

- 8 a) i) Categorize the types of pollutants from automobiles. (1 mark)
- ii) Automobiles are the largest air pollution source in some cities in the world. Name and describe three control devices developed for the control of automotive emissions. (3 marks)
- iii) An air quality standard limits 8-h average carbon monoxide (CO) levels to 9 ppm. Express this concentration in terms of mg/m³ at 25°C and 1 atm pressure? Molecular weights of C and O₂ are 12 and 16 respectively. (3 marks)
- b) i) What is meant by floodplain? What is a flood hazard area? (2 marks)
- ii) Estimate the peak rate runoff on 15 ha watershed from a storm with rainfall intensity of 15 mm/h. Use the runoff coefficient of 0.6. If the runoff of 35% of the above area, having a runoff coefficients of 0.95, is proposed to be collected through rainwater harvesting, estimate the size of collector tanks to be constructed for the same intensity of rainfall. (5 marks)
- c) i) List three general characteristics of a watershed that may affect the runoff volume and rate of runoff. (3 marks)
- ii) Explain the purpose of the unit hydrograph and explain how it might be applied in the analysis of a storm sewer design or a stream flood control project. (3 marks)