

PART-I

PHYSICS

1. The rate of change of momentum of a body falling freely under gravity is equal to its.
 - A. Impulse
 - B. Kinetic energy
 - C. Power
 - D. Weight

2. Car X is traveling at half the speed of car Y. Car X has twice the mass of car Y.
Which statement is correct?
 - A. Car X has half the kinetic energy of car Y
 - B. Car X has one quarter of the kinetic energy of car Y
 - C. Car X has twice the kinetic energy of car Y
 - D. The two cars have the same kinetic energy

3. A ball is thrown vertically upwards. Neglecting air resistance, which statement is correct?
 - A. The kinetic energy of the ball is greatest at the greatest height attained.
 - B. By the principle of conservation of energy, the total energy of the ball is constant throughout its motion.
 - C. By the principle of conservation of momentum, the momentum of the ball is constant throughout its motion.
 - D. The potential energy of the ball increases uniformly with time during the ascent.

4. The gravitational field strength at a point P on the Earth's surface is numerically equal to.
 - A. The acceleration of free fall at p
 - B. The change in potential energy per unit distance from p
 - C. The force acting on any body placed at p
 - D. The Work done in bringing unit mass from infinity to p

5. Satellites are in circular orbit around the Earth. What is the relationship between the radii r of their orbits and their speeds v ?
 - A. $v \propto r^2$
 - B. $v \propto r$
 - C. $v^2 \propto \frac{1}{r}$
 - D. $v \propto \frac{1}{r^2}$

6. An Object travels at constant speed around a circle of radius 1.0 m in 1.0s, what is the magnitude of its acceleration?
 - A. Zero
 - B. 1.0 m s^{-2}
 - C. 2 m s^{-2}
 - D. 4 m s^{-2}

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7. An object of mass of 2.kg rotates at constant speed in a horizontal circle of radius 5. m. The time for one complete revolution is 3 s. What is the magnitude of the resultant force acting on the subject?

- A. $\frac{4 rr^2}{9} \text{ N}$
- B. $\frac{40 rr^2}{9} \text{ N}$
- C. $\frac{100 rr^2}{9} \text{ N}$
- D. $\frac{400 rr^2}{9} \text{ N}$

8. Which pair includes a scalar quantity and a vector quantity?

- A. Kinetic energy and momentum
- B. Potential energy and work
- C. Velocity and acceleration
- D. Weight and force

9. At a temperature of 25 °C, a steel rod has a length of 10m. What will be the increase in length if temperature is raised to 35 °C,? ($\alpha = 1.1 \times 10^{-5} \text{ K}^{-1}$)

- A. $11 \times 10^{-3} \text{ m}$
- B. $11 \times 10^{-3} \text{ m}$
- C. $111.1 \times 10^{-3} \text{ m}$
- D. $1111.01 \times 10^{-3} \text{ m}$

10. A 60 watt bulb is operated by 240 volts. What is the current through the bulb?

- A. 2.5 A
- B. 0.25 A
- C. 0.0125 A
- D. 25 A

11. When a force 4 N acts on a mass of 2 kg for a time of 2 s, what is the rate of change of momentum?

- A. 1 kg m s^{-2}
- B. 2 kg m s^{-2}
- C. 4 kg m s^{-2}
- D. 8 kg m s^{-2}
- E. 16 kg m s^{-2}

12. The internal energy of a fixed mass of an ideal gas depends on

- A. Pressure, but not volume or temperature.
- B. Temperature, but not pressure or volume.
- C. Volume, but not pressure or temperature.
- D. Pressure and temperature but not volume.

13. A system absorbs 80 J through heating while doing 100 j of external work. What is the change in the internal energy of the System?

- A. - 100 j

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- B. - 20j
- C. + 80j
- D. + 180j

14. The SI unit of electrical resistance is

- A. Ampere
- B. Volt
- C. Farad
- D. Ohm

15. In a circuit, there is a current of 6 amp is changed so that the current falls to zero in 0.1 s. If an average emf of 250 volts is induced. What is the self Inductance of the circuit?

- A. 41.6 henrys
- B. 416 henrys
- C. 4.166 henrys
- D. 0.416 henrys

16. A particle performs simple harmonic motion of amplitude 0.020 m and frequency 2.5 Hz. What is its maximum speed?

- A. 0.008 ms⁻¹
- B. 0.050 ms⁻¹
- C. 0.125 ms⁻¹
- D. 0.157 ms⁻¹
- E. 0.314 ms⁻¹

17. Progressive waves of frequency 300 Hz are superimposed to produce a system of stationary waves in which adjacent nodes are 1.5 m apart. What is the speed of the progressive waves?

- A. 100 ms⁻¹
- B. 200 ms⁻¹
- C. 450 ms⁻¹
- D. 900 ms⁻¹
- E. 1800 ms⁻¹

18. A generator produces 100 kw of power at a potential difference of 10 kv. The power is transmitted through cables of total resistance 5 . How much power is dissipated in the cables?

- A. 50 W
- B. 250 W
- C. 500 W
- D. 1000 W
- E. 50000 W

19. Two thin lenses have focal lengths 20 cm and -40 cm. The focal length of combination in contact is.

- A. + 20 cm
- B. + 40 cm
- C. - 20 cm
- D. - 40 cm

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20. The magnifying power of a telescope (Astronomical) is 8 and the distance between two lenses is 54.cm. The focal length of objective and eyepiece are respectively _____ cm.
- A. 6,48
 - B. 48, 6
 - C. 8,64
 - D. 64,8
21. The position vector of a particle is given by $r=3t^2 i + 4t^2 j + 7 k$, find the displacement after 10 seconds.
- A. 500 m
 - B. 650 m
 - C. 350 m
 - D. 400 m
22. Capacitor A has a charge q on it whereas B is uncharged. When the switch is ON, the charge appearing on B is.
- A. Zero
 - B. $\frac{-q}{2}$
 - C. q
 - D. 2q
23. The distance between the optical centre of the lens and its principal focus is called.
- A. Aperture of the lens
 - B. Pole of the lens
 - C. Focal length
 - D. None of the above
24. In a spectrometer experiment, monochromatic light is incident normally on a diffraction grating having 4.5×10^5 lines per meter. The second order line is seen at an angle of 30° to the normal. What is the wavelength of the light (approx)?
- A. 200 m
 - B. 430 m
 - C. 500 m
 - D. 556 m
 - E. 589 m
25. When the light from two lamps fall on a screen, no interference pattern can be obtained? Why is this?
- A. The lamps are not point sources.
 - B. The lamps emit light of different amplitudes.
 - C. The light from the lamps is not coherent.
 - D. The light from the lamps is white.

PART-II
ENGLISH

READ THE PASSAGE TO ANSWER QUESTIONS 1-2

Young people must be educated in modern science- ties methods they will find the modern world utterly incomprehensible. But they cannot be good citizens of the world, or of t heir own national state, unless they are intellectually and imaginatively aware of the values which underlie human beliefs, motives and conduct. In this troubled period of human history, religion and the humanities are as vital as science to the education of good members of a good society.

26. "Incomprehensible" can best be replaced by
- A. Understandable
 - B. Explicable
 - C. Reasonable
 - D. Beyond their understanding
27. "Troubled period of human history" refers to
- E. primitive times
 - F. modern times
 - G. good times
 - H. bad times

COMPLETE THE SENTENCES BY CHOSSING THE MOST APPROPRIATE WORD, FROM THE GIVEN LETTER CHOICES (A to D) BELOW EACH.

28. Crystal vase breaks easily, _____ handle it which care.
- A. So that
 - B. So much
 - C. So
 - D. So well
29. The police do not understand how the thieves _____ the house.
- A. Got in
 - B. Got into
 - C. Get into
 - D. Get in

IDENTIFY THE WORD OR PHRASE THAT NEEDS TO BE CHANGED FOR THE SENTENCE TO BE CORRECT.

30. Ali finds it difficult to put his idea into words. No error
A B C D E
31. Owing for the flooded condition of roads, most of the people were unable
A B C
to get to the offices No error
D E

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CHOOSE THE LETTERED WORD OR PHRASE THAT IS MOST NEARLY OPPOSITE IN MEANING TO THE WORD IN CAPITAL LETTERS.

32. MIRACLE

- A. Usualness
- B. Wonder
- C. Marvel
- D. Sensation

33. MONOTHEIST

- A. Psychologist
- B. Analyst
- C. Polytheist
- D. Physicist

CHOOSE THE WORD MOST SIMILAR MEANING TO THE CAPITALIZED ONE.

34. ASTONISH.

- A. Tranquil
- B. SERENE
- C. PEACEFI
- D. START;ED
- E. CALM

35. BEHOLD

- A. See
- B. Touch
- C. Hear
- D. Smell

PART-III

BIOLOGY

Total Questions 40 (20 in Part-III, 20 in Part-IV)

(Botany-III)

36. THE CALVIN-BENSON CYCLE

- A. Does not use light directly
- B. Occurs in the cytoplasm
- C. Releases CO₂
- D. Produces ATP
- E. None of the above

37. WHICH IS CORRECTLY ASSOCIATED?

- A. RNA: thymine
- B. DNA: uracil
- C. RNA: replication
- D. mRNA: picks up amino acids
- E. RNA: ribose sugars

38. WHICH OF THE FOLLOWING STATEMENTS ABOUT THE KERB'S CYCLE IS NOT TRUE?

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- A. The kerb's cycle occurs in the matrix of the mitochondrion.
- B. The kerb's cycle is linked to glycoysis by pyruvate
- C. The kerb's cycle is the single greatest direct source of ATP in the cell.
- D. Citrate is an intermediate in the kerb's cycle
- E. The kerb's cycle produces nucleotides such as NADH+ H⁺ and FADH

39. ALL VIRUSES

- A. Carry DNA
- B. Carry RNA
- C. Lack protein
- D. Cannot reproduce outside of cells

40. A BLACK MALE MOUSE (I) IS CROSSED WITH A BLACK FEMALE MOUSE, AND THEY PRODUCE 15 BLACK AND 5 WHITE OFFSPRING. A DIFFERENT BLACK MALE MOUSE (II) IS CROSSED WITH THE SAME, AND THE OFFSPRING FROM THIS MATING ARE 30 BLACK MICE. WHICH OF THE FOLLOWING MUST BE TRUE?

- A. The female mouse is homozygous.
- B. Male mouse II is heterozygous.
- C. Two of the mice are heterozygous.
- D. All the progeny of mouse II are homozygous.
- E. All three mice are homozygous

41. WHAT MIGHT BE THE BEST STRATEGY TO PREVENT ECOLOGICAL DAMAGE DUE TO ACID RAIN?

- A. Stock the lakes with bigger fish so that they can resist the effects of the acid better.
- B. Reduce the amount of fossil fuels that are burned
- C. Supply plants with excess phosphorus and water
- D. Supply fungi with excess sugars and amino acids
- E. Only fish when it is sunny.

42. IF ONE RIBOSE MOLECULE WERE BONDED TO ONE ADENINE MOLECULE AND ONE PHOSPHATE MOLECULE, WE WOULD HAVE A

- A. Ribosome
- B. Nucleotide
- C. Nucleic acid
- D. ATP
- E. ADP

43. THE FORMATION OF CHIASMATA IS AN IMPORTANT FEATURE OF MEIOTIC DIVISION BECAUSE IT.

- A. Ensures that the same genetic characteristics appear in the daughter cell as in the parents.
- B. Ensures that the number of genes in the new chromosomes remains constant
- C. Provides opportunities for new genotypes to arise
- D. Prevents homologous chromosomes from pairing
- E. Allows attachment of the chromatids to the spindle fibers

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44. ALBINOS HAVE A GENOTYPE OF AA, WHILE ALL OTHER MEMBERS OF POPULATION ARE EITHER AA OR Aa. THE OFFSPRING OF A CROSS BETWEEN A HETEROZYGOUS MALE AND ALBINO FEMALE WOULD BE
- A. 100% albino
 - B. 100% normal
 - C. 50% normal, 50% albino
 - D. 25% normal, 75% albino
 - E. 75% normal, 25% albino
45. MOLDS AND YEAST ARE CLASSIFIED AS
- A. Rhodophytes
 - B. Bryophytes
 - C. Fungi
 - D. Ciliates
 - E. Flagellates
46. WHICH COMPOUND CAPTURES LIGHT ENERGY IN PLANTS?
- A. O₂
 - B. CO₂
 - C. H₂O
 - D. Chlorophyll
 - E. None of the above
47. WHICH OF THE FOLLOWING IS NOT A CHARACTERISTIC OF THE KINGDOM PROTISTA?
- A. Members can be photosynthetic
 - B. Members can be free living.
 - C. Some members move via flagella.
 - D. Some members are shaped like rods and termed bacilli
 - E. Some members spend part of their life cycle inside insects.
48. WHICH OF THE FOLLOWING TERMS DESCRIBES THE PROCESS BY WHICH THE PLASMA MEMBRANE MOVES SUBSTANCES INWARD, AGAINST A CONCENTRATION GRADIENT?
- A. Facilitated diffusion
 - B. Active transport
 - C. Simple diffusion
 - D. Autotrophism
49. WHICH OF THE FOLLOWING NITROGENOUS BASES ARE FOUND IN DNA?
- I. Thymine
 - II. Cytosine
 - III. Uracil
- A. I only
 - B. II only
 - C. I and II only
 - D. I and III only
 - E. I, II, and III

50. THE BEST DEFINITION OF A SPECIES IS
- A. A group of organisms that occupy the same niche
 - B. A population that works together to defend itself from predators
 - C. A group of organisms that can mate with each other
 - D. A population that preys on other populations
 - E. A population where all members benefit from the association in some way
51. PLANTS THAT HAVE TRUE ROOT, STEMS, AND LEAVES, AS WELL AS FLOWERS AND SEEDS ENCLOSED IN FRUIT ARE CLASSIFIED AS
- A. Bryophytes
 - B. Tracheophytes
 - C. Gymnosperms
 - D. Angiosperms
 - E. Endosperms

Part-IV (Zoology)

52. WHICH OF THE FOLLOWING IS NOT AN ORGANELLE?
- A. Nucleus
 - B. Golgi apparatus
 - C. Lysosome
 - D. Chlorophyll
 - E. Chloroplast
53. WHICH OF THE FOLLOWING STATEMENTS ABOUT SKELETAL MUSCLE TISSUE IS TRUE?
- A. In the muscle fiber, actin is the thick filament.
 - B. The sarcoplasmic reticulum stores Ca^{2+} within a muscle cell.
 - C. In a muscle fiber, myosin is the thin filament.
 - D. Contraction of a muscle fiber can occur in the absence of Ca^{2+}
54. WHICH OF THE FOLLOWING MEN MIGHT HAVE EXPLAINED THE AUK'S LOSS OF THE ABILITY TO FLY WITH THE FOLLOWING HYPOTHESIS?
"SINCE THE AUK STOPPED USING ITS WINGS, THE WINGS BECAME SMALLER, AND THIS ACQUIRED TRAIT WAS PASSED ON TO THE OFFSPRING."
- A. Darwin
 - B. Mendel
 - C. De Vries
 - D. Lamarck
 - E. Morgan
55. What is the correct sequence of events in the development of the embryo?
- A. morula → cleavage → blastula → gastrula
 - B. Cleavage → morula → blastula → gastrula
 - C. Cleavage → gastrula → blastula → morula
 - D. Blastula → cleavage → gastrula → morula
 - E. morula → blastula → cleavage → gastrula

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56. IN WHICH FORM IS CARBON DIOXIDE MAINLY TRANSPORTED IN BLOOD?

- A. As carbamino-haemoglobin
- B. As carbonic acid
- C. As hydrogencarbonate
- D. In solution

57. THE DIAGRAM SHOWS A SECTION THROUGH A KIDNEY AND ASSOCIATED BLOOD VESSELS.

In which area is there the greatest rate of movement of fluid from the blood through the walls of blood vessels?

- A. A
- B. B
- C. C
- D. D
- E. E

58. THE MOUSE IS KNOWN AS MUS MUSCULUS. THE MUS IS THE

- A. Phylum
- B. Class
- C. Order
- D. Genus
- E. Species

59. ALL OF THE FOLLOWING ARE FUNCTIONS OF THE LIVER EXCEPT

- A. Produce bile
- B. Store glycogen
- C. Secrete insulin
- D. Store vitamins

60. THE BONES AT JOINTS ARE HELD TOGETHER BY A TISSUE, THE

- A. Tendons
- B. Connective tissue
- C. Joints
- D. Ligament

61. ARTHROPODS CAN BE CHARACTERIZED BY ALL OF THE FOLLOWING EXCEPT

- A. A hard exoskeleton
- B. A water vascular system
- C. Jointed appendages
- D. Moulting
- E. Segmented body

61. A BIRD THAT FEEDS ON BOTH INSECTS AND BERRIES WOULD BE CLASSIFIED AS A

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- I. primary consumer
 - II. secondary consumer
 - III. Tertiary consumer
-
- A. I only
 - B. II only
 - C. III only
 - D. I and III only
 - E. II and III only
- 63.** ALL OF THE FOLLOWING ARE TRUE ABOUT THE ENDOCRINE SYSTEM EXCEPT
- A. It relies on chemical messenger that travel through the bloodstream
 - B. It is a control system that has extremely rapid effects on the body
 - C. The hormones affect only certain “target” organs
 - D. It is involved in maintaining body homeostasis
 - E. Its organs secrete hormones directly into the bloodstream, rather than through ducts.
- 64.** TWO ORGANISMS LIVE IN CLOSE ASSOCIATION WITH ONE ANOTHER. ONE ORGANISM IS HELPED BY THE ASSOCIATION, WHILE THE OTHER IS NEITHER HELPED NOR HARMED. WHICH OF THE FOLLOWING TERMS BEST DESCRIBES THIS RELATIONSHIP?
- A. Mutualism
 - B. Commensalism
 - C. Symbiosis
 - D. Parasitism
 - E. Predator-prey relationship

Chemistry

(Part-V)

Total Questions 25 (15 in Part-V, 10 in Part-VI).

- 65.** If 18 g of glucose ($C_6H_{12}O_6$) is present in 1000 g of an aqueous solution of glucose it is said to be
- A. 1 molar
 - B. 1.1 molar
 - C. 0.5 molar
 - D. 0.1 molar
- 66.** An oxidizing agent is
- A. One that remains natural
 - B. Always become positive
 - C. Mostly found in Groups IA or IIA
 - D. One that accepts electrons from another substance
- 67.** The Chemical method used for determination of rate of reaction is
- A. Spectroscopic
 - B. Conductimetric
 - C. Refractometric
 - D. Titration

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68. For a reaction: $\text{H}_{2(g)} + \text{Br}_{2(g)} \rightarrow 2\text{HBr}_{(g)}$
The experimental data suggests $\text{Rate} \propto [\text{H}_2][\text{Br}_2]^{1/2}$
What will be the overall order of the reaction?
- A. 2
 - B. 1.5
 - C. 1
 - D. 0.5
69. How many molecules are present in one gram of hydrogen.
- A. 6.02×10^{23}
 - B. 3.01×10^{23}
 - C. 2.5×10^{23}
 - D. 1.5×10^{23}
70. Isotopes differ in the
- A. Number of neutrons
 - B. Number of protons
 - C. Number of electrons
 - D. Number of atoms
71. A sample of a given mass of gas at a constant temperature occupies 95 cm^3 under a pressure of $9.962 \times 10^4 \text{ Nm}^{-2}$. At the same temperature its volume at a pressure of $10.13 \times 10^4 \text{ Nm}^{-2}$ is
- A. 190 cm^3
 - B. 93 cm^3
 - C. 46.5 cm^3
 - D. 47.5 cm^3
72. At the same temperature and pressure which of the following gas will have highest K.E. per mole?
- A. Hydrogen
 - B. Oxygen
 - C. Methane
 - D. All of the above
73. Which order of vapor pressure in the following liquid is correct?
- A. Water > ethanol > acetone > ether
 - B. Ether > acetone > ethanol > water
 - C. Ether > ethanol > acetone > water
 - D. Water > ether > acetone > ethanol
74. Which one of the following shows the correct electronic configuration of the outermost shell in inert gases?
- A. Ns^2, np^6
 - B. Ns^2, np^3
 - C. Ns^2, np^5
 - D. Ns^2, np^4
75. According to Heisenberg uncertainty principle, maximum number of electrons an atomic orbital can accommodate is
- A. 2
 - B. 1
 - C. 0
 - D. 3

Chemistry

(Part-VI)

76. In a group IIA from top to bottom as the atomic number increases, there is regular decrease in
- A. Ionic size
 - B. Atomic size
 - C. Ionization potential
 - D. None of the above
77. Which of the following are electropositive in nature?
- A. Alkali metals
 - B. Alkaline earth metals
 - C. Halogens
 - D. Alkali and alkaline earth metals
78. Any process of chemical decay of metals due to action of surrounding medium, is called
- A. Surrounding
 - B. Enamel
 - C. Corrosion
 - D. Coating
79. Alkanes are also known as
- A. Saturated hydrocarbon
 - B. Unsaturated hydrocarbon
 - C. Paraffin
 - D. None of the above
80. Benzene does not undergo
- A. Substitution reactions
 - B. Addition reactions
 - C. Oxidation reactions
 - D. Elimination reactions
81. Which one of the following is not a nucleophile?
- A. H_2O
 - B. H_2S
 - C. BF_3
 - D. NH_3
82. Ketones are prepared by the oxidation of
- A. Primary alcohols
 - B. Secondary alcohols
 - C. Tertiary alcohols
 - D. None of the above
83. Substances that tend to decrease the activity of enzymes are called
- A. Coenzymes

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- B.** Anti-enzymes
 - C.** Inhibitors
 - D.** Apoenzyme

- 84.** The raw material for the manufacture of urea fertilizer is
 - A.** Hydrogen and ammonia
 - B.** Steam, methane and ammonia
 - C.** Methane and air
 - D.** None of the above

- 85.** Which of the following is not the allotrope of carbon?
 - A.** Coke
 - B.** Methane
 - C.** Diamond
 - D.** Graphite

- 86.** Boric Acid cannot be used
 - A.** As antiseptic in medicine
 - B.** For washing eyes
 - C.** In soda Bottle
 - D.** For enamels and glazes

- 87.** Bauxite is an ore of
 - A.** Aluminum
 - B.** Boron
 - C.** Carbon
 - D.** Gallium

- 88.** Out of all the elements of group VIA the highest melting and boiling points are shown by element
 - A.** Te
 - B.** Se
 - C.** S
 - D.** Sb

- 89.** Which of the halogens is radioactive?
 - A.** F
 - B.** Cl
 - C.** I
 - D.** At