Parasite antigen

(2) Monoclonal antibody against parasite antigen

(3) Covalent linking of secondary antibody

(4) Conjugate solution

87. 16S rRNA sequencing is performed to identify which of the following species?

(1) Bacteria

(2) Yeast

(3) Fungi

(4) Parasite

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88. Gene therapy is approved and works on the principle of _____

(1) Epigenetic inheritance

(2) Genetic modification

(3) Lateral gene transfer

(4) Horizontal gene transfer

89. Among the following processes, which is the major contributor to global warming?

(1) Generation and burning of solid waste

(2) Contamination of water resources

(3) Usage of fossil fuels

(4) Deforestation

90. Rice contains _____ number of Marker Assisted Selection (MAS) genes which is applied for the selection of pest-resistant and nutrient-rich strains.

(1) 3

(2) 10

(3) ~30

(4) 300

91. Phytoremediation uses one of the following principles to immobilize and detoxify the pollutants: _____

(1) Phytoextraction

(2) Phytoconversion

(3) Phytodegradation

(4) Phytostabilization

92. The analyte that is measured to monitor stress and anxiety using saliva is

(1) Blood pressure

(2) Cortisol

(3) Alpha-Amylase

(4) Adrenaline

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93. How does AFLP differ from other DNA fingerprinting techniques like RFLP?

(1) AFLP uses DNA probes for identification

(2) AFLP uses restriction enzymes

(3) AFLP is limited to coding regions of DNA

(4) AFLP uses selective PCR amplification and restriction enzyme digestion

94. Among the following options, which one is NOT TRUE about fusion tags, used in recombinant protein production?

(1) Aids in identification of recombinant protein

(2) Aids in proper folding of recombinant protein

(3) Aids in improving the catalytic function of the protein

(4) Aids in isolation of the expressed recombinant protein

95. Which of the following statements is TRUE about the type II error?

(1) Type II error is accepting an incorrect hypothesis

(2) Type II error is rejecting an incorrect hypothesis

(3) Type II error is accepting a correct hypothesis

(4) Type II error is rejecting a correct hypothesis

96. In a positively-skewed distribution, the relationship between mean, median and mode is

(1) Mean < Median < Mode

(2) Mean > Median > Mode

(3) Mean = Median = Mode

(4) Mode < Mean < Median

97. When silver halide crystals are exposed to the radiation in an autoradiograph, which of the following chemical conversions take place?

(1) Silver to nanosilver

(2) Alpha radiation to beta radiation

(3) Silver halide to metallic silver

(4) Nanosilver to silver

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98. Image processing method after capturing image by microscope involves

(1) Image enhancement and restoration

(2) Pixel capturing efficiency

(3) Color luminance selection

(4) Capturing of luminance

99. EEG is conducted to analyse the following EXCEPT to

(1) perform brain activity recording

(2) diagnose conditions affecting the brain

(3) detect epilepsy

(4) brain tumor

100. Which of the following methods is NOT used for ground sensing?

(1) Magnetometry

(2) Resistivity

(3) Georadar

(4) Visible and infrared sensors

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