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| **Question Number** | **I** | **II** | **III** | **IV** | **Total** |
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| **Question I:**   1. **For the regular curve defined by  compute the torsion .** 2. **Define Bertrand curves.** 3. **Prove that the distance between corresponding points of a pair of Bertrand curves is constant.** |
| **Question II:**  **Let be a simple surface defined by , and , be defined by . Then answer the following:**   1. **Show that the curve lies on the simple surface .** 2. **Use part (a) to find a tangent vector to the simple surface at the point**   **Question III:**   1. **Let be a simple surface and be a coordinate transformation. Prove that is a simple surface.** 2. **Let defined by be a coordinate transformation, where , and**   **. Then answer the following:**  **(i) Find the Jacobian matrix for the function *f* at the point .**  **(ii) Find,**  **Question IV:**  **Let be defined . Then answer the following:**   1. **Show that is a simple surface.** 2. **Find the equation of the tangent plane to the surface at the point .**   Good Luck ☺ |