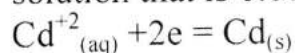




Note : answer 5 questions only (20 marks for each question)

Q1)A

what is the potential for a half-cell consisting of a cadmium electrode immersed in a solution that is 0.0150 M in  $\text{Cd}^{+2}$  ?



$$E^\circ = -0.403 \text{ v}$$

B

Prepare 0.5L 0.1N HCl if you have a bottle of HCl has specific gravity of 1.18 and is 35.4% HCl (W/W).

Q2)

for equilibrium reaction below.



When 76 ,90, 105 and 55.35 are equivalent weights of A,B,C and D respectively , and the valence A and C =1, but valence of B and D =2, and weight of D formed was 2.037 gm calculate weights of reaction items and formed items ?

Q3)

Calculate the pH values during the titration of 25.00 ml of 0.1 M  $\text{NH}_4\text{OH}$  with 0.1 M HCl after the addition of the following volumes of reagent:

0, 5, 25 and 30 ml ?  $\text{pK}_b = 4.74$

Q4)

A solution of 20 ml 0.01M  $\text{AgNO}_3$  is added to 80 ml 0.05M  $\text{K}_2\text{CrO}_4$ . Compute  $Q_{\text{sp}}$  for  $\text{Ag}_2\text{CrO}_4$  and show are there precipitating of  $\text{Ag}_2\text{CrO}_4$  or no ?for  $\text{Ag}_2\text{CrO}_4$

$$K_{\text{sp}} = 1 \times 10^{-12}$$

Q5)

1-Why titration of weak acid with weak base do not to be feasible ?

2-Define two of

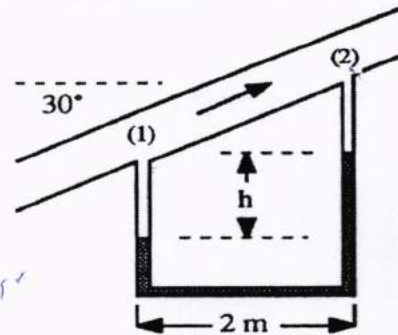
Titrand , indicator , End point





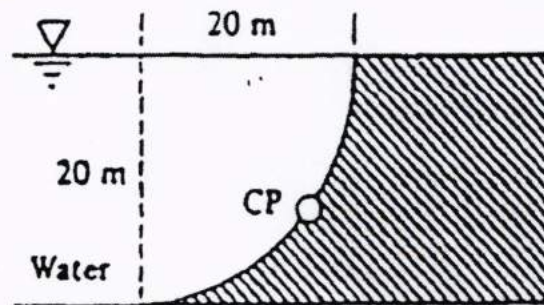
Note : Answer to Four questions and assume any reasonable value if you needed.

Q1: Water flows upward in a pipe slanted at  $(30^\circ)$ , as in Figure. The mercury manometer reads  $(h = 12 \text{ cm})$ . What is the pressure difference between points (1) and (2) in the pipe? If  $(\gamma_w = 9790 \frac{\text{N}}{\text{m}^3})$  and  $(r. d_{\text{Mercury}} = 13.59)$ .



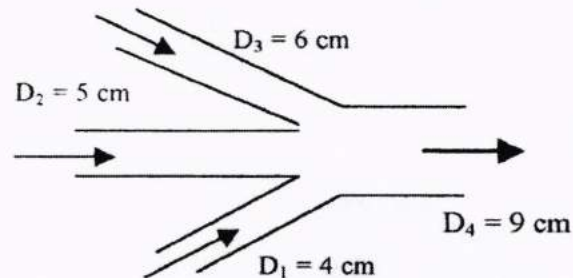
(25 Point)

Q2: The dam in Figure is a quartercircle (50 m) wide into the paper. Determine the horizontal and vertical hydrostatic forces against the dam. Use  $(\gamma_w = 9790 \frac{\text{N}}{\text{m}^3})$ .



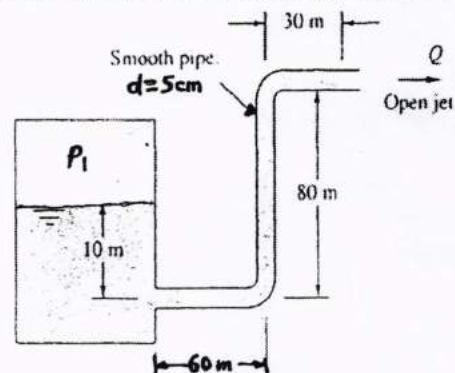
(25 Point)

Q3: Three pipes steadily deliver water to a large exit pipe in Figure. The velocity  $(V_2 = 5 \text{ m/s})$ , and the exit flow rate  $(Q_4 = 120 \text{ m}^3/\text{hr})$ . Find  $(V_1, V_3)$  and  $V_4)$  if you know that  $(Q_3)$  is equal to half  $(Q_4)$ .



(25 Point)

Q4: The pipe flow in Figure is driven by pressurized air in the tank. What gage pressure  $(P_1)$  is needed to provide a water flow rate  $(Q = 60 \text{ m}^3/\text{hr})$ ? If  $(\rho_w = 998 \frac{\text{kg}}{\text{m}^3})$  and  $(\mu = 0.001 \frac{\text{kg}}{\text{m} \cdot \text{sec}})$ .



(25 Point)

Q5: Define the (Venturi Meter and Pitot Tube). What is the principle of work of each device? (25 Point)

Good Luck

Examiner  
Akram K. Mohammed

Examiner  
Ahmed Sh. Ahmed

Head of Department  
Prof. Dr. Aziz I. Abdulla



Note: 1- Answer All Questions, 2- This Exam Sheet should be handed and not retaken after the end of exam.

**Q1: Put (True) or (False) on the following sentences:** (Choose 5 only) (15 Marks)

1. He aren't playing tennis now.
2. She has a mobile phone.
3. Where do you go ?
4. He have some photos.
5. Are you a teacher ?
6. I have lunch with my friend.

**Q2: Put ( some) or ( any) in the foloowing blanks.** (choose 5 only) (15 Marks)

1. I haven't got ----- paper.
2. Is there ----- petrol in the car?
3. I bought ----- fruit yesterday.
4. Do you have ----- change?
5. I need ----- help with my homework.
6. I don't have ----- free time today. Sorry.

**Q3: Complete the sentences with( a/an, the, nothing)** (choose 5 only) (10 Marks)

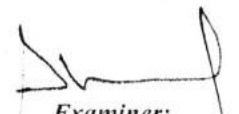
1. It is ----third of August
2. I went home by ---- car.
3. ---- Honey is very useful for glottis.
4. I light ---- lamp.
5. He is ---- acrobat .
6. ----moon is so big tonight.

**Q4: Put the right choice in the blank.** (10 Marks)

1. There aren't ----- apples here. (much , many)
2. ----- you like a coffee? (Do , Would)
3. I ----- a meeting with the boss . (have got, have)
4. Look out ! that car ----- hit you. (is going to , will)
5. Is she sick? Yes, ----- . ( she is . she has)

**Q5 : Choose the right answer and rewrite the word.** (choose 5 only) (10 Marks)

1. ---pack. (in, un, il, ment)
2. --- agree . (in, un, dis, im)
3. employ ----. ( ation, sion, ment, ance)
4. crazy----. (ment, ness, sion, ance)
5. grate----. (ful, ous, y, ly)
6. guilt----- . (y, ly, ful, ance)

  
Examiner:  
Asst. Instr. Ahmed S. Abdullah

((Good Luck)))

  
Head of Dept.: