Unit 9 - Week 7

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-18, 23:59 IST.

1) Which of the following influences the selection of filtration equipment? — 1 point

a. Fluid density
b. Cake characteristics
c. Solids concentration in the suspension
d. All of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

2) Which of the following affects the rate of filtration? — 1 point

a. Filtrate viscosity
b. Filter medium resistance
c. Pressure drop
d. All of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

3) Which of the following is not a characteristic of the deep-bed filtration? — 1 point

a. Particles penetrate into the pores of the filter medium
b. Removal of fine particles from very dilute suspensions
c. With time initial layers become the effective filter medium
d. None of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

4) During cake washing process, the filtrate fraction in the exit solution is _____ the volume of wash solution. — 1 point

a. Independent of
b. Inversely proportional to
c. Directly proportional to

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

5) The pressure drop is independent of which of the following parameters, for the case of filtration where the cake is compressible. — 1 point

a. Superficial filtrate velocity
b. Voidage of the cake
c. Fluid density
d. Specific cake resistance

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

6) Filter-aids usually result in: — 1 point

a. compressible cake
b. incompressible cake
c. reduced cake thickness
d. cake with high specific resistance

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

7) Which of the following is not a favorable characteristic for selecting the filter medium? — 1 point

a. Mechanically strong
b. Significant resistance to the flow
c. Resistant to corrosivity
d. Granular and/or woven materials for filling filter space

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

8) Which type of filtration process does the bed filters work on? — 1 point

a. Cake filtration
b. Constant rate filtration
c. Constant pressure drop filtration
d. Deep-bed filtration

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

9) When filter medium resistance affects the filtration process, to which of the following is the pressure drop remains unaffected? — 1 point

a. Filtrate volume
b. Filtrate viscosity
c. Filtrate density
d. Particle size

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

10) Batch filtration is preferred over continuous process, for — 1 point

a. low cake resistance
b. high cake resistance
c. any kind of cake resistance
d. none of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

11) Which of the following requires an intermittent shutdown for the removal of cake formed during the filtration? — 1 point

a. Vacuum filter
b. Bag filter
c. Cartridge filter
d. Plate and frame press

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

12) Cross-flow filtration is beneficial for — 1 point

a. flocculated slurry
b. dilute solution with fine particles
c. shear thinning slurry
d. all of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

13) Which of the following operates at the lowest of pressures? — 1 point

a. Pressure leaf filters
b. Plate and frame press
c. Vacuum filters
d. Filter press

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

14) Which of the following does not happen when the operating blades of the filtration equipment are at high speeds? — 1 point

a. Higher cake thickness than the clearance depth
b. Insignificant build up
c. Significantly lesser cake thickness than the clearance depth
d. Nearly constant cake thickness

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

15) Consider the case of a slurry of solids having a surface-volume mean size, 44 μm, filtrate volume of 0.65 m^3 and viscosity of 0.001 Pa.s results in solids incompressible cake build-up of 0.85 m at a constant cake voidage of 0.52 and a pressure drop of 1200 Pa. If the filter medium resistance is ignored then, what is the specific cake resistance and the rate of filtration for this case and the pressure drop required for processing at same filtration rate to collect 0.5 m^3 of the filtrate. (Consider the area, $A = 0.04\ m^2$.) — 3 points

a. $1.27 \times 10^{11}/m^2$, $4.45 \times 10^{-7}\ m^3/s$ and 923.1 Pa
b. $2.65 \times 10^{11}/m^2$, $4.45 \times 10^{-7}\ m^3/s$ and 1560.1 Pa
c. $1.27 \times 10^{11}/m^2$, $2.13 \times 10^{-6}\ m^3/s$ and 923.1 Pa
d. $2.65 \times 10^{11}/m^2$, $2.13 \times 10^{-6}\ m^3/s$ and 1560.1 Pa

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

16) A filter has an area of 0.6 m^2 and operates at a constant pressure drop of 560 kPa. The test results for a slurry in water, which formed incompressible filter cake, are tabulated below. Calculate — 3 points

- time needed to collect 0.9 m^3 of filtrate at a constant pressure drop of 475 kPa
- the rate of passage of filtrate at the end of that filtration period and
- the time required to wash the resulting cake with 1.5 m^3 of water at a pressure drop of 365 kPa. (Assume that the wash water has the same physical properties as that of the filtrate)

Volume of filtrate collected (m^3)	0.1	0.2	0.3	0.4	0.5
Time (s)	140	360	660	1040	1500

a. 1.36 hr, $1.03 \times 10^{-4}\ m^3/s$ and 7.26 hr
b. 1.36 hr, $1.03 \times 10^{-4}\ m^3/s$ and 5.26 hr
c. 1.51 hr, $1.72 \times 10^{-4}\ m^3/s$ and 7.26 hr
d. 1.51 hr, $1.72 \times 10^{-4}\ m^3/s$ and 5.26 hr

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.