1. 35 degrees Celsius is equivalent to
   a) 0
   *b) 95
   c) 1.6
   d) 55 degrees Fahrenheit.

2. The treatment facility treats 100,000 cuft of water a day and operates for 18 hours a day. How much water do they treat a day expressed in MGD?
   *a) .75MGD
   b) 1.80MGD
   c) 2.92MGD
   d) 5.75 MGD

3. 25 MGD is equivalent to
   a) 1122gpm and 1560cu/ft of water
   b) 36000gpm and 187cuft/sec
   *c) 17362gpm and 38.75cuft/sec
   d) 15600gpm and 466.7cuft/sec

4. Convert 1000 ft^3 to cu. yards
   $1000\cancel{ft^3} * \frac{cu.yards}{27\cancel{ft^3}} = 37 cu.yards$

5. Convert 10 gallons/min to ft^3/hr
   $\frac{10\cancel{gallons}}{\cancel{min}} * \frac{ft^3}{7.48\cancel{gallons}} * \frac{60\cancel{min}}{hr} = \frac{80.2 ft^3}{hr}$

6. Convert 100,000 ft^3 to acre-ft.
   $100,000\cancel{ft^3} * \frac{acre-ft}{43,560\cancel{ft^2-ft}} = 2.3 acre-ft$
   Note: From the conversion table: acre = 43,560 ft^2
   Thus, acre-ft = 43,560 ft^2-ft or 43,560 ft^3

7. Find the flow in gpm when the total flow for the day is 65,000 gpd.
   $\frac{65,000 \text{gpd}}{1,440 \text{ min/day}} = 45 \text{gpm}$

8. Find the flow in gpm when the flow is 1.3cfs.
   $1.3\frac{\text{cfs}}{1} \text{x} \frac{448 \text{gpm}}{1 \text{cfs}} = 582 \text{gpm}$

9. Find the flow in gpm when the flow is 0.25cfs.
   $0.25\frac{\text{cfs}}{1} \times \frac{448 \text{gpm}}{1 \text{cfs}} = 112 \text{gpm}$

10. Convert 22$\circ C$ into degree Fahrenheit.

11. Convert 56$\circ C$ into degree Celsius.

12. Convert 45 psi to feet of head
    $45\ \cancel{psi} * \frac{ft\ head}{0.433\cancel{psi}} = \boxed{92.4 \text{ feet}}$

13. convert 3 miles to cm

    Solution:

    $3\ \cancel{miles} * \frac{5,280\ \cancel{ft}}{\cancel{mile}} * \frac{30.48\ cm}{\cancel{ft}} = \boxed{482,803\ cm}$

14. The water flow to a treatment plant has a velocity of 61 cm/s. What is this velocity expressed in ft/min. Given: 1 ft = 30.48 cm

    Solution:

    $61\ \frac{\cancel{cm}}{\cancel{s}} * \frac{ft}{30.48\ \cancel{cm}} * \frac{60\ \cancel{s}}{min} = \boxed{120\ ft/min}$

15. The wastewater flow to a treatment plant has a velocity of 61 cm/s. What is this velocity expressed in ft/min.

    (1 ft = 30.48 cm)

    $61\ \frac{\cancel{cm}}{\cancel{s}} * \frac{ft}{30.48\ \cancel{cm}} * \frac{60\ \cancel{s}}{min} = \boxed{120\ ft/s}$

    Correct Answer(s):

    a. 120.0

16. The velocity of the wastewater flow through a grit chamber is 62 ft/min. What is the velocity expressed in inches per second.

    $Velocity\ in\ \frac{in}{sec} = 62\ \frac{\cancel{ft}}{\cancel{min}} * \frac{12\ in}{\cancel{ft}} * \frac{\cancel{min}}{60\ sec} = \boxed{12.4\ \frac{in}{sec}}$

17. Convert 1.7 MGD to ft3/s

    Correct Answer(s):

18. Convert 100 Ac-ft to MG

    Correct Answer(s):

    a. 32.6

19. Convert 3.5 cu. ft/s to MGD

    Correct Answer(s):

    a. 2.26

20. Sludge with a sludge density of 7% would have a solids concentration of

    a. 7 mg/l

    b. 700 mg/l

    c. 7000 mg/l

    *d. 70,000 mg/l

21. As an operator of a wastewater plant you are treating a flow of 21 MGD, what is the flow in gallons per minute?

    a. 1,458

    b. 5,833

    c. 8,750

    d. 14,583

e. 87,500 Solution:

$$\frac{21 \cancel{MG}}{\cancel{day}} * \frac{1,000,000 \ gal}{\cancel{MG}} * \frac{\cancel{day}}{24 * 60 \ min} = \boxed{\frac{14,583 \ gal}{min}}$$

22. Given 1 ft = 30.48 cm and 5,280 ft = mile, convert 3 miles to cm

Solution:

$$3 \ \cancel{miles} * \frac{5,280 \ \cancel{ft}}{\cancel{mile}} * \frac{30.48 \ cm}{\cancel{ft}} = \boxed{482,803 \ cm}$$

23. The wastewater flow to a treatment plant has a velocity of 61 cm/s. What is this velocity expressed in ft/min. Given: 1 ft = 30.48 cm

Solution:

$$61 \ \frac{\cancel{cm}}{\cancel{s}} * \frac{ft}{30.48 \ \cancel{cm}} * \frac{60 \ \cancel{s}}{min} = \boxed{120 \ ft/min}$$

24. Convert 8.0cfs to gpm.

a. 1.07gpm

b. 64.2gpm

c. 480gpm 8×449

(e.) 3,436gpm

25. Conyert 4,000 gpm to cfs.

a. 8.91cfs

b. 66.65cfs

c. 499cfs

d. 535cfs

e. 32,076cfs

26. Convert 12MGD to gpm.

a. 0.00833gpm

b. 7,200gpm 12×700

d. 17,280gpm

e. 199,992gpm

27. Convert 5.5 cfs to MGD.

a. 0.059MGD

b. 0.148 MGD

c. 0.475MGD

(64) more Aaumole

e. 7,920 MGD

28. Convert 45 Acre-feet into million gallons.

a. 6.02Mgal

b. 1.96Mgal

c. 14.7Mgal

d. 45Mgal

e. 336.6Mgal

29. Convert 6.5 feet per second into miles per hour.
    a. 4.43mph
    c. 13.3mph
    d. 106mph
    e. 266mph

30. Convert 3.4 miles into feet.
    a. 5,000 feet
    b. 5,280 feet
    c. 5,984 feet
    d. 10,000 feet
    (e.) 17,952 feet

$$= \frac{6.5/5280}{1/60 \times 60}$$

    1 m/e = 25 ft

31. Convert $2,250$gpm into MGD.
    a. 0.054MGD
    b. 3.24MGD
    d. $2,250$MGD
    e. 3,240 MGD

32. Convene 9.75MGD into cfs.
    a. 15.1cfs
    b. 37.75cfs
    c. 113cfs
    d. 363cfs
    e. 845cfs

$$236\pi$$

33. Convert $1,000,000$ cubic feet into Acre-feet.
    a. 0.04356AF
    b. 0.325829AF
    c. 3.07AF
    d. 22.96AF
    e. 172AF

34. How many milliliters (ml) are in 1 gallon of water? *a. 3,785ml b. 2,345ml c. 834ml d. 743ml

35. If exactly 100gal of polymer costs $19.50, what will $5,500$gal cost, assuming no quantity discount?

$$\frac{19.50}{100} \times 5500 = 1,072.5$$

36. A room measures 12ft high, 30 ft long, and 17 ft wide. How many cubic feet per minute of air must a blower in an air exchange unit move to completely change the air every 10 minutes?
    a. 102

b. 612

c. 1,020

d. 6,120

37. 500 GPM is how many gallons per houl?

10560

$$\frac{500 \text{ g}'}{1 \text{ m}} = \frac{500}{1/10h} = \text{ Ans } \frac{30 \text{ e0r}}{\text{gph}}$$

38. 30,000 gph is how many gallons per day?

$$\frac{30,000 \text{ g}}{h} = \frac{30,000}{1/24} = 30,020 \times 24 \text{ Ans. } \frac{720,010}{\text{gpd}}$$

39. A flow of 25gpm is low many gpd?

$$\frac{25 \text{ g}}{m} = \frac{25}{1/60} \times \frac{1}{24} \quad (25 \times 1440) \text{ Ans. } 36,0w \text{ gpd}$$

40. A flow of 800, 000gpd is how many gpm? $\frac{800,000}{0.8MGD \times 700} = 560 \times 24 \times 60 \quad 555.55$

0.80gpm

41. A flow of 150gpnn is how many MGD?

700 (wm.

Ans.

MGD

42. Convert 1000 ft^3 to cu. yards

Solution:

43. Convert 10 gallons/min to ft^3/hr

Solution:

$$\frac{ft^3}{hr} = 10\frac{\cancel{gal}}{\cancel{min}} * \frac{ft^3}{7.48\cancel{gal}} * \frac{60\cancel{min}}{hr} = \boxed{80.2\frac{ft^3}{hr}}$$

44. Find the flow in gpm when the flow is 0.25cfs.

Solution:

$$\frac{gal}{min} = 0.25\frac{\cancel{ft^3}}{\cancel{sec}} * \frac{7.48gal}{\cancel{ft^3}} * \frac{60\cancel{sec}}{min} = \boxed{112.2\frac{gal}{min}}$$

45. The flow rate through a filter is 4.25 MGD. What is this flow rate expressed as gpm?

Solution:

$$\frac{gal}{min} = 4.25\frac{\cancel{MG}}{\cancel{day}} * \frac{1,000,000gal}{\cancel{MG}} * \frac{\cancel{day}}{1,440min} = \boxed{2,951\frac{gal}{min}}$$

46. After calibrating a chemical feed pump, you've determined that the maximum feed rate is 178 mL/ minute. If this pump ran continuously, how many gallons will it pump in a full day?

Solution:

$$\frac{gal}{day} = 178\frac{\cancel{mL}}{\cancel{min}} * \frac{L}{1000\cancel{mL}} * \frac{1,440\cancel{min}}{day} = \boxed{119,680\frac{gal}{day}}$$

47. A plant produces 2,000 cubic foot of water per hour. How many gallons of water is produced in an 8-hour shift?

    Solution:

$$\frac{gal}{8-hr\ \ shift} = 2,000\frac{\cancel{ft^3}}{\cancel{hr}} * \frac{7.48gal}{\cancel{ft^3}} * \frac{8\cancel{hr}}{8-hr\ \ shift} = \boxed{253.6\frac{gal}{day}}$$

48. Change 70 ˚F to ˚C

    Solution:

$$\circ C = \frac{\circ F - 32}{1.8} = \frac{70-32}{1.8} = \boxed{21.1\circ C}$$

49. Change 4 ˚C to ˚F

    Solution:

$$\circ F = (\circ C \times 1.8) + 32 = (4 * 1.8) + 32 = \boxed{39.2\circ F}$$

50. Convert 1000 ft^3 to cu. yards

$$1000\cancel{ft^3} * \frac{cu.yards}{27\cancel{ft^3}} = 37cu.yards$$

51. Convert 10 gallons/min to ft^3/hr

    Note: This involves use of two conversion factors - one for converting gallons to cubic feet and another for converting minute to gallons.

$$\frac{10\cancel{gallons}}{\cancel{min}} * \frac{ft^3}{7.48\cancel{gallons}} * \frac{60\cancel{min}}{hr} = \frac{80.2ft^3}{hr}$$

52. Convert 100,000 ft^3 to acre-ft.

$$100,000\cancel{ft^3} * \frac{acre-ft}{43,560\cancel{ft^2 - ft}} = 2.3acre-ft$$

53. Convert 8 ft^3 of water to pounds.

    Here the conversion is from a volume (ft^3) to a weight (lbs). It involves use of a standard correlation of the volume of water to its weight - its density.

$$Weight\ of\ water\ in\ lbs = 8\cancel{ft^3} * 62.4(\frac{lbs}{\cancel{ft^3}}) = 499.2\ lbs$$