International Science Supremo Olympiad (ISSO)

CLASS-12 SAMPLE QUESTION PAPER

The Actual Question Paper Contains 50 Questions. The duration of the Test Paper is 60 Minutes.

CPS OLYMPIADS
COMPETITION PROMOTION SOCIETY
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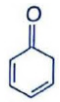
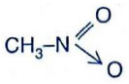
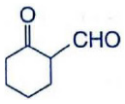
1. A solenoid of 0.4 m length with 500 turns carries a current of 3 A. A coil of 10 turns and of radius 0.01 m carries a current of 0.4 A. The torque required to hold the coil with its axis at right angle to that of solenoid in the middle part of it, is

(A) $6\pi^2 \times 10^{-7}$ N m (B) $3\pi^2 \times 10^{-7}$ N m
(C) $9\pi^2 \times 10^{-7}$ N m (D) $12\pi^2 \times 10^{-7}$ N m
(E) None of these

2. Uniform magnetic field *B* is directed vertically upwards and 3 wires of equal length *L*, carrying equal current *I* are lying in a horizontal plane such that the first one is along north, second one along north-east and the third one at 60° north of east. Force exerted by magnetic field *B* on them is

(A) zero on the first
(B) $\frac{BIL}{\sqrt{2}}$ on the second
(C) $\sqrt{3}\frac{BIL}{\sqrt{2}}$ on the third
(D) *BIL* on all of them (E) None of these

3. Which of the following compound(s) can exhibit tautomerism?

(A)  (B) 
(C)  (D) All of these
(E) None of these

4. Ellingham's diagram represents

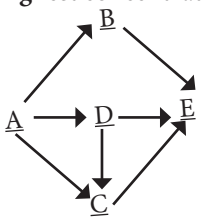
(A) Change in ΔG with temperature
(B) Change in ΔH with temperature
(C) Change in ΔG with pressure
(D) Change in (ΔG - TΔS) with temperature.
(E) None of these

5. Which one of the following is a correct statement?

(A) "Bt" in "Bt-cotton" indicates that it is a genetically modified organism produced through biotechnology.
(B) Somatic hybridisation involves fusion of two complete plant cells carrying desired genes.
(C) The anticoagulant hirudin is being produced from transgenic Brassica napus seeds.
(D) "Flavr savr" variety of tomato has an enhanced production of ethylene which improves its taste.
(E) None of these

6. Given is a diagram of food web of a terrestrial ecosystem. The arrows represent energy flow and the letters represent different species. In which species would a toxic pollutant that accumulates in animals probably reach the highest concentration?

(A) Species D
(B) Species B
(C) Species C
(D) Species E
(E) None of these



7. Which of the following statements about the female reproductive system are false?

(i) Both estrogen and progesterone are necessary for ovulation to take place.
(ii) Estrogen tends to inhibit the production of FSH by the anterior pituitary gland.
(iii) Fertilization of the ovum by the spermatozoon normally takes place in the uterus.
(iv) Progesterone production is largely under the control of LH.
(v) The ejection of milk is stimulated by the hormone prolactin released from anterior lobe of the pituitary gland.

(A) (i) and (iii) (B) (i) and (ii)
(C) (i), (iii) and (v) (D) (iii), (iv) and (v)
(E) None of these

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8. **If A is a square matrix of order $n \times n$ and k is a scalar , then adj (kA) is equal to**

(A) k adj(A) (B) k^n adj(A)
(C) k^{n-1} adj(A) (D) k^{n+1} adj(A)
(E) None of these

9. **Let A, B, C be three events. If the probability of occurring exactly one event out of A and B is $1 - a$, out of B and C is $1 - 2a$, out of C and A is $1 - a$ and that of occurring three events simultaneously is a^2, then the probability that at least one out of A, B, C will occur is**

(A) 1/2 (B) Greater than 1/2
(C) Less than 1/2 (D) Greater than 3/4
(E) None of these

10. **If $\vec{a} = \hat{i} + \hat{j} + \hat{k}, \vec{b} = 4\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{c} = \hat{i} + \alpha\hat{j} + \beta\hat{k}$ are linearly dependent vectors and $|\vec{c}| = \sqrt{3}$, then**

(A) $\alpha = 1, \beta = -1$ (B) $\alpha = 1, \beta = \pm 1$
(C) $\alpha = -1, \beta = \pm 1$ (D) $\alpha = \pm 1, \beta = 1$
(E) None of these