

國立中山大學 109 學年度 碩士暨碩士專班招生考試試題

科目名稱：環境工程概論【環工所碩士班】

— 作答注意事項 —

考試時間：100 分鐘

- 考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- 答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，不得另攜帶紙張，請衡酌作答。
- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，其後果由考生自行負擔。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶具有通訊、記憶或收發等功能或其他有礙試場安寧、考試公平之各類器材、物品（如鬧鈴、行動電話、電子字典等）入場。
- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。
- 試題採雙面列印，考生應注意試題頁數確實作答。
- 違規者依本校招生考試試場規則及違規處理辦法處理。

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題號：433002

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Section A – Choose the only correct answer for each statement.
(75 total points, 3 points per question)

1. Disinfection efficiency is ()?
A. Reduced at higher pH value of water
B. Unaffected by pH value of water
C. Increased at higher pH value of water
D. Highest at pH value equal to 7
2. Which one of the following lists contains only non-fossil energy sources?
A. Coal, nuclear, natural gas, wind B. Nuclear, hydro-electric, wind, solar
C. Hydro-electric, solar, wind, natural gas D. Nuclear, hydro-electric, oil, wind
3. Two monitoring wells were constructed in an unconfined aquifer. The wells are separated by a distance of 250 ft. The water surface elevations in the up-gradient and down-gradient wells were 101.00 ft and 100.85 ft, respectively. The aquifer hydraulic conductivity is 5 ft/day. The fluid velocity (ft/day) in the aquifer is most nearly:
A. 1.5 B. 0.75 C. 0.003 D. 0.0006
4. Which of the following devices is not used to control particulate emissions?
A. Electrostatic precipitator B. Bag filter C. Catalytic converter D. All of the mentioned
5. A gas mixture at 25°C and 1 atm contains 100 mg/L of H₂S. The partial pressure (atm) exerted by the H₂S is most nearly:
A. 0.14 B. 0.072 C. 0.0056 D. 0.0029
6. What does the aerodynamic diameter of an aerosol indicate?
A. Size of the aerosol particle when floating in air.
B. Equivalent diameter of a sphere having same volume as that of the aerosol.
C. Average diameter of aerosol particles present in unit volume of air.
D. Maximum size of aerosol particle that can float in the air.
7. Which of the following is associated with the corrosion of sanitary sewers?
A. H₂S B. BOD C. NH₃ D. Ozone
8. The correct relation between Theoretical oxygen demand (TOD), Biochemical oxygen demand (BOD) and Chemical oxygen demand (COD) is given by:
A. TOC > BOD > COD B. BOD > COD > TOD C. TOD > COD > BOD D. COD > BOD > TOD
9. A heat exchanger is designed to heat liquid water from 150°C to 190°C inside tubes using steam condensing at 230°C on the outer surface of the tubes. For a constant flow rate, the effect of fouling of the heat transfer surfaces is to:
A. increase the temperature rise of the water. B. decrease the temperature rise of the water.
C. increase heat exchanger effectiveness. D. make no change in heat exchanger effectiveness.
10. Which of the following can be considered in Environmental Risk Assessment?
A. Exposure period B. Potency of a toxic material C. Quality of models D. All of the above
11. Which of the following is a liquid form of aerosol?
A. Fume B. Dust C. Smoke D. Mist

試題請隨卷繳回，請留意背面是否有題

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12. Which of the following laws states that the solubility of a gas in a liquid is proportional to the partial pressure of that gas in contact with liquid?
A. Hick's law
B. Henry's law
C. Hardy-Weinburg law of equilibrium
D. 2nd Law of Newton
13. For coal-fired steam electric power plants, control of SO_x emissions is most commonly achieved by?
A. Catalytic conversion B. Electrostatic precipitation C. Carbon adsorption D. Lime scrubbing
14. Which bacteria results in the corrosion of iron and steel pipes embedded in soil?
A. Iron bacteria B. Sulphur bacteria C. Escherichia coli bacteria D. Bacterium coli bacteria
15. Which of the following air pollution control device has maximum efficiency?
A. Electrostatic precipitator B. Dynamic precipitator C. Spray tower D. Wet cyclonic scrubber
16. The ration of 5 day BOD to ultimate BOD is about?
A. 1/3 B. 2/3 C. 3/4 D. 1.0
17. The settling velocity of a particle in a sedimentation tank depends on?
A. Depth of tank B. Surface area of tank C. Both depth and surface area of tank D. None of the above
18. Which of the following parameters is not a good indicator of contamination in ground water?
A. BOD B. Nitrates C. Silica D. Chlorides
19. For the same solid content, if the quantity of sludge with moisture content of 98% is X, then the quantity of sludge with moisture content of 96% will be?
A. X B. X/2 C. 3X/4 D. X/4
20. Flue gas laden with fine particles from a thermal power plant with a volume flow rate of 100 m³/second passes through an electrostatic precipitator (ESP) having 5000 m² of collector plate area. If the particle collection efficiency of the ESP is 98%, the drift velocity of the flue gas must be?
A. ~ 0.052 m/s B. ~ 0.078 m/s C. ~ 0.15 m/s D. ~ 1.5 m/s
21. In Environmental assessment study, interpretation and evaluation should consider?
A. Uncertainty of possible impacts.
B. Significance of measured impacts.
C. Comparison of alternatives.
D. All of the above.
22. Biogas produced by anaerobic bacterial activity is a mixture of?
A. CH₃OH, CO₂, NH₃ and H₂O
B. CH₄, CO₂, NH₃, H₂S and H₂O
C. H₂S, CO₂, CO, CH₄ and LPG
D. CO₂, SO₂, NO₂, CH₄ and H₂O
23. The biodegradability of xenobiotics can be characterized by?
A. Rate of CO₂ formation
B. Rate of O₂ consumption
C. Ratio of BOD to COD

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D. All of the above

24. Solid waste treatment by pyrolysis involves

- A. Autoclaving
- B. Heating in presence of air
- C. Heating in presence of H₂O
- D. Heating in absence of air

25. Which one of the following is a waste recycling method of solid waste management?

- A. Pelletisation
- B. Composting
- C. Incineration
- D. Sanitary Landfill

Section B – Short answer questions.

(25 total points)

1. What is PM 2.5 and PM 10? How they affect health? (9 points)

2. What is the concentration of H⁺ ions in moles/L in water if the pOH value is 6? (5 points)

3. What is noise? Describe briefly the effects of noise on human health? How to control noise pollution? (11 points)