**Answer Model**

**Final writing exam**

**POSTGRADUATES**

**Molecular Biodiversity course/code JMB518**

**M.Sc. TEMPUS program**

**Second semester 2016/2017**

**The date of exam: 17-1-2017**

**1. Cytologists can use which of the following to describe locations of a gene at a specific place on the chromosome?**

A.DNA sequence of a chromosomal region.

B. Protein expression from a chromosomal region.

C. Banding pattern of stained chromosomes. ☑

D. Comparison to markers located within a few thousand bp.

**2. Which of the following questions could be easily answered by FISH?**

A. How often does recombination occur between the *ebony* and *sepia* loci in Drosophila?

B. In a particular family affected with Becker muscular dystrophy, is the mutation due to a deletion of the entire gene? ☑

C. How large a piece of DNA would you need to clone in order to clone the group of human globin genes from chromosome 11?

D. All of these.

E. None of these.

**3. *In situ* hybridization is done on fragments of specific chromosomes.**

A. True

B. False☑

**4. Which of these is a key characteristic of a molecular marker?**

A. It is a known gene.

B. It is located at a known site on the chromosome. ☑

C. It is only useful for linkage and physical mapping studies.

D. None of these.

**5. Changes in restriction enzyme sites can be used as polymorphic markers.**

A. True☑

B. False

**6. A molecular marker which is amplified by PCR and is polymorphic by length is a(n):**

A. Restriction fragment length polymorphism (RFLP).

B. Variable number of tandem repeats site (VNTR).

C. Amplified fragment length polymorphism (AFLP). ☑

D. Single nucleotide polymorphism (SNP).

**7. A polymorphism is:**

A. Any change in the DNA sequence.

B. The most common variation of a gene or marker sequence.

C. The least common variation of a gene or marker sequence.

D. A variation of gene or marker sequence present in >1% of the population. ☑

E. None of these.

**8. An AFLP is an example of a sequence tagged site.**

A. True ☑

B. False

**9. Which of these statements regarding RFLP analysis is correct?**

A. RFLP analysis requires Southern blotting for detection of fragments. ☑

B. RFLPs can identify single base pair changes at any site in the chromosome.

C. An RFLP typically produces several different alleles.

D. All of these are correct.

E. None of these are correct.

**10. RFLPs are inherited in a simple Mendelian fashion and display codominance.**

A. True ☑

B. False

**11. A monomorphic DNA segment is:**

A. A segment of DNA that exists in many forms in the population.

B. A segment of DNA that controls a single gene function.

C. A segment of DNA inherited in a dominant fashion.

D. A segment of DNA shared by over 99% of the population. ☑

E. All of these.

**12.** **Linkage mapping can determine the distance between which of the following pairs of DNA sequences?**

A. AFLPs and RFLPs.

B. Two AFLPs.

C. Two known genes.

D. A known gene and any type of molecular marker.

E. All of these. ☑

**13. The reduced numbers of progeny with the pattern of (5,000bp, 4,300bp, 2,300bp, and 2,000bp bands) or (5,000bp, 4,300bp, and 3,350bp bands) indicates a selective disadvantage for these genotypes**

A. True

B. False☑

**14.** **What was the arrangement of the markers in the original parental strains?**

A. A: 5,000bp, B: 4,300bp and A: 3,350bp, B: 2,300/2000bp☑

B. A: 5,000bp, B: 2,300/2,000bp and A: 3,350bp, B: 4,300bp

C. A: 3,350bp, B: 4,300bp and A: 5,000bp, B: 4,300bp

D. A: 3,350bp, B: 2,300/2000bp and A: 3,350bp, B: 2,300/2000bp

**15. What is the distance between these two markers?**

A. 0.167mu.

B. 0.20mu.

C. 16.7mu. ☑

D. 20mu.

E. None of these.

**16.** **Which of the following would be a reasonable use of an RFLP map?**

A. Identification of the exact location of an unknown gene along the chromosome.

B. Description of the size of DNA fragment required to clone the region containing an unknown gene.

C. Identification of the region in which an unknown gene is located. ☑

D. All of these.

E. None of these.

**17. Which of these genetic markers is most likely to be highly polymorphic (have many different alleles)?**

A. An RFLP.

B. A microsatellite. ☑

C. An SNP.

D. All of these are equally polymorphic.

E. None of these are likely to be polymorphic.

**18. Why might use of microsatellites in genetic mapping studies be an advantage over RFLPs?**

A. Microsatellites are easier to detect.

B. Microsatellites are more abundant than RFLPs.

C. Microsatellites have more potential alleles than RFLPs.

D. All of these. ☑

E. None of these.

**19.** **Isolation of individual chromosomes can be used to map genes.**

A. True☑

B. False

**20. How are individual chromosomes identified in chromosome sorting techniques?**

A. Relative level of fluorescence when stained with a dye mixture. ☑

B. Level of charge relative to size.

C. Size of the molecule.

D. All of these.

E. None of these.

21. **Which of these describes a contig?**

A. A complete genomic library including overlapping clones.

B. A complete mRNA library.

C. A chromosome-specific library of overlapping clones. ☑

D. An ordered genomic library.

**22. What vector would be best suited for creating a contig of bovine (cattle) chromosome 10?**

A. λ

B. A plasmid.

C. A YAC. ☑

D. All of these.

E. None of these.

**23. Which of the following would not be a critical characteristic of a YAC vector?**

A. Telomeric sequences.

B. A gene encoding a required structural protein. ☑

C. An origin of replication.

**24. In the laboratory, DNA molecules can be cut at specific sequences using:**

A. UV light.

B. restriction nucleases. ☑

C.  DNA ligase.

D. laser tweezers.

**25. In agriculture, a monoculture is an excellent example of biodiversity.**

A. True

B. False ☑

**26. Biodiversity is exhibited at all levels of biological organization: genetic, individuals, species, communities, ecosystems.**

A. True ☑

B. False

**27. Biodiversity is a result of:**

A. changeable environments

B. competition within species

C. competition between species

D. genetic variability☑

**28. Cloning is a good example of an increase in biodiversity.**

A. True

B. False ☑

**29. In an agricultural crop with little genetic variation, diseases and insects can cause more damage than in crops with high levels of genetic variation.**

A. True ☑

B. False

**30. Greater levels of terrestrial biodiversity are found in the:**

A.  Antarctic

B. temperate grasslands

C. tropics

D. deserts ☑

**31.** [**What is Biodiversity?**](http://www.proprofs.com/discuss/q/158050/what-is-biodiversity)

A. A type of coconut

B. A brand of oil

C. The spread of all living things ☑

D. A plant species

**32. Which branch of biodiversity provides 60% of all the worlds' medicine?**

A. Animals

B. Bacteria

C. Plants ☑

D. All of the above

**33. In**[**biology**](http://quiz.thefullwiki.org/Biology)**and medicine, a molecular marker (**[**biomarker**](http://quiz.thefullwiki.org/Biomarker_(medicine))**) can be a substance native to the organism whose detection indicates a particular disease state (for example, the presence of an \_\_\_\_\_\_\_\_ may indicate an**[**infection**](http://quiz.thefullwiki.org/Infection)**).**

A. Autoantibody

B. Antibody ☑

C. Adaptive immune system

D. Immune system

34. In genetics, a molecular marker (identified as [genetic marker](http://quiz.thefullwiki.org/Genetic_marker)) is a fragment of [DNA sequence](http://quiz.thefullwiki.org/DNA_sequence) that is associated to a part of the \_\_\_\_\_\_\_\_.

A. RNA

B. Population genetics

C. Genome ☑

D. Genomics

35. In \_\_\_\_\_\_\_\_, a **molecular marker** can be a substance that is introduced in an organism as a means to examine something.

A. Physician

B. Specialty (medicine)

C. Surgery

D. Medicine ☑

**36. Which of the following statements about basal promoters is true?**

A. basal promoters can be located in the 3' UTR

B. basal promoters are necessary for enhancer trapping ☑

C. basal promoters are necessary for heterologous expression

D. basal promoters are sufficient for expression in the shoot apical meristem

**37. RAPD molecular markers are**

A. recessive

B. co dominant  
C. dominant ☑

D. neutral

**38. PCR and Restriction Fragment Length Polymorphism are the methods for**

A. DNA sequencing

B. Genetic fingerprinting ☑

C. Study of enzymes

D. Genetic transformation

**39. If a SNP could be distinguished by restriction enzyme digestion, it is also called**

A. Microsatellite marker

B. Minisatellite marker

C. Indel (insertion/deletion)

D. Restriction fragment length polymorphism (RFLP) ☑

**40. DNA fingerprint was based which of following DNA polymorphisms?**

A. Microsatellite marker

B. Minisatellite marker ☑

C. Indel (insertion/deletion)

D. Restriction enzyme polymorphism (RFLP)

**With all the best wishes and success for all**

**Prof. Dr. Hassan Sayed Ahmed Sherif**

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**Genetics and genetic engineering family**