

University of Health Sciences, Lahore



Total MCQs: 200

Max. Marks: 200

MDCAT-2022

For F.Sc. and Non-F.Sc. Students

Time Allowed: 210 Minutes (3-½ hours)

Instructions:

- i. Read the instructions on the MCQ Response Form carefully.
- ii. Choose the **Single Best Answer** for each question.
- iii. Each Correct Answer carries One Mark. There is **No Negative Marking**
- iv. Candidates are strictly prohibited from giving any identification mark except Roll. No. & Signature in the specified columns only.

BIOLOGY

Q.1 What does the term bacteriophage refer to?

- | | |
|-----------------------------------|--------------------------------------|
| a. A virus that infects bacteria | c. A virus which behaves as bacteria |
| b. A bacterium that infects virus | d. Combination of Bacterium & Virion |

Q.2 What of the following virus contains single stranded DNA?

- | | |
|-----------------|----------------|
| a. Adeno virus | c. Parvo virus |
| b. Herpes virus | d. Pox virus |

Q.3 How many tail fibrils are attached to the end plate of a bacteriophage?

- | | |
|------|------|
| a. 2 | c. 6 |
| b. 4 | d. 8 |

Q.4 The enzymes integrase, protease and reverse transcriptase are found in which virus?

- | | |
|----------------------|---------------------------------|
| a. Hepatitis A virus | c. Influenza virus |
| b. Herpes virus | d. Human immunodeficiency virus |

- Q.5 What is the end product of glucose by yeast in anaerobic respiration?**
- Ethanol and oxygen
 - Ethanol and water
 - Ethanol and CO₂
 - Lactic acid and CO₂
- Q.6 Each carrier in Electron Transport Chain is first _____ and then _____.**
- Broken-down, Regenerate
 - Generated, Broken-down
 - Oxidized, Reduced
 - Reduced, Oxidized
- Q.7 Electron transport chain explains:**
- Photophosphorylation
 - Z-Scheme
 - Photolysis
 - Mechanism of ATP synthesis
- Q.8 What is the colour of Chlorophyll-b molecule?**
- Blueish green
 - Yellowish green
 - Dark Green
 - Reddish green
- Q.9 Upon initial hydrolysis starch yields:**
- Maltose
 - Glucose
 - Sucrose
 - Mannose
- Q.10 Human Bone cells contain.% of water?**
- 20
 - 40
 - 85
 - 90
- Q.11 Unique three-dimensional shape of the fully folded polypeptide, constitutes:**
- Primary structure of protein
 - Secondary structure of protein
 - Tertiary structure of protein
 - Quaternary structure of protein
- Q.12 Butyric acid is a _____ carbon fatty acid.**
- 6
 - 2
 - 4
 - 8
- Q.13 Which of the following is a conjugated molecule?**
- Protein
 - Lipid
 - Glycoproteins
 - Vitamins
- Q.14 Hydrolysis process is a reverse of ----- process.**
- Photolysis
 - Condensation
 - Deduction
 - Convection
- Q.15 Proteins are the main ----- of the cell?**
- Physiological components
 - Functional components
 - Structural components
 - Biological components

- Q.16 Cell wall may be absent in which of the following?**
- a. Plant & Algae
 - b. Algae & Fungi
 - c. Fungi & Archaea
 - d. Bacteria & Archaea
- Q.17 Structure formed by invagination of plasma membrane and involved in cell division and DNA replication of prokaryotic cell:**
- a. Lysosomes
 - b. Mesosomes
 - c. Golgi bodies
 - d. Phragmoplasts
- Q.18 Which of the following are single membranous organelles?**
- a. Mitochondria and ribosomes
 - b. Cytosol, mitochondria and ribosomes
 - c. Golgi bodies, Lysosome and ER
 - d. Golgi bodies, lysosome and mitochondria
- Q.19 Movement of molecules against the concentration gradient is?**
- a. Passive transport
 - b. Active transport
 - c. Facilitated diffusion
 - d. Filtration
- Q.20 The digestive vacuoles and autophagosomes are also known as?**
- a. Phagocytosis
 - b. Primary lysosome and autophagy
 - c. Secondary lysosome
 - d. Peroxisome
- Q.21 The cell wall of Bacteria is made up of:**
- a. Chitin
 - b. Murein
 - c. Cellulose
 - d. Hemicellulose
- Q.22 Which one is common in both prokaryotic and eukaryotic cells?**
- a. Cytoplasmic streaming movement
 - b. Ribosome
 - c. Binary fission
 - d. Nuclear envelope
- Q.23 There is no clear difference between dendrites and axons in sensory neurons, except:**
- a. Thickness
 - b. Length
 - c. Terminal portions
 - d. None of the above
- Q.24 The neurotransmitter active outside the CNS (Central Nervous System) is:**
- a. Acetylcholine
 - b. Dopamine
 - c. Glutamate
 - d. Serotonin
- Q.25 A hormone that plays a major role in social bonding, childbirth, milk ejection and sexual reproduction is:**
- a. Estrogen
 - b. Oxytocin
 - c. Prolactin
 - d. Secretin
- Q.26 Hormone produced by placenta is:**
- a. Follicle-Stimulating Hormone (FSH)
 - b. Luteinizing Hormone (LH)
 - c. Progesterone
 - d. Testosterone

- Q.27 The middle layer of meninges is:**
- a. Arachnoid mater
 - b. Pia mater
 - c. Dura mater
 - d. Cranium
- Q.28 The part of brain which guides smooth and accurate motions and maintains body position is:**
- a. Cerebrum
 - b. Cerebellum
 - c. Pons
 - d. Medulla
- Q.29 Water vascular system or ambulacral system is a unique and complex system specially present in?**
- a. Sponges
 - b. Arthropods
 - c. Echinoderms
 - d. Fishes
- Q.30 Round worms belong to which phylum?**
- a. Annelida
 - b. Coelenterata
 - c. Nematoda
 - d. Platyhelminthes
- Q.31 Silver fish is a/an?**
- a. Insect
 - b. Mollusc
 - c. Jawless fish
 - d. Cartilaginous fish
- Q.32 Tissue are not found in the following animal?**
- a. Flat worms
 - b. Sponges
 - c. Cnidarians
 - d. Round worms
- Q.33 Enzymes lower the activation energy by stabilizing the transition state of a metabolic reaction due to?**
- a. Changing conditions within the active site
 - b. Changing conditions within the protein framework
 - c. Rearranging the fatty acids in active site
 - d. Distorting the molecules in the allosteric site
- Q.34 Competitive inhibitors compete with?**
- a. Enzyme
 - b. Substrate
 - c. Product
 - d. Coenzyme
- Q.35 Non-competitive inhibitor molecules have:**
- a. A similar structure to the normal substrate molecule
 - b. A quite different structure from the substrate molecule
 - c. A different conformation but fit into the active site
 - d. A similar conformation but does not fit into the active site
- Q.36 Zinc ion is attached at the active site of the enzyme carboxypeptidase. The zinc ion functions as:**
- a. A coenzyme molecule
 - b. An activator
 - c. An inhibitor molecule
 - d. Controller of Allosteric site

- Q.37** What is the best physiological pH for optimum functioning for most of the cellular enzymes of human?
- a. 2-3 pH
 - b. 3-5 pH
 - c. 6-8 pH
 - d. 8-10 pH
- Q.38** Adaptations that an organism acquires by its own actions during its life span without modifying its genome are:
- a. Heritable
 - b. Non-heritable
 - c. Can be made heritable through some modification
 - d. Sometimes heritable and other times non-heritable
- Q.39** For evolutionary process to occur, which of the following is NOT a geographical barrier?
- a. Ocean
 - b. River
 - c. Mountains
 - d. Atmosphere
- Q.40** According to the Biogenetic Law of Ernst Haeckel:
- a. There is survival of the fittest
 - b. There is use and disuse of organs
 - c. Phylogeny recapitulates ontogeny
 - d. Ontogeny recapitulates phylogeny
- Q.41** The animal species on Galapagos resemble species living on the:
- a. Northern Europe
 - b. Great Britain
 - c. North American mainland
 - d. South American mainland
- Q.42** Digested food from intestine is carried to the liver by?
- a. Hepatic artery
 - b. Hepatic vein
 - c. Hepatic portal vein
 - d. Hepatic portal artery
- Q.43** ----- proteins are produced by WBCs in response to ----- and provide immunity?
- a. Antibiotics, antigen
 - b. Antibodies, RBC
 - c. Globulin, histamine
 - d. Antibodies, antigen
- Q.44** The lymphatic vessels of the body empty the lymph into blood stream at ?
- a. Abdominal vein
 - b. Jugular vein
 - c. Subclavian vein
 - d. Bile duct
- Q.45** Flow of blood in the capillaries is adjusted by?
- a. Heart directly
 - b. Pre-capillary sphincters
 - c. Meta-arteriole
 - d. Valves
- Q.46** The pressure exerted by a solution separated by a semipermeable membrane from pure water is _____?
- a. Osmotic Pressure
 - b. Soil potential
 - c. Solute Potential
 - d. Solvent potential

- Q.47** Which of the following is NOT a consequence of anaerobic respiration in humans muscles cells?
- Cramps
 - High consumption of energy
 - Pain
 - Tiredness
- Q.48** The respiratory surfaces exhibit following characteristic?
- It must be permeable
 - It must be thick for low diffusion
 - It should be non-vascularized
 - It should have low ventilation mechanism
- Q.49** Which of the following is a prokaryote?
- Protista
 - E.coli
 - Amoeba
 - Fungi
- Q.50** Number of layers present in Gram-negative bacterial cell wall :
- one
 - two
 - three
 - four
- Q.51** The division of cocci in three planes form Sarcina, which is a cube of ----- Cocci?
- 02
 - 04
 - 08
 - 16
- Q.52** Which of the following statement is correct?
- Tuberculosis and Pneumonia are caused by Gram Positive Bacteria
 - Tuberculosis and Pneumonia are caused by Gram Negative Bacteria
 - Pneumonia is a lung disease caused by Gram Negative Bacteria
 - Tuberculosis is a lung disease caused by Gram Negative Bacteria
- Q.53** Nitrifying bacteria are the examples of:
- Heterotrophic bacteria
 - Chemosynthetic bacteria
 - Saprophytic bacteria
 - Parasitic bacteria
- Q.54** Each human testis is divided into:
- 50-100 lobules
 - 150-200 lobules
 - 200-300 lobules
 - 250-300 lobules
- Q.55** Which cells in the human males are responsible for the release of testosterone?
- Pituitary Gland
 - Hypothalamus
 - Sertoli cells
 - Leydig cells or interstitial cells
- Q.56** Fertilized ovum is implanted and undergoes further development in the:
- Ovary
 - Uterus
 - Oviduct
 - Cervix
- Q.57** Level of luteinizing hormone (LH) is maximum in blood during which stage of menstrual cycle?
- Menstrual stage
 - Proliferative stage
 - Ovulation stage
 - Secretory stage

Q.58 Major source of transmission of syphilis is:

- a. Blood transfusion
- b. Insect bite
- c. Contaminated water
- d. Sexual contact

Q.59 What is FALSE about cartilage?

- a. There are many blood vessels in cartilage
- b. It is a form of connective tissue
- c. It covers ends of the bones at joints
- d. It is much softer than bone

Q.60 Which of the following is a muscle component that act as store for energy?

- a. ATP
- b. Creatine-PO₄
- c. Myoglobin
- d. Creatinine-PO₄

Q.61 Which of the following is NOT found in skeletal muscle fibers in human?

- a. Multiple nuclei
- b. Multiple mitochondria
- c. Large amount of myoglobin
- d. Large amount of hemoglobin

Q.62 Hinge joint is present between which of the following bones?

- a. Humerus and radio-ulna
- b. Femur and pectoral girdle
- c. Femur and acetabulum
- d. Humerus and pectoral girdle

Q.63 Test cross is made to check the genotype of a trait. Which of the following crosses is a test cross?

- a. Unknown x At
- b. Unknown x tt
- c. Unknown x AB
- d. Unknown x TT

Q.64 What happens when a Rh -ve woman, married to a Rh +ve man conceives a child who is Rh +ve?

- a. Maternal-foetal incompatibility
- b. Paternal-foetal incompatibility
- c. Cancer of fetus
- d. Death of mother

Q.65 DNA stores biological information in discrete units termed as:

- a. Genes
- b. Phenotypes
- c. Karyotypes
- d. Cells

Q.66 To study sex linkages in Drosophila, Morgan mated white eyed males with wild type red eyed females. What will be the phenotype of offspring?

- a. All red eyed males and females
- b. Red eyed females and white eyed males
- c. White eyed females and red eyed males
- d. All white eyed females and males

Q.67 Which one of the following is X Linked Dominant disorder?

- a. Haemophilia
- b. Color blindness
- c. Hypophosphatemic rickets
- d. Hypertrichosis

Q.68 Mode of inheritance in humans can be traced through:

- a. Experimental Mating
- b. Chi Square Chart
- c. Pedigree Analysis
- d. Probability Analysis

CHEMISTRY

Q.69 One a. m .u stands for

- a. An atom of C – 12
- b. 1/12th of a carbon
- c. 1/12th of H
- d. 1 atom of all the elements

Q.70 A compound of sodium oxide has 74.2 % sodium and 25.8% of Oxygen. The empirical formula of the compound is?

- a. NaO
- b. NaO₂
- c. Na₂O
- d. Na₂O₂

Q.71 30 grams of 2-propanol were mixed with excess acidified K₂Cr₂O₇ and boiled under reflux for 20 minutes. The organic product was then collected by distillation. The yield of product was 75.0%. What is the mass of product produced?

- a. 1.74g
- b. 21.75g
- c. 2.74g
- d. 29 g

Q.72 According to which scientist, the probability of finding an electron at a certain position is possible?

- a. Bohr's
- b. De-Broglie
- c. Hund's
- d. Schrodinger

Q.73 Which gas in the discharge tube produces lightest canal ray particles?

- a. Ar
- b. He
- c. H₂
- d. Ne

Q.74 Which element has the ground state electronic configuration of 1s², 2s², 2p⁶, 3s², 3p⁶?

- a. Ar
- b. Cl
- c. Na
- d. S

Q.75 What is the proton (atomic number) of an element that has four unpaired electrons in its ground state?

- a. 6
- b. 14
- c. 22
- d. 26

Q.76 A gaseous mixture contains 9.6% NH₃, 22.6% N₂ and 67.8% H₂ gases. If the total pressure is 50 atm, then the partial pressure of H₂ is

- a. $67.8 \times 100 / 50$
- b. $50 \times 100 / 100$
- c. $67.8 \times 50 / 100$
- d. $67.8 + 50 / 100$

- Q.77** If we want to raise the temperature of one mole of an ideal gas by one kelvin, we have to provide how much amount of energy?
- 0.0821 joules
 - 8.314 dm³-atm
 - 0.0821 kJ
 - 0.0821 dm³-atm
- Q.78** The process of heat flow between hotter and colder gases remains continued until all the molecules have equal
- Average translational kinetic energy
 - Average rotational kinetic energy
 - Average translational potential energy
 - Average vibrational kinetic energy
- Q.79** In liquid, with the change in dipole-dipole forces, there is a change in some physical properties. Select the property which is not affected by the strength of dipole-dipole forces?
- boiling point
 - heat of vaporization
 - heat of sublimation
 - moles
- Q.80** Which of the following factor does not affect the magnitude of vapor pressure?
- amount of liquid
 - size of molecule
 - temperature of liquid
 - intermolecular forces
- Q.81** A small building block which belongs to whole information about crystal structure is called?
- Cell
 - Unit Cell
 - Crystal lattice
 - Crystal unit
- Q.82** Which type of solid is called as atomic solid?
- Covalent solids
 - Ionic solids
 - Metallic solids
 - Molecular solids
- Q.83** The decrease in solubility of the salt in a solution that already contains an ion common to that salt is known as:
- Le Chatelier's principle
 - Solubility Product
 - Common ion effect
 - K_{sp}
- Q.84** The precipitation occurs if the ionic concentration is:
- Less than k_{sp}
 - More than k_{sp}
 - Equal to k_{sp}
 - Present in any amount
- Q.85** One can estimate the direction in which equilibrium will shift with the help of:
- Le Chatelier's principle
 - Law of mass action
 - Mess's law
 - Law of heat of formation

- Q.86** What is the overall order of this rate equation? $\text{Rate} = k[\text{H}_2][\text{NO}_2]^2$
- 1
 - 2
 - 3
 - 4
- Q.87** The catalysis in which the catalyst and the reactants are in the same phase is known?
- Heterogeneous catalyst
 - Homogeneous catalyst
 - Slow
 - Fast
- Q.88** Born-Haber cycle is used to determine the Lattice energy of ionic compounds. It is the application of
- Henry's law
 - Le - Chatelier's Principle
 - Hess's law
 - Common ion effect
- Q.89** Which of the following term is state function?
- freezing
 - decomposition
 - sublimation
 - enthalpy
- Q.90** An electrochemical cell is based upon which reaction?
- Acid-base reaction
 - Redox reaction
 - Nuclear reaction
 - Neutralization reaction
- Q.91** In which of the following, oxygen shows fractional oxidation number?
- OF_2
 - Na_2O_2
 - KO_2
 - Cl_2O_7
- Q.92** Which of the following element has smaller size?
- Na
 - K
 - Al
 - Li
- Q.93** Among LiCl , BeCl_2 , NaCl , CsCl , the compounds with the greatest and the least ionic character respectively are:
- LiCl and CsCl
 - NaCl and LiCl
 - CsCl and NaCl
 - CsCl and BeCl_2
- Q.94** Which statement describes the conversion of magnesium atoms to magnesium ions for ionic bond formation with chlorine?
- The change is reduction, because there has been a gain of electrons
 - The change is oxidation, because there has been a loss of electrons
 - The change is reduction, because there has been a loss of electrons
 - The change is oxidation, because there has been a gain of electrons
- Q.95** AB_4 Type with no Lone Pairs geometry enables to form which shape of molecule?
- Trigonal
 - Regular tetrahedron
 - Regular octahedron
 - Regular pyramidal

Q.96 Why dimer of Aluminum chloride is formed

- a. Aluminum is electron rich
- b. Aluminum is having lone pair of electron
- c. Aluminum donates lone pair to form bridge
- d. Aluminum forms coordinate bonds with chlorine to complete its octet

Q.97 Which group of the periodic table contain non-metals, metalloids and metals.

- a. I B
- b. VII A
- c. IV A
- d. VI A

Q.98 Which of the following sulfate compound is insoluble in water ?

- a. BeSO_4
- b. BaSO_4
- c. MgSO_4
- d. CaSO_4

Q.99 Which of the following complex show a tetrahedral geometry?

- a. $[\text{Fe}(\text{CO})_5]$
- b. $[\text{Cu}(\text{CN})_4]^{2-}$
- c. $[\text{Au}(\text{Cl})_4]^-$
- d. $[\text{Pt}(\text{NH}_3)_4]^{2+}$

Q.100 In which pair one has all Unpaired d orbitals while other have all paired d orbitals ?

- a. Cu and Zn
- b. Cr and Fe
- c. Cr and Zn
- d. Mn and Co

Q.101 In which of the following functional groups, the carbon atom is sp hybridized?

- a. $-\text{CHO}$
- b. $-\text{COOH}$
- c. $-\text{CN}$
- d. $-\text{COOR}$

Q.102 The compounds containing R-SH functional group are known as:

- a. Alcohols
- b. Thio-alcohols
- c. Thio-ether
- d. Nitrile

Q.103 What is the number of isomers of a hydrocarbon having a molecular formula, C_4H_8 ?

- a. 2
- b. 3
- c. 4
- d. 5

Q.104 Alkylbenzene is formed when benzene is treated with an alkyl halide in the presence of anhydrous aluminum chloride. Identify the type of reaction.

- a. Halogenation
- b. Friedel-Crafts acylation reaction
- c. Friedel-Crafts alkylation reaction
- d. Sulphonation

Q.105 Three alternate single and double bonds in benzene are called?

- a. Conjugate bonds
- b. Coordinate covalent bonds
- c. Fixed bonds
- d. Ionic bonds

Q.106 Which of the following compound is more acidic?

- a. Alkane
- b. Alkene
- c. Alkyne
- d. Cycloalkane

Q.107 Consider the chlorination of methane, the attack of chlorine free radical on methane form methyl free radical occurs in ?

- a. Initiation step
- b. Propagation step
- c. Termination step
- d. Last step

Q.108 The ratio of sigma to pi electrons in benzene is?

- a. 1:3
- b. 3:1
- c. 4:1
- d. 1:4

Q.109 When halogen is removed from an alkyl halide a carbocation is formed, identify the most reactive carbocation

- a. Primary carbocation
- b. Secondary carbocation
- c. Tertiary carbocation
- d. Methyl carbocation

Q.110 Freon is commonly known as ?

- a. Refrigerant
- b. A solvent
- c. Insecticides
- d. A fire extinguisher

Q.111 Neopentylchloride belongs to which class of alkyl halides?

- a. Primary alkyl halides
- b. Secondary alkyl halides
- c. Tertiary alkyl halides
- d. Quaternary alkyl halides

Q.112 What is the common name of 1,2,3-propanetriol?

- a. Butyl alcohol
- b. Glycol
- c. Glycerol
- d. Propyl alcohol

Q.113 Benzene is formed when Na reacts with which of the following?

- a. Alcohol
- b. Butyl alcohol
- c. Propanol
- d. Phenol

Q.114 When Phenol reacts with formaldehyde, which of the following product is produced?

- a. Adduct
- b. Hydronium ion
- c. Oxonium ion
- d. Phenoxide ion

Q.115 Which of the following is the correct name of $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_2\text{CHO}$?

- a. 3-oxo hexanal
- b. 3-one hexanal
- c. 3-oxo hexanol
- d. 3 keto hexanol

Q.116 Which is the most suitable reagent for the conversion of $R-CH_2OH \rightarrow RCHO$?

- a. $KMnO_4/NaOH$
- b. $K_2Cr_2O_7/H_2SO_4$ (Conc.)
- c. CrO_3
- d. Cr_2O_4/H_2SO_4 (Conc.)

Q.117 Which of the following is also called silver mirror test?

- a. Benedict's solution test
- b. Fehling's solution test
- c. Iodoform test
- d. Tollen's reagent test

Q.118 Which among the following have least pH?

- a. CH_3CH_2COOH
- b. CH_2ClCH_2COOH
- c. CH_3CHCl_2COOH
- d. $CH_3CH_2CH_2COOH$

Q.119 If carboxylic acid and ketone groups $C=O$ are present in a chain then final name will be given as

- a. oxo, oic acid
- b. one, oic acid
- c. Both 1 and 2
- d. None of these

Q.120 When carboxylic acids and dicarboxylic acids have similar molecular weights, how do their melting points compare?

- a. Carboxylic acids have greater melting points
- b. Dicarboxylic acids have greater melting points
- c. Both acids have similar melting points
- d. No any consistent trends exists

Q.121 When food reaches stomach, the action of which of the following come to an end due to acidic PH?

- a. Lipases
- b. Amylase
- c. Maltase
- d. Hydrolases

Q.122 Which of the following proteins acts as carrier of copper in blood plasma?

- a. Hemoglobin
- b. Glycoprotein
- c. Ceruloplasmin
- d. Histone

PHYSICS

Q.123 What is the shape of velocity-time graph for constant acceleration?

- a. Parabola line
- b. Straight line
- c. Incline curve
- d. Decline curve

Q.124 Which of the following is the correct definition of variable velocity?

- a. Unequal distances are covered in equal intervals of time
- b. Equal displacements are made in unequal intervals of time
- c. Unequal displacements are made in equal intervals of time
- d. Equal displacements are made in equal intervals of time

Q.125 A stone thrown horizontally from the top of a tall building follows a path that is:

- a. Circular
- b. Made of two straight line segments
- c. Hyperbolic
- d. Parabolic

Q.126 Which of the following is incorrect?

- a. Reaction force on a body is always balanced by the action force
- b. Reaction and action forces are always equal
- c. Action and reaction forces never act on the same body
- d. Newton's Third Law is always valid in all situations

Q.127 A fireman wants to slide down a rope. The breaking load of the rope is $\frac{3}{4}$ th of the weight of the man. With what acceleration should the fire man slide down? (Acceleration due to gravity is 'g')

- a. g
- b. $g/4$
- c. $3g/4$
- d. 0

Q.128 When a heavy coin falls a short distance towards the ground it does not reach terminal velocity. Why is this so?

- a. The coin has not hit the ground
- b. The weight of coin is equal to air resistance
- c. The weight of coin increases as air resistance increases
- d. The weight of coin is more than air resistance

Q.129 The consumption of energy by a 60 W bulb in 2 s is:

- a. 120 J
- b. 60 J
- c. 30 J
- d. 0.02 J

Q.130 A long spring, when stretched by a distance x, has potential energy V. On increasing the stretching to nx, the potential energy of the spring will be:

- a. nV
- b. V/n
- c. $n^2 V$
- d. V/n^2

Q.131 Ignoring details associated with friction, extra forces exerted by arm and leg muscles, and other factors, we can consider a pole vault as the conversion of an athlete's running kinetic energy to gravitational potential energy. If an athlete is to lift his body 5 m during a vault, what speed must he have when he plants his pole?

- a. 5 m/s
- b. 10 m/s
- c. 15 m/s
- d. 20 m/s

- Q.132** A particle of mass m at rest is acted upon by a force P for time t . Its kinetic energy after time t is:
- $(P^2 t^2)/m$
 - $(P^2 t^2)/2m$
 - $(P^2 t^2)/3m$
 - $(P^2 t^2)/4m$
- Q.133** The number of revolutions in 3π radians is:
- $1/60$
 - $3/2$
 - 2
 - 6
- Q.134** If a flywheel is rotating at 3.0 rad/s , the time it takes to complete one revolution is about
- 0.67 s
 - 1.0 s
 - 1.3 s
 - 2.1 s
- Q.135** A fighter plane is moving in a vertical circle of radius r . Its minimum velocity at the highest point of the circle will be ?
- $\sqrt{3gr}$
 - $\sqrt{2gr}$
 - \sqrt{gr}
 - $\sqrt{(gr/2)}$
- Q.136** Which of the following increase by increasing amplitude?
- Wavelength
 - Frequently
 - Zero
 - Loudness
- Q.137** An airplane travels at a speed of $0.5v$ where v is the speed of sound. The airplane approaches a stationary observer. The frequency of sound emitted by the aircraft is 200 Hz . Which frequency does the observer hear?
- 400 Hz
 - 100 Hz
 - 120 Hz
 - 180 Hz
- Q.138.** If the wavelength of light coming from a galaxy shifts towards the red end of spectrum, then galaxy is:
- Approaching Earth
 - Receding the Earth
 - Stationary
 - Approaching Earth or is stationary
- Q.139** The shortest distance between any two points in phase on a wave is called:
- Displacement
 - Amplitude
 - Wavelength
 - Frequency
- Q.140** When will the oscillations stop in the absence of resistive forces?
- Never
 - After 10 minutes
 - In 10 minutes
 - Immediately

Q.141 The mechanical waves are not generated by:

- a. Electric and magnetic fields
- b. Coil of springs
- c. Ropes
- d. Water

Q.142 Reducing mass M of a suspending body to one fourth will change the frequency of oscillation to:

- a. One fourth
- b. Double
- c. Quadruple
- d. Half

Q.143 A distant star is receding from the Earth with a speed of 1.40×10^7 m/s. It emits light of frequency 4.57×10^{14} Hz. The speed of light is 3.0×10^8 m/s. The Doppler effect formula can be used with light waves. What will be the frequency of this light when detected on Earth?

- a. 2.04×10^{13} Hz
- b. 4.37×10^{14} Hz
- c. 4.57×10^{14} Hz
- d. 4.79×10^{14} Hz

Q.144 Thermodynamics is that branch of Physics in which we study

- a. relations between heat and mechanical energies
- b. relations between heat and ionization energies
- c. relations between chemical and mechanical energies
- d. relations between kinetic and potential energies

Q.145 When a gas is compressed isothermally, the product of its pressure and volume during the process is:

- a. not constant
- b. constant
- c. zero
- d. proportional to entropy

Q.146 Temperature of given mass of a gas is changed from 150°C to 300°C during an isobaric process, volume of the gas will become:

- a. Half
- b. Double
- c. Remain same
- d. Less than double

Q.147 A capacitor is charged with a battery and energy stored is U . After disconnecting battery another capacitor of same capacity is connected in parallel to the first capacitor. Then energy stored in each capacitor is

- a. $U/2$
- b. $U/4$
- c. $4U$
- d. $2U$

Q.148. What is the potential difference between two points in an electric field if it takes 600 J of energy to move a charge of 2 C between these two points?

- a. 1200 J
- b. 800 J
- c. 300 J
- d. 0 J

Q.149. Gauss law cannot be used to find which of the following quantity?

- a. Electric field intensity
- b. Electric flux density
- c. Charge
- d. Permittivity

Q.150 Which one of the following statements is true?

- a. electrostatic force obeys inverse square law while gravitational force does not
- b. both gravitational force and electrostatic force are repulsive in nature
- c. gravitational force is much weaker than electrostatic force
- d. Both electrostatic force and gravitational force don't obey inverse square law

Q.151 The Coulomb's constant k depends upon:

- a. nature of medium
- b. system of units
- c. types of charge
- d. nature of medium and system of units

Q.152 A charged particle is moving in a uniform electric field. For the motion of the particle due to the field, which quantity has a constant non-zero value?

- a. acceleration
- b. displacement
- c. rate of change of acceleration
- d. velocity

Q.153 A capacitor of capacitance ' C ' has a charge ' Q ' and stored energy is ' w '. If the charge is increases to ' $2Q$ '. The stored energy will be:

- a. $2W$
- b. $4W$
- c. $W/4$
- d. $W/2$

Q.154 How much potential drop exist across closed switch?

- a. 0 V
- b. 1 V
- c. 2 V
- d. 3 V

Q.155 A 3 V battery is connected in series with ammeter and 2 ohm resistance after short circuiting. What will be the reading of ammeter?

- a. 1 A
- b. 1.5 A
- c. 5 A
- d. 6 A

Q.156 The resistance of a conductor does not depend on which of the following?

- a. area
- b. resistivity
- c. length
- d. mass

Q.157 Which of the following statement is NOT CORRECT about Kirchhoff's rule?

- a. Kirchhoff's current rule based upon the law of conservation of charge
- b. Wheatstone bridge is an application of Kirchhoff's rule
- c. Kirchhoff's rules are more suitable in AC circuits
- d. Kirchhoff's voltage rule based upon the law of conservation of energy

Q.158 What do the substances whose resistance decreases with increase in temperature have?

- a. high temperature coefficient
- b. negative temperature coefficient
- c. positive temperature coefficient
- d. zero temperature coefficient

Q.159 A low voltage supply with an e.m.f. of 20 V and an internal resistance of 1.5 ohms is used to supply power to a heater of resistance 6.5 ohms in a fish tank. What is the power supplied to the water in the fish tank?

- a. 41 W
- b. 50 W
- c. 53 W
- d. 62 W

Q.160 Electric forces change the magnitude and direction of velocity while magnetic forces change _____ of velocity

- a. Only Magnitude
- b. Only direction
- c. Magnitude and direction
- d. Neither magnitude nor direction

Q.161 Which surface has greater magnetic flux in same magnetic field, each has an area 1 m^2 .

- a. Circular
- b. Rectangular
- c. Square
- d. Flux is independent of shape

Q.162 The source of magnetic field is:

- a. An isolated magnetic pole
- b. Static electric charge
- c. Nonmagnetic substance
- d. Current loop

Q.163 One meter long copper rod is moving with speed 20 m/sec in the magnetic field of strength 0.6 tesla. What is the value of induced emf ?

- a. 10 v
- b. 12 v
- c. 14 v
- d. 16 v

Q.164 The unit of $\Delta\Phi/\Delta t$ can be written as ?

- a. $\text{NmA}^{-2}\text{s}^{-1}$
- b. NmAs^{-1}
- c. $\text{NmA}^{-1}\text{s}^{-1}$
- d. $\text{NmA}^{-2}\text{s}^1$

Q.165 Working principal of magnetic levitation train is according to ?

- a. Faraday law
- b. Max planks law
- c. Ohm law
- d. Lenz law

- Q.166** A copper hoop is held in a vertical east-west plane in a uniform magnetic field whose field lines run along the north-south direction. The largest induced emf is produced when the hoop is ?
- Rotated about a north-south axis
 - Rotated about an east-west axis
 - Moved rapidly, without rotation, toward the east
 - Moved rapidly, without rotation, toward the south
- Q.167** In transformer, there is no _____ connection between the two coils but they are _____ linked ?
- Magnetic, electrically
 - Electrical, magnetically
 - Magnetic, magnetically
 - Electrical, optically
- Q.168** When the temperature of semiconductor suddenly drops to zero kelvin, then a semiconductor acts as:
- Conductor
 - Semi-conductor
 - Super conductor
 - Insulator
- Q.169** If electron, proton, neutron, and alpha particle have same velocity, which of them has the shortest wavelength?
- Electron
 - Proton
 - Neutron
 - Alpha particle
- Q.170** The process of ejection of loosely bound electrons from a certain photo sensitive surface by absorption of photon is called:
- Compton effect
 - Photoelectric effect
 - Pair production
 - Black body radiation
- Q.171** In a photoelectric effect experiment, the stopping potential is:
- The kinetic energy of the most energetic electron ejected
 - The potential energy of the most energetic electron ejected
 - The photon energy
 - The electric potential that causes the electron current to vanish
- Q.172** The line spectrum of hydrogen atom contains the spectral lines in the region of:
- ultraviolet
 - infrared
 - visible
 - all of these
- Q.173** The speed of electron in the first Bohr orbit is:
- $2.19 \times 10^6 \text{ ms}^{-1}$
 - $2.19 \times 10^{-6} \text{ ms}^{-1}$
 - $2.19 \times 10^4 \text{ ms}^{-1}$
 - $2.19 \times 10^{-4} \text{ ms}^{-1}$

Q.174 A low energy neutron has RBE factor of 10. How much energy is absorbed by a man of mass 80 Kg if the value of equivalent dose is 400 rem?

- a. 16 J
- b. 32 J
- c. 48 J
- d. 64 J

Q.175 It has been observed that Thorium ($_{90}^{234}\text{Th}$) is transformed into Protactinium ($_{91}^{234}\text{Pa}$) after the emission of particle:

- a. Alpha
- b. Beta
- c. Gamma
- d. Alpha, Beta, Gamma

Q.176 The half-life of Strontium (Sr) is 8.70 hours. Its decay constant is:

- a. 0.000022 s
- b. 45000 /s
- c. 0.000022 / s
- d. 0.000032 / s

ENGLISH

Q.177 Synonym of the word "Capricious" is:

- a. Fickle
- b. Predictable
- c. Uniform
- d. Invariable

Q.178 Diseases like diabetes are supposed to be taken seriously or they can be Which of the following words will fill in the blank most appropriately?

- a. Cursing
- b. Healthy
- c. Fatal
- d. Impersonating

Q.179 Choose the most appropriate antonym for "abandonment":

- a. cessation
- b. stoppage
- c. halt
- d. extension

Q.180 Fill in the blank with the correct word. The shepherd ploughed this mountain with cattle the first time it ever ploughed.

- a. was
- b. was been
- c. had
- d. had been

Q.181 To give one some idea of Rabies' horrors, one only read such descriptions as the following: spasms, restlessness, shudders at the least breath of air, an ardent thirst, convulsive movements, and fits of furious age.

- a. needs
- b. need
- c. needed
- d. has needed

Q.182 By 2030, people been reading the works of Charles Dickens for more than 190 years.

- a. had
- b. will
- c. have
- d. will have

Q.183 Choose the most suitable/appropriate sentence out of the following:

- a. Penny did not let me to get my book.
- b. Penny was not leaving me to get my book.
- c. Penny did not let me get my book.
- d. Penny had not left me get my book.

Q.184 Which one of the following is correct?

- a. We visited, Istanbul, Turkey, and Kowloon, Hong Kong last summer.
- b. We visited: Istanbul, Turkey, and Kowloon, Hong Kong last summer.
- c. We visited Istanbul, Turkey, Kowloon, Hong Kong last summer.
- d. We visited Istanbul, Turkey, and Kowloon, Hong Kong last summer.

Q.185 Which of the following sentences is correct?

- a. How could Sarah perswad her mum to stay out later?
- b. How could Sarah persuade her mum to stay out later?
- c. How could Sarah persuad her mum to stay out later?
- d. How could Sarah parsuade her mum to stay out later?

Q.186 Choose the sentence with the correct use of article.

- a. Natasha can play a piano and a violin.
- b. Natasha can play the piano and the violin.
- c. Natasha can play the piano and a violin.
- d. Natasha can play piano and violin.

Q.187 Distribute the handouts _____ the candidates. The correct preposition to be filled in is:

- a. into
- b. among
- c. in
- d. on

Q.188 Choose the correct sentence:

- a. These scissors are very sharp
- b. This scissors is very sharp
- c. This scissor is very sharp
- d. These scissor are very sharp

Q.189 Identify the sentence, out of the following, that is error free:

- a. I do not enjoy being laughed at by other people
- b. I did not enjoy laughing by other people
- c. I am not enjoying laughing by other people
- d. I do not enjoying being laughed at by other people

Q.190 Choose the sentence that is grammatically correct.

- a. We agreed that the play was rather boring so we felt bored
- b. We agreed that the play was rather bored so we felt boring
- c. We agreed that the play was rather bore so we felt bores
- d. We agreed that the play was rather bores so we felt bored