Math Multiple Choice

You must show your work (i.e. formulas, intermediate calculations, etc.) to receive full credit even if the answer is correct.

Circle the letter corresponding to the correct answer provided for each question

For grader's use	
Points (25/50)	Proper answer

#	Question	Choices			
1	The influent suspended solids concentration is 80 mg/L. The effluent suspended solids concentration is 20 mg/L. Calculate the treatment efficiency of the plant. $\frac{80-20}{80} = \frac{60}{80} = 75\%$	A	25%	____	D
		B	40%		
		C	60%		
		(D)	75%		
2	What is the efficiency of a lift station where the pump has an efficiency of 92% and the motor has an efficiency of 84%. $92\% \times 84\% = 77\%$	(A)	77%	____	A
		B	84%		
		C	92%		
		D	110%		
3	How many pounds of polymer must be added to 30 gallons of water to make a 0.1% polymer solution? $30 \times 8.34 \times 0.001 = 0.25$	A	1.50 lbs	____	B
		(B)	0.25 lbs		
		C	0.50 lbs		
		D	1.0 lbs		
4	The influent BOD to a series of ponds is 250 mg/L. The effluent BOD is 50 mg/L. What is the efficiency of BOD removal? $\frac{250-50}{250} = \frac{200}{250} = 80\%$	A	60%	____	C
		B	70%		
		(C)	80%		
		D	90%		
5	How much alkalinity is required to oxidize 10 lbs of ammonia? $7.14 \times 10 = 71.4$	A	10.25 lbs	____	D
		B	14.77 lbs		
		C	717.01 lbs		
		(D)	71.4 lbs		

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6	What approximate horsepower is required for a pump discharge of 1000 gpm at 110 psi? Assume the pump is 100% efficient. $110\ psi \times 2.31 = 254'\ head$ $HP = \frac{1000 \times 254}{3960} = 64$	A	32 HP	____	B
		(B)	64 HP		
		C	110 HP		
		D	220 HP		
7	Convert the temperature of a sample from 20C to degrees Fahrenheit $20 \times \frac{9}{5} + 32 = 68$	A	50F	____	C
		B	62F		
		(C)	68F		
		D	85F		
8	Determine the sludge volume index (SVI) for a sample with a MLSS of 3000 mg/L and settles to 25% of volume in 30 minutes. $25\% \times 1000 = 250\ ml$ $SVI = \frac{250}{3000} \times 1000 = 83.3$	A	75	____	B
		(B)	83		
		C	120		
		D	750		
9	If your polymer is 1/6 active ingredient, what is the approximate percentage of active ingredient? $\frac{1}{6} \times 100\% = 16.6\%$	A	10%	____	B
		(B)	17%		
		C	25%		
		D	67%		
10	If a solids sample is 5% solids, what is the concentration in mg/L? $5\% \times 10{,}000 = 50{,}000$	A	500 mg/L	____	D
		B	5,000 mg/L		
		C	50 mg/L		
		(D)	50,000 mg/L		

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11	The BOD level of the wastewater entering an aeration tank is 220 mg/L. If the flow to the tank is 1.65 mil.gal/day, what is the lbs/day of BOD loading? There are 8.34 lbs/gal. $220 \times 8.34 \times 1.65 = 3027$	A	3596 lbs/day	____	D
		B	4515 lbs/day		
		C	5299 lbs/day		
		(D)	3027 lbs/day		
12	A pump is discharging into a 0.25 mil.gal aeration basin. If it takes 12 hours to fill the basin, what is the pumping rate in gpm? $0.25 \times 1000000 = 250{,}000$ gal; $12 \times 60 = 720$ min; $\frac{250{,}000}{720} =$	A	255 gpm	____	C
		B	319 gpm		
		(C)	347 gpm		
		D	528 gpm		
13	Given the following data, determine the amount of solids that need to be wasted: AB Vol=1.5 MG; Actual MLSS=2550 mg/L; Desired MLSS: 2290 mg/L $(2550 - 2290) \times 8.34 \times 1.5$	A	2017 lbs	____	C
		B	2521 lbs		
		(C)	3253 lbs		
		D	5197 lbs		
14	A 250 foot long pipe 12 inches in diameter holds how many gallons of water when full? $\left(\frac{12}{12}\right)^2 \times 3.14 \times 250 = 196 ft^3$; $196 \times 7.48 = 1468.7$	A	196	____	B
		(B)	1470		
		C	5870		
		D	1640		
15	A collection line is to be laid at 1/4 inch drop per foot. How much deeper will the pipe be after running 375 feet? $375 \times \frac{1}{4} = 93.75''$; $\frac{93.75}{12} = 7.81$	(A)	7.8 feet	____	A
		B	31.2 feet		
		C	93.8 feet		
		D	12 feet		