99 Outside

1.	Purity of the proteins during purification can be assessed by measuring specific activity.		1
2	To search for novel products from microbial genomes in an environment.		1
3	Using M-13 phage as cloning vector which has a single strand DNA as genome.		1
4	The barnase/barstar system should be introduced into the mustard seeds.		1
5	(Any 1 reason) Interferon is expressed intracellularly No post translational modifications are possible for the eukaryotic protein in *E.coli*.		1
6	(Any 2 reasons) Alternate splicing of genes Overlapping genes Post translational modification RNA editing	½ X 2	
7	pHmaintenance required for optimal activity of enzymes and other biomolecules. CO_2- bicarbonate buffer system		1 1
8	Cost effective and easy availability of bulk media components required in large scale culturing. Sources (Any two, Page. 86)		1 ½+ ½
9	Serum supplemented medium has no defined (known) composition and contains nutrients, hormones etc.		2
10	rHuEPO stimulates RBC production without the risks involved of blood transfusion such as transfusion related diseases like AIDS etc.		2
11	Any two:		

	Batch	**Continuous**	
(a)	Closed system	Open system	2
(b)	Nutrients are limited	Only one nutrient is limited	
(c)	Normal growth kinetics	Growth rate constant (log phase)	
(d)	Used for laboratory purposes	Used for commercial applications	

12 In animal cell cultures, cells are in the bottom of the container and hence can be visualized only by an inverted microscope — 2

13 (Any 1)Karyotype analysis confirms: — 1

- the species of origin
- detects chromosomal abnormalities

(Any1)Stability affected by:

- cell line
- growth conditions
- frequency of subculturing
- cells frozen or not

— 1

OR

Animal cells: Complex nutritional requirements and fragility of cells — 1

Serum essential due to undefined nutritional and growth factor requirements — 1

14 Interspecific crosses lead to abnormal endosperm development resulting in premature death. — 1

Embryo should be excised and cultured. — 1

15 Restriction Enzymes: Cut DNA specifically
DNA ligase: Join different DNA fragments
Alkaline phosphatase: Prevents self-ligation of the vector — 1+1+1

16 Proteins are engineered by Site directed mutagenesis. — 1

Technique applied to improve the stability of subtilisin/ properties of other proteins (Any 1) (Page. 52 onwards) — 2

17

	Any 3 (Page.59)	
	Structural Genomics	**Functional genomics**
(a)	High throughput DNA sequencing	High throughput biological function of the genes
(b)	Assembly and organization of sequences	Predicting interactions between genes and proteins

— 3

(c)	High resolution genetic physical and transcript maps	Experimental methodologies with computational analysis
(d)	3-D structure of proteins	Biological functions of proteins

18	Diagram and steps as on Page.120 Should include following steps: Identifying and cloning of gene of interest into Ti plasmid Transformation of *Agrobacterium* with recombinant plasmid Generation of transgenic plants and growth.		1+1+1
19	Antigenic proteins used as vaccines are expressed in edible plant parts such as banana, tomato etc. (Any 2) Advantages: Painless delivery systems, cost effective, no storage problems etc.		1 1+1
20	Any six as listed on Pages 130-131	½X 6	
21	Expressing recombinant proteins in farm animal's milk on a commercial scale. Four advantages as on page 39.		1 ½ X 4
22	Schematic representation of FISH technique (as described on pages 65-66). Steps should include (Using the example of CML) a) Constructing fluorescent probes specific to chromosome 9 and chromosome 22 by using nick translation with DNase I ,DNA polymerase I with red fluorescent dNTP's (for chromosome 9) and green fluorescent dNTP's (chromosome 22). b)Hybridising the green and red probes with the patients lymphocytes /chromosome smear c)Visualising hybridized regions with fluorescent microscope to detect translocations.		1 1 1
23	Screening transformed cells –Blue white selection method as described on page 17/GFP as described on page 15		3
24.	Due to any two : Alternate splicing, Overlapping genes , Post translational modifications and RNA editing Any example from table on page 61 regarding lack of correlation a)Number of genes in human genome and worm are not very different.		2 1

	b)Number of genes in Arabidopsis more than complex human being.	
25	Diagram of Mass spectrometer as on page 45	2
	Protein sequences / Molecular mass can be determined.	1
26.	Principle: Chain termination using dd NTPs	1
	Diagram (figure 13),page 24	2
	Steps on page 23	2
27.	Two phases consisting of Dextran and PEG. Proteins will partition into PEG and cellular debris into dextran /diagram on page 42.	2
	Precautions to maximize stability of proteins. Any three from page 43.	3
	OR	
	Proteins with nutritional and medicinal value.	1
	Importance of curd in controlling intestinal infections and having beneficial bacteria for digestion	2
	Whey increases glutathione levels useful for detoxification of xenobioticsand to decrease the production of oxygen intermediates.	2
28.	SNP –Single Nucleotide Polymorphism. Variation at single nucleotides	1
	Physicians use SNP maps to correlate SNPs with disease susceptibility as depicted on page 63	2
	Examples: ApoE gene linked to Alzheimer's disease.	2
	CCR5 gene linked to resistance to HIV (Page 63) (Any one)	
	OR	
	Any four databases with information content as on page 80.	4
	Example of database retrieval tool (any one) and its application as on page 78 -79.	1