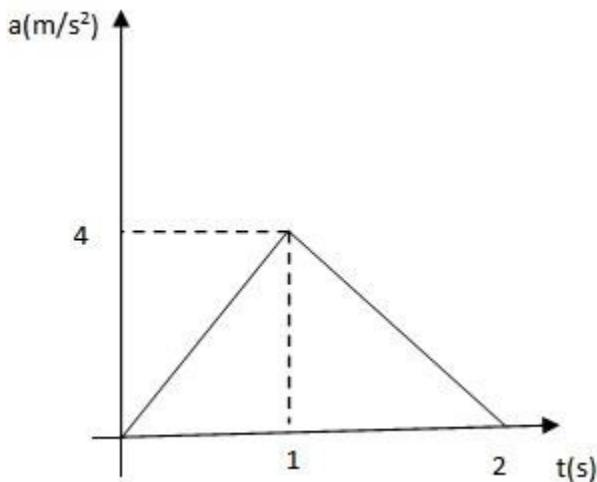


PHYSICS

1. A vector \vec{A} of magnitude two units lies in XY plane. It is inclined at 30^0 with a positive X-axis and at 60^0 with a positive Y-axis. Another vector of magnitude 5 units lies along the positive x-axis. is equal to $\vec{A} \cdot \vec{B}$
 - A. $5\sqrt{3}$
 - B. $3\sqrt{5}$
 - C. $2\sqrt{3}$
 - D. $3\sqrt{2}$
2. A bus is moving with a velocity of 10ms^{-1} on a straight road. A scooterist wishes to overtake the bus in the 100s. If the bus is at a distance of 1 km from the scooterist, what velocity should the scooterist chase the bus?
 - A. 50ms^{-1}
 - B. 40ms^{-1}
 - C. 30ms^{-1}
 - D. 20ms^{-1}
3. The acceleration - time graph of a particle moving in a straight line is shown in the figure. The velocity of the particle at time $t=0$ is 2m/s. The velocity after 2s will be



- A. 6 m/s
- B. 4 m/s
- C. 2 m/s
- D. 8 m/s

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

4. A particle is projected vertically upwards from point A on the ground. It takes time t_1 to reach point B, but it continues to move up. If it carries further t_2 time to reach the ground from point B. Then the height of the point B from the ground is

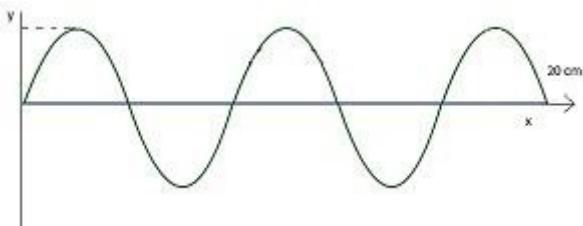
- A. $\frac{1}{2}g(t_1 + t_2)^2$
 - B. gt_1t_2
 - C. $\frac{1}{8}g(t_1 + t_2)^2$
 - D. $\frac{1}{2}gt_1t_2$
5. A lead ball strikes a wall and falls down. A tennis ball has the same mass, and velocity strikes the same wall and bounces back. Which of the following is correct?
- A. The tennis ball suffers a greater change in momentum
 - B. The lead ball suffers a greater change in momentum
 - C. Both balls suffer the same change in momentum
 - D. The momentum of the lead ball is greater than that of the tennis ball
6. Consider the following statements and identify the correct answer
- (A) The moment of inertia of a rigid body about an axis of rotation is numerically equal to twice the kinetic energy of rotation of the body, when rotating with angular velocity about that axis
 - (B) Radius of gyration of a body changes with change in location of the axis of rotation
- A. A is false, but B is true
 - B. Both A and B are true
 - C. A is true, but B is false
 - D. Both A and B are false
7. A tensile force of 2×10^5 dyne doubles the length of an elastic cord whose cross section area is 2 cm^2 . Young's modulus of the material of the cord is
- A. $2 \times 10^5 \text{ N/m}^2$
 - B. $2 \times 10^5 \text{ dyne/cm}^2$
 - C. 1010 dyne/cm^2
 - D. 104 N/m^2

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

8. Starting with the same initial conditions, an ideal gas expands from volume V_1 to V_2 in three different ways. The work done by the gas is W_1 if the process is purely isothermal, W_2 if purely isobaric and W_3 if purely adiabatic, then

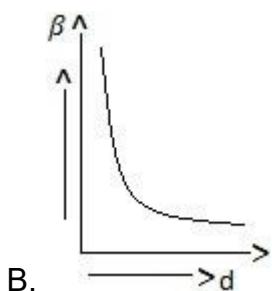
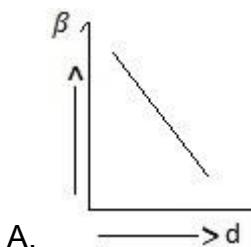
- A. $W_1 > W_2 > W_3$
- B. $W_2 > W_3 > W_1$
- C. $W_2 > W_1 > W_3$
- D. $W_1 > W_3 > W_2$

9. For the wave shown in the fig, the frequency and wavelength if its speed is 320 m/sec are

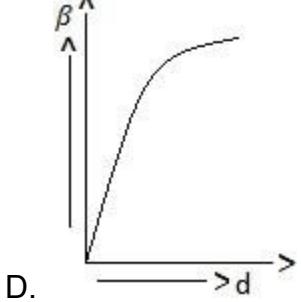
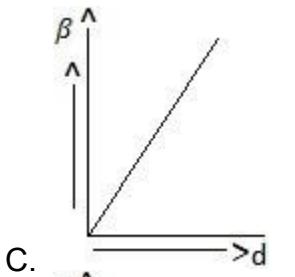


- A. 8 cm, 400Hz
- B. 80 cm, 40Hz
- C. 8 cm, 4000Hz
- D. 40 cm, 8000Hz

10. The correct between fringe width β and distance between the slits (d) is



Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.



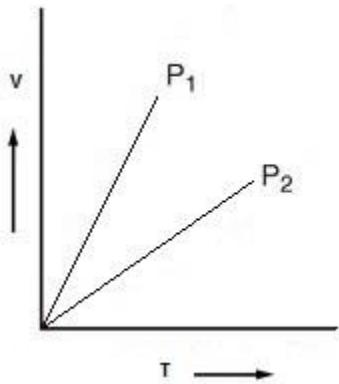
Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

CHEMISTRY

1. The number of spectral lines possible when an electron falls from the fifth orbit to ground state in a hydrogen atom is
 - A. 4
 - B. 15
 - C. 10
 - D. 21
2. The octet rule is not valid for molecules
 - A. CO₂
 - B. H₂O
 - C. O₂
 - D. CO
3. BCl₃ is a planar molecule, whereas NCl₃ is pyramidal because
 - A. BCl₃ has no lone pair of electrons, but NCl₃ has a lone pair of electrons
 - B. B-Cl bond is more polar than N-Cl bond
 - C. Nitrogen atom is smaller than boron atom
 - D. N-Cl bond is more covalent than B-Cl bond
4. I₁ and I₂ of Mg are 178 and 348 Kcal/mole, respectively. The energy required for the reaction $Mg_{(g)} \rightarrow Mg_{(g)}^{+2} + 2e$ is
 - A. +170 Kcal
 - B. +526 Kcal
 - C. -170 Kcal
 - D. -525 Kcal
5. In the redox reaction,
 $KMnO_4 + 3H_2SO_4 + 5H_2C_2O_4 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO_2$
The volume of 0.1M KMnO₄ required to oxidize 25ml of 0.25M H₂C₂O₄ solution is
 - A. 25litre
 - B. 125ml
 - C. 25ml
 - D. 1.25litre

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

6. V vs T curves at constant pressure P_1 and P_2 for an ideal gas is shown below



Which is correct

- A. $P_1 > P_2$
 - B. $P_1 < P_2$
 - C. $P_1 = P_2$
 - D. All of the above
7. If R is the radius of the spheres in the close-packed arrangement and r is the radius of the octahedral void, then
- A. $R=0.414r$
 - B. $r=0.414R$
 - C. $R=0.225r$
 - D. $r=0.224R$
8. In the reaction $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$, the rate of formation of NO is 1×10^{-3} mole/litre-sec. The rate of disappearance of O_2 is
- A. 4×10^{-3}
 - B. 5×10^{-3}
 - C. 1.25×10^{-3}
 - D. 0.8×10^{-3}
9. Duralumin is an alloy of
- A. Al and Mg
 - B. Al, Mg and Ni
 - C. Al, Mg, Mn and Cu
 - D. Al and Ni

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

10. Copper on reaction with dil HNO_3 give

- A. $\text{Cu}(\text{NO}_3)_2 + \text{N}_2\text{O}$
- B. $\text{Cu}(\text{NO}_3)_2 + \text{NO}$
- C. $\text{Cu}(\text{NO}_3)_2 + \text{NO}_2$
- D. $\text{CuNO}_3 + \text{NO}$

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

BOTANY

1. Floridean starch is found in
 - E. Chlorophyceae
 - F. Myxophycere
 - G. Phaeophyceae
 - H. Rhodophyceae
2. The fruits of *annoma squamosa* develop from
 - A. Multicarpellary, syncerous superior gynoecium
 - B. Monocarpellary, syncerous superior gynoecium
 - C. Multicarpellary syncerous inferior gynoecium
 - D. Multicarpellary, apocarpous, superior gynoecium
3. Which of the following statements are true?
 - I). Uneven thickening of cellwall is a characteristic of sclerenchyma.
 - II). Periblem forms the cortex of the stem and the root.
 - III). Tracheids are the chief water transport elements in gymnosperms.
 - IV). Companion cell is devoid of nucleus at maturity.
 - V). The commercial cork is obtained from *quercus* subes
 - A. I and IV
 - B. II and V
 - C. III and IV
 - D. II, III and IV
4. Disjunction refers to
 - A. The separation of homologous chromosomes at anaphase-I
 - B. The type of chromosomal aberration in which there is loss of a part of a chromosome
 - C. Incompatibility in fungi and other thallophytes
 - D. Modification of gene action by a non-allelic gene

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

5. You are given two plants(A & B)of liliaceae. In plant A the leaf tip is modified for performing vegetative reproduction while in B the leaf apex is modified for performing mechanical support. A & B are respectively
- Smilex and Allium
 - Scilla and Gloriosa
 - Gloriosa and Yucca
 - Ruscus and Scilla
6. In which one pair, both the plants can be vegetatively propagated by leaf pieces?
- Bryophyllum and leaf kalanchoe
 - Chrysanthemum and Agave
 - Agave and kalanchoe
 - Asparagus and Bryophyllum
7. A bacterium divides once in every 25 minutes, if a culture containing 10^5 cells per ml is grown for 3hrs short of 5 minutes, what will be the cell concentration per ml?
- 10×10^{30} cells
 - 32×10^5 cells
 - 128×10^5 cells
 - 175×10^5 cells
8. In tissue culture medium, the embryoids formed from pollen grains is due to
- Cellular totipotency
 - Organogenesis
 - Double fertilization
 - Test tube culture
9. Assertion: Biopiracy is being resorted to by the countries of north.
Reason: Countries of south are incapable of biopiracy
- Both Assertion and reason are true and reason is the correct explanation of assertion
 - Both Assertion and reason are true and reason is not the correct explanation of assertion
 - Assertion is true but reason is false
 - Assertion is false but reason is true

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

10. To form one molecule of glyceraldehyde phosphate in Calvin cycle

- A. 9ATP and 36 NADPH are required
- B. 6ATP and 6NADPH are required
- C. 3ATP and 3NADPH are required
- D. 9ATP and 6NADPH are required

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

ZOOLOGY

1. Choanocyte is the characteristic of
 - A. Annelida
 - B. Porifera
 - C. Arthropoda
 - D. None of the above
2. Fore wings in cockroach arise from
 - A. Mesothorax and are dark and leathery
 - B. Prothorax and are called tegmine
 - C. Mesothorax and are transparent and membranous
 - D. Prothorax and are transparent and membranous
3. How many leucocytes are present in humans in $1 \mu\text{L}$ of blood?
 - A. 100 million
 - B. 10000 million
 - C. 3.5 million
 - D. 5000 million
4. The vitamin-C or ascorbic acid prevents
 - A. Rickets
 - B. Pellagra
 - C. Scurvy
 - D. Antibody synthesis
5. Blood protein which initiates blood coagulation, is
 - A. Prothrombin
 - B. Thrombin
 - C. Fibrinogen
 - D. Fibrin

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.

6. If due to some injury, the chordae tendinae of the tricuspid valve of the human heart is partially non - functional. What will be the immediate effect?
 - A. The flow of blood into the aorta will be slowed down
 - B. The pacemaker will stop working
 - C. The blood will tend to flow back into the left atrium
 - D. The flow of blood into the pulmonary artery will be reduced
7. Route of the reflex arc is
 - A. Receptors, effectors, grey mater and motor fibres
 - B. Receptors, sensory fibres, grey mater, motor fibres and effectors
 - C. sensory fibres, grey mater, motor fibres, receptors and effectors
 - D. Effectors, grey mater, motor, sensory fibres and receptors
8. When pregnancy occurs in the ovary itself, it is called
 - A. Tubual pregnancy
 - B. Ectopic pregnancy
 - C. Abdominal pregnancy
 - D. None of these
9. Similarities between organisms of different genotypes are due to
 - A. Convergent evolution
 - B. Divergent evolution
 - C. Microevolution
 - D. Macroevolution
10. The toxic substance, 'Haemozoin', related to high fever and chill, is released during the following disease
 - A. Dengue
 - B. Malaria
 - C. Diphteria
 - D. Pneumonia

Note: All questions are of objective type (multiple choice questions). Each question has four options of which one is correct. Each correct answer will be awarded 2 marks. The wrong answer and unanswered questions will receive nil marks.