

**KENDRIYA VIDYALAYA SANGATHAN – REGIONAL
OFFICE LUCKNOW
MARKING SCHEME – FIRST PREBOARD
EXAMINATION (2025–26)
SUBJECT: BIOTECHNOLOGY (045) – CLASS XII
MAX MARKS: 70 TIME: 3 HOURS**

SECTION – A (1 × 16 = 16 Marks)

Q. No	Answer / Key	Marks
1	pBR322 containing gene of interest	1
2	Leucine	1
3	(i), (ii), and (iii) only	1
4	(i) and (iii)	1
5	False: Two organisms' DNA on one microarray	1
6	Exponential phase	1
7	Antibiotics	1
8	Provide sterile environment to cell culture	1
9	Barnase protein	1
10	5–10%	1
11	Totipotency of plant cells	1
12	To increase its thermal stability	1
13	Assertion true, Reason false	1
14	Both true; Reason correct explanation	1
15	Both true; Reason correct explanation	1
16	Both true; Reason correct explanation	1
	Total = 16 Marks	

SECTION – B (5 × 2 = 10 Marks)

Q. No	Expected Answer / Key Points	Marks
17	BCAA prevent muscle breakdown; promote recovery & energy.	2
18	Cancer only: B,E; Normal only: A; Both: C,F; None: D,G	2
19	BLAST tool; FISH diagram showing Philadelphia chromosome.	2
20	$\mu = 3.46 \text{ h}^{-1}$; Doubling time = 0.2 h (12 min)	2
21	Aeration, Agar, Antifoam, Corn steep liquor – functions	2
	Total = 10 Marks	

SECTION – C (7 × 3 = 21 Marks)

Q. No	Expected Answer / Key Points	Marks
22	Selectable markers & M13 vector advantage	3
23	Uses of R-HuEPO, Factor VIII, IX, tPA, OKT3, Herceptin	3
24	Sickle cell mutation & peptide mapping (diagram)	3
25	Herbicide (EPSPS/bar), Bt gene, Flavor-savor (antisense RNA)	3
26	Subtilisin improvement by site-directed mutagenesis	3
27	Cryoprotectants prevent lysis; aeration by shaking/sparging	3
28	UniGene, Homologene, RefSeq applications	3
	Total = 21 Marks	

SECTION – D (2 × 4 = 8 Marks)

Q. No	Expected Answer / Key Points	Marks
29	Contact inhibition, properties of continuous line, CHO use	4
30	PCR sequence, 32 duplexes, DNA primer, primer function	4
	Total = 8 Marks	

SECTION – E (3 × 5 = 15 Marks)

Q. No	Expected Answer / Key Points	Marks
31	Charge relay system / Monoclonal antibody steps & selection	5
32	Sanger sequencing principle & reading / Blue-white selection	5
33	Tissue culture steps & edible vaccine / Ti plasmid process	5
	Total = 15 Marks	