

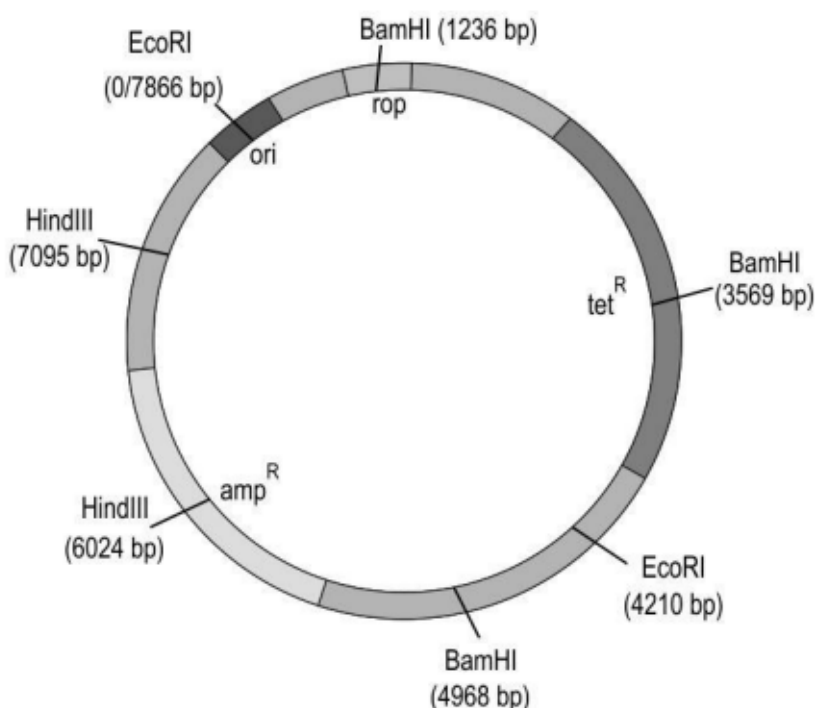
## CCT TEST ITEM

|                                  |                        |
|----------------------------------|------------------------|
| <b>CLASS</b>                     | <b>XII</b>             |
| <b>SUBJECT</b>                   | <b>BIOLOGY</b>         |
| <b>Name of the Teacher</b>       | <b>AKHILESWARI K P</b> |
| <b>Name of the Topic/Chapter</b> | <b>BIOTECHNOLOGY</b>   |

### MOLECULAR BIOLOGY AND GENETIC ENGINEERING

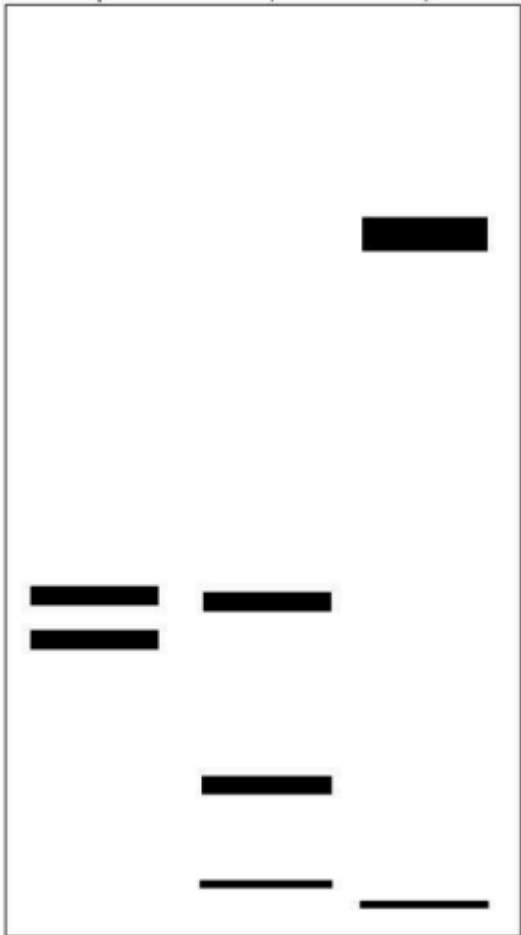
Plasmids are small, circular molecules of double-stranded DNA derived from larger plasmids that occur naturally in bacteria.<sup>68</sup> Most plasmid-cloning vectors are designed to replicate in *E. coli*.<sup>69</sup> All of the enzymes required for replication of the plasmid DNA are produced by a host bacterium. The classic example of plasmid vector is pBR322.

The plasmid shown below is 7866 base pairs in length and contains genes that confer resistance to antibiotics tetracycline and ampicillin. The bp at which the restriction site is present is also shown.



**Based on the above paragraph and diagram, answer the following questions:**

|               |                                                                                                                                                                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Q.1.</b>   | <b>Which part of the vector controls the copy number of target DNA in a host cell?</b><br>(a) Cloning site<br>(b) Ori site<br>(c) Selectable marker<br>(d) Both (a) and (c)                                                                                                       |
| <b>Answer</b> | <b>(b) Ori site</b>                                                                                                                                                                                                                                                               |
| <b>Q.2.</b>   | Aditya digested a target DNA with HindIII, and ligated it with plasmids (refer the given image) digested with the same enzyme and transferred them into a bacterial cell. Select the correct option regarding selection of transformant with recombinant from a non-transformant. |

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <p>(a) The bacterial cells transformed with recombinant will be resistant to both ampicillin and tetracycline</p> <p>(b)The bacterial cells that are non transformed will be resistant to both ampicillin and tetracycline</p> <p>(c) The bacterial cells that are transformed with recombinant will be resistant to the antibiotic ampicillin but not be resistant to tetracycline</p> <p>(d)The bacterial cells that are transformed with recombinant will be resistant to the antibiotic tetracycline but not be resistant to ampicillin</p>                                                                                                                                                                                                                 |
| Answer | (d)The bacterial cells that are transformed with recombinant will be resistant to the antibiotic tetracycline but not be resistant to ampicillin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Q.3.   | <p>Which part of the vector code for proteins involved in replication of plasmids?</p> <p>(a) Ori site</p> <p>(b)rop</p> <p>(c) Selectable marker gene</p> <p>(d)None of the above</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Answer | (b)rop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Q.4.   | <p>While working in the lab, Abhishek took three individual samples of the plasmid. She added different restriction enzymes, EcoRI, HindIII, and BamHI, separately in each of the samples.She ran the three digested samples on an agarose gel electrophoresis to see the fragments. The results are shown below:</p> <div><div>Maker size (bp)</div><div>Sample 1</div><div>Sample 2</div><div>Sample 3</div><div><div>8000</div><div>7500</div><div>7000</div><div>6500</div><div>6000</div><div>5500</div><div>5000</div><div>4500</div><div>4000</div><div>3500</div><div>3000</div><div>2500</div><div>2000</div><div>1500</div><div>1000</div></div><div></div></div> |

|               |                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <p>Considering complete restriction digestion had happened, help her to identify which sample is digested by what enzyme.</p> <p>(a) Sample 1: Bam H1 Sample 2: EcoRI Sample 3: Hind III</p> <p>(b) Sample 1: EcoRI Sample 2: BamHI Sample 3: Hind III</p> <p>(c) Sample 1: Hind III Sample 2: BamHI Sample 3: EcoRI</p> <p>(d) Sample 1: EcoRI Sample 2: HindIII Sample 3: Bam HI</p> |
| <b>Answer</b> | (b)Sample 1: EcoRI Sample 2: BamHI Sample 3: Hind III                                                                                                                                                                                                                                                                                                                                  |