ALL. N°2 al verbale n°3

PROVA 1

A) Descrivere brevemente la tecnica per clonare un gene

B) Descrivere i principi della tecnica "polymerase chain reaction (PCR) e i passaggi da eseguire per effettuare tale analisi su un campione di tessuto fresco

Accertamento conoscenze informatiche

Il candidato descriva quale programma utilizzerebbe per raccogliere ed elaborare dei dati (es. calcolare una media di più osservazioni)

Accertamento conoscenza lingua inglese
Leggere e tradurre in italiano il seguente testo:

Genomic DNA constitutes the total genetic information of an organism. The genomes of almost all organisms are DNA, the only exceptions being some viruses that have RNA genomes. Genomic DNA molecules are generally large, and in most organisms are organized into DNA–protein complexes called chromosomes. The size, number of chromosomes, and nature of genomic DNA varies between different organisms. Genomic DNA contains genes, discrete regions that encode a protein or RNA. A gene comprises the coding DNA sequence, as well as the associated regulatory elements that control gene expression. Nuclear eukaryotic genes also contain noncoding regions called introns. The number of genes varies widely between different organisms.

PROVA 2

A) Descrivere come si effettua una purificazione di DNA plasmidico da batteri

B) Descrivere su quale principio si basa la tecnica ELISA

Accertamento conoscenze informatiche

Indicare qual è la procedura corretta per inserire simboli speciali non presenti sulla tastiera, con Word

Accertamento conoscenza lingua inglese
Leggere e tradurre in italiano il seguente testo:

Sources for DNA extraction are very diverse, practically DNA can be isolated from any part of human body such as saliva, hair, mouth swabs and even from several skin cells left on the surface after it has been touched. However, the most common sources are soft tissue or blood samples. There are many different methods which can be used to perform DNA extraction on such samples such as organic extraction, salting out, magnetic separation and silica based technology. The choice of a method depends on many factors: the tissue type, the concentration of DNA, sample number, safety of the experiment and coast. Regardless of the used methods, they happen to follow some common procedures aimed to achieve effective cell lysis, proteins and RNA removal, and lastly DNA precipitation. Resulting in a homogeneous DNA preparation that represent the entire genetic information contained within the cell.

PROVA 3

A) Descrivere la differenza tra una elettroforesi su gel di agarosio e di acrilamide

B) Descrivere le fasi principali della Real time PCR

Accertamento conoscenze informatiche

Il candidato descriva come procederebbe per inviare lo stesso messaggio e-mail a una serie di destinatari.

Accertamento conoscenza lingua inglese
Leggere e tradurre in italiano il seguente testo:

Characterization of extracted DNA by spectrophotometric assay: DNA concentration and purity can be determined by measuring the absorption of ultraviolet light. The DNA has a maximum and minimum absorbance at 260 nm and 234nm, respectively and the purines and pyrimidine in nucleic acid are responsible for these absorptions. At 260 nm double-stranded DNA has specific absorption coefficient of 0.02 $(\mu g/ml)^{-1}$ cm^{-1}. Moreover, the A260/A280 ratio allow to detect nucleic acid purity from proteins contamination since proteins have maximum absorption at 280 nm. Highly purified DNA samples have a 260/280 nm ratio of (1.8-1.9), thus below (1.8) a significant amount of protein impurity may present within the sample. The A260/A230 ratio determined to confirm that the sample is pure from carbohydrates, peptides, ethanol or any organic compounds, and it is usually between 2 and 2.2.

PROVA 4

A) Descrivere il funzionano degli enzimi di restrizione

B) Descrivere le basi delle tecniche cromatografiche e loro utilizzo

Accertamento conoscenze informatiche

Il candidato descriva quale programma utilizzerebbe per preparare una presentazione scientifica.

Accertamento conoscenza lingua inglese
Leggere e tradurre in italiano il seguente testo:

When a dilute aqueous DNA solution is heated slowly, the two strands of the double helix gradually separate, leading to the formation of a single stranded DNA (denaturation). It results in an increase in absorbance at 260 nm. Temperature for midpoint of denaturation gives Tm by increasing the temperature slowly and measuring absorbance at 260 nm as melting profile can be generated. The DNA of each species has a specific denaturation curve which is dependent on the % GC content and length. In double stranded DNA, G and C base pairing is more stable and requires more heat energy to break the three hydrogen bonds to separate the strands.

PROVA 5

A) Che cosa è un vettore plasmidico

B) Cosa studia la genomica e con quali tecniche

Accertamento conoscenze informatiche

Il candidato descriva come calcolerebbe la somma di una serie di dati con il programma EXCEL.

Accertamento conoscenza lingua inglese
Leggere e tradurre in italiano il seguente testo:

Under physiological conditions, DNA is a negatively charged molecule due to the presence of phosphate groups in the backbone. Therefore, in aqueous media, under the influence of an electrical field, DNA molecules will move through an agarose matrix towards the positively charged anode, at a rate that is inversely proportional to the molecular weight. The electrophoretic migration rate of DNA through agarose gel depends on the following: size of DNA molecules, concentration of agarose gel, voltage applied, conformation of DNA, and the buffer used for electrophoresis. Several buffers are used for agarose gel electrophoresis, but the most common are: Tris-acetate EDTA buffer (TAE) and Tris-borate EDTA buffer (TBE). The DNA mobility in TBE buffer is approximately two times slower than in TAE buffer. This is due to the lower porosity of agarose gel when agarose polymerizes in the presence of borate.

PROVA 6

A) Cosa sono le estremità coesive dopo taglio di un DNA con enzima di restrizione?

B) Descrivere i metodi per il sequenziamento del DNA

Accertamento conoscenze informatiche

Il candidato descriva quali sono le principali applicazioni del programma excel (fare un esempio)

Accertamento conoscenza lingua inglese

Leggere e tradurre in italiano il seguente testo:

Polymerase chain reaction (PCR) is a laboratory version of DNA replication in cell where particular piece of DNA can be amplified in billions of copies in a short time. The PCR amplify a precise fragment of DNA from a complex mixture of starting material termed the template DNA which controlled by heating and cooling. It does require the knowledge of some DNA sequence information which flanks the fragment of DNA to be amplified (target DNA). To amplify a specific piece of DNA, two synthetic oligonucleotides are synthesised called primers each complementary to a stretch of DNA to the 3' side of the target DNA, one oligonucleotide for each of the two DNA strands (DNA polymerase can add a nucleotide only onto a preexisting 3'-OH group).

PROVA 7

A) Descrivere come si quantifica un acido nucleico

B) Descrivere i principi generali della tecnica del Western Blot

Accertamento conoscenze informatiche

Il candidato descriva come si inserisce una formula in una cella Excel

Accertamento conoscenza lingua inglese
Leggere e tradurre in italiano il seguente testo:

Restriction enzymes (RE) are enzymes that have the ability to recognizes a specific, short nucleotide sequence and cleave the sugar phosphate backbones in double stranded DNA at that specific site, which is known as RESTRICTION SITE or target sequence. RE naturally found in a wide variety of prokaryotes. In live bacteria, restriction enzymes function to defend the cell against invading viral bacteriophages by cleaving its DNA at specific sites and so prevent replication. Over 300 restriction enzyme have been isolated and the nomenclature depends on the organism from which they are derived e.g. EcoRI: is isolated from E. coli strain RY13, I (Roman numeral) indicates it was the first enzyme of that type isolated from E. coli RY13.