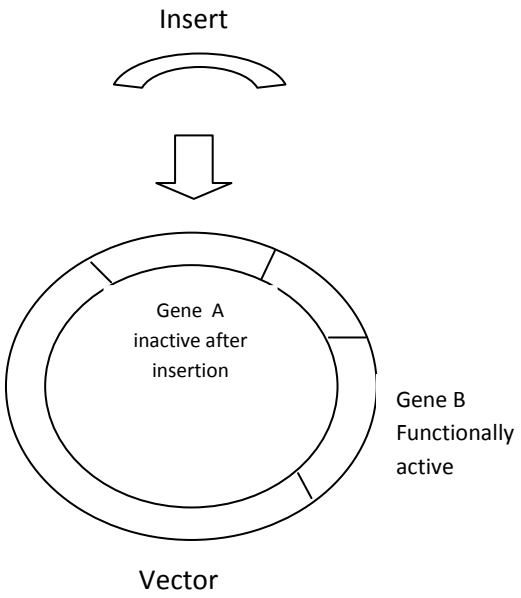
**Paper Biotechnology 99/0**

**Marking Scheme**

1. Grow in solution, no adherence to vessel; e.g. blood cells. $^{1/2} + ^{1/2}$
2. *Taxus* species; anti carcinogenic. $^{1/2} + ^{1/2}$
3. Used as antifoaming agent to prevent denaturation $^{1/2} + ^{1/2}$
4. A stationary phase culture has stopped growing. 1
5. $T_d = 0.693/\mu$ 1
6. Matrix assisted laser desorption and Ionisation. Proteins are volatalised and ionised for analysis of their molecular masses (m/z ratio). $1/2 + 1^{1/2}$
7. Algorithm based on known training sets, inaccurate. Reason: overlapping genes/splice variants. Pg 61 2
8. Any one from book (Pg 122-130)
   Bt Cotton- pest resistance/ canola, soyabean, corn, cotton- herbicide tolerant/ papaya etc.- virus resistant. 2
9. cDNA for expressed genes; gDNA for all genome sequences. 1 + 1
10. To store novel strains/species for repository. 1
    MTCC Chandigarh, NBAIM (Mau, UP) 1
11. Any two components from pg 110 such as -
    Sucrose as Carbon source, ammonium salts as nitrogen source, vitamins, hormones as growth regulators etc. 2
12. Mortality of finite cultures; lack of adherence of continuous cultures etc. pg 137-138 (any two). 2
13. Protein engineering/ site directed mutagenesis. 1
    Application: subtilisin/ epitope micromanipulation (page 53) 1
14. Vector selection is based on size of fragments, a 22 kb fragment can be suitably cloned in phage based vector 1
    Host: Bacterium 1
15. Generation of various parts of plants: roots, shoots. 2
16. Any 3:
    High production capacity/ ease of source material collection/ low operational cost/ ease of production. 3
17. To solve medico-legal cases. 1

Principle: DNA from subject is isolated and restricted, followed by comparison of RFLPs to assess variations. Pg 7 + 8 2

18. Pg 91 for graph (fig. 6) and other details 3
19. pH- stability of protein 1
    less time- to prevent denaturation 1
    agitation- causes instability in protein 1
20. Vector in which foreign DNA is inserted has genes A & B for different antibiotic resistance. Cloning into A causes insertional inactivation and hence, causes sensitivity to antibiotic A. Since gene B is functionally active hence resistance to B results.



OR

As on page 17

Principle based on insertional inactivation of lac Z gene on the vector (PUC 19) used.

No insertional inactivation, ß- galactosidase expressed.

---- X-gal converted to blue product- therefore, blue colonies

Insertional inactivation, ß- galactosidase not expressed ----- white colony. 3

21. 100mg/ 500ml; therefore 500X1000mg in $25X10^5$ ml or 2500L. $1^{1/2}$
    For 50LX2 fermentors/week= 2500/ 100X4 = 6 months/25 wks. $1^{1/2}$
22. Fusion of protoplasts results in intergenetic somatic hybrids.
    Benefits: to obtain hybrids with useful agronomic traits not normally found through sexual fertilisation. e.g. pomatoes, topatoes. 3
23. Animal cells require $O_2$ for energy (ATP production). $1^{1/2}$
    Addition of microcarrier beads/ roller culture bottles. $1^{1/2}$
24. For better compression of data. B, H 1 + 2
25. Antigen epitope specific; e.g. OKT 3/ Herceptin etc 1 + 2
26. pg 45 for MS
    OR
    pg 36-38 for protein finger printing
    interpretation of results with respect to Sickle cell anaemia 4 +1
27. Pg 67-69
    Principle 2
    Diagram 2
    Interpretation 1
28. Sanger's dideoxy method pg 23-25 (fig 15) 3 +2
    OR
    Description of Southern Hybridization; (Fig 10), Page 20