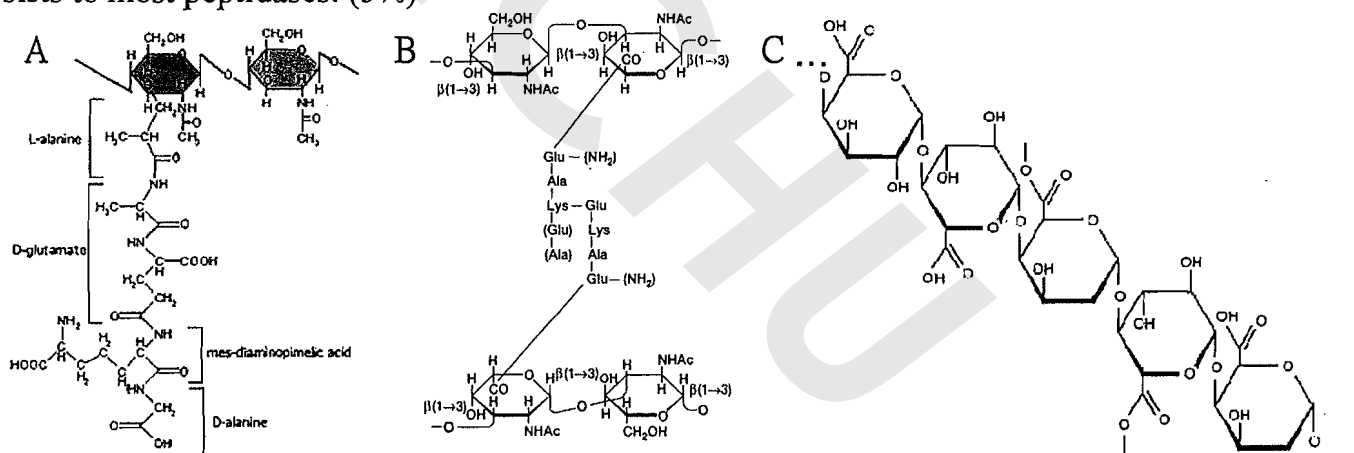


請務必將每題題目看完後再開始作答，第 8 題解釋名詞各小題的分數不同，請依序作答。

1. Please explain what bacteriocin and antibiotics are and their mechanisms in controlling bacterial growth. (15%)
2. "Gram-negative Enterobacteriaceae with resistance to carbapenem that is conferred by *bla*NDM-1 gene-encoding New Delhi metallo- $\beta$ -lactamase 1 (NDM-1) are potentially a major global health problem. According to a recent survey, Indian isolates has *bla*NDM-1 exclusively on plasmids, whereas it is found on plasmids or chromosome of the UK isolates. In some isolates, *bla*NDM-1 is carried on more than one plasmid." Based on the description, please discuss the possible mechanisms of *bla*NDM-1 transmission between enteric bacteria and the presence of multiple copies in one bacterium. (8%)
3. Please describe the major characteristics of the genus *Pseudomonas* and the roles of pseudomonads in natural environments. (10%)
4. Please describe and compare the ecological niches of epiphyte, endophyte, and saprophyte. (10%)
5. Please choose the correct peptidoglycan monomer from the following structures and explain why it resists to most peptidases. (5%)



6. Please use an example to explain how viruses with plus-strand RNA genomes replicate in host cells. (6%)
7. Please list the major differences in cell wall structures of G<sup>+</sup> and G<sup>-</sup> bacteria. (10%)
8. Please explain the following terms and its involvement in microbial growth or survival. (36%)
  - (1) Fermentation (4%)
  - (2) water activity (4%)
  - (3) type II protein secretion pathway (5%)
  - (4) chemotaxis (5%)
  - (5) symbiosis (5%)
  - (6) gas vacuoles (4%)
  - (7) pasteurization (4%)
  - (8) pentose phosphate pathway (5%)