# PCAT Q&As

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**QUESTION 1**

Which of the following is necessary for the penetration of an egg?

A. the flagellum

B. mitochondria

C. acrosome

D. centriole

Correct Answer: C

In order to penetrate an egg, a spermatozoon must bind with the exterior of the egg. This binding takes place by way of the acrosome reaction, in which the sperm penetrates the jelly coat of the egg to breach and fuse with the egg plasma membrane before releasing its constituents into the eggs cytoplasm.

**QUESTION 2**

What is the role of a nurse cell?

A. secrete testosterone

B. secrete sperm

C. nurture maturing red blood cells

D. activate sperm motility

Correct Answer: C

Nurse cells aid in the maturation of red blood cells. They are macrophages that absorb immature red blood cells and facilitate the growth of red blood cells.

**QUESTION 3**

$\int_{\pi}^{2\pi} \sin x \, dx =$

A. $2\int_{0}^{\pi/2} \cos x \, dx$

B. $\int_{\pi}^{2\pi} \cos x \, dx$

C. $-2\int_{0}^{\pi/2} \cos x \, dx$

D. $\int_{0}^{\pi} \cos x \, dx$

=

A. Option A

B. Option B

C. Option C

D. Option D

Correct Answer: C

**QUESTION 4**

An electron pair donor is best classified as a:

A. strong acid

B. Bronsted-Lowry acid

C. Lewis acid

D. Lewis base

Correct Answer: D

By definition, a Lewis base is an electron pair donor. A Lewis acid, on the other hand, is an electron pair acceptor.

**QUESTION 5**

At two independently assorting loci, a man has the following genotype: GgHH. He marries a woman with the genotype ggHh. What is the probability that they will have a child who has the same genotype as the father?

A. 0

B. 1/2

C. 1/4

D. 1/8

Correct Answer: C

This is a "probability" genetics question that can be answered by practical application of Mendel\\'s Laws. Mendel\\'s Law of Segregation states that alleles segregate during meiosis, resulting in gametes that carry only one allele for any given inherited trait (i.e., haploid gametes). Mendel\\'s Law of Independent Assortment states that unlinked genes assort independently during meiosis. By applying Mendel\\'s Laws, we can conclude that each parent in the problem can produce two possible gametes. The father can produce the gametes GH and gH, and the mother can produce the gametes gH and gh. The probability of the father\\'s genotype (GgHH) appearing in the progeny can be determined by calculating the number of different gamete combinations that will produce this genotype. Thus, a GgHH zygote can only be produced by the fusion of a GH gamete and a gH gamete. The probability that one parent will donate a particular

gamete is independent of the probability that the other parent will donate a particular gamete. Thus, the probability of the father donating a GH gamete is 1/2, and the probability of the mother donating a gH gamete is 1/2. The probability of producing a genotype that requires the occurrence of both these independent events is equal to the product of the individual probabilities that these events will occur. Thus, 1/2 ?1/2 = 1/4, so the probability that this couple will have a child with the genotype GgHH is 1/4.