Assignment-4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-02-27, 23:59 IST.

1) Identify the FALSE statement with regard to the Power’s model for hydration of portland cement based paste system (PCBPS)  1 point

- Cement gels are basically considered as colloids
- The model establishes the relationship between volume of gel and strength of PCBPS
- The model establishes the relationship between porosity and strength of PCBPS
- The model is applicable for all curing conditions

No, the answer is incorrect.
Score: 0
Accepted Answers:
The model is applicable for all curing conditions

2) Identify the FALSE statement with regard to portland cement based paste systems (PCBPSs)  1 point

- C-S-H gel does not exert crystal pressure during its growth due to limited space within the system
- Aft exerts crystal pressure during its growth due to limited space within the system
- Degree of hydration increases with increase in the time of curing
- Degree of hydration of cement system is unaffected by the presence of impurities in C₃S and C₂S

No, the answer is incorrect.
Score: 0
Accepted Answers:
Degree of hydration of cement system is unaffected by the presence of impurities in C₃S and C₂S
The hydration of $C_3A$ is rapid without gypsum.

No, the answer is incorrect.

Score: 0

Accepted Answers:
The hydration of $C_3A$ is rapid without gypsum

4) Identify the TRUE statement with regard to portland cement based paste systems (PCBPSs) 1 point

- Evaporable water considers only the water present in capillary pores
- The amount of water in the pores (both gel and capillary pores) is independent of the w/c ratio
- The amount of gel pores at 28 day curing period in PCBPSs having different w/c ratio may be taken to be equal
- The minimum w/c ratio for complete hydration of PCBPS with gel pores fully saturated is 0.42

No, the answer is incorrect.

Score: 0

Accepted Answers:
The minimum w/c ratio for complete hydration of PCBPS with gel pores fully saturated is 0.42

5) Identify the TRUE statement with regard to portland cement based paste systems (PCBPSs) 1 point

- For a fully saturated system, the amount of non-evaporable water is higher than evaporable water
- For a fully saturated system, the sum of evaporable and non-evaporable water is about 36%
- The strength of PCBPSs increases as the gel-to-space ratio in the system increases
- Compared to $C_3S$, the rate of hydration for both $C_3A$ and $C_2S$ is lower

No, the answer is incorrect.

Score: 0

Accepted Answers:
The strength of PCBPSs increases as the gel-to-space ratio in the system increases

6) Identify the FALSE statement with regard to portland cement based paste systems (PCBPSs) 1 point

- Washburn's equation is used to calculate the porosity of PCBPSs
- At early curing periods, the porosity of the system is low since the capillary pores are disconnected
- Irrespective of the w/c ratio, the permeability of PCBPS typically in the range of about 10-5 to 10-13 m/s
- The size of connected capillary pores in system is measured in terms of effective or critical pore access diameter

No, the answer is incorrect.

Score: 0

Accepted Answers:
At early curing periods, the porosity of the system is low since the capillary pores are disconnected

7) Identify the FALSE statement with regard to heat of hydration of portland cement based paste systems (PCBPSs) 1 point

- The total heat evolved at any instant of time within the system is related to the heat of hydration of the individual Bogue's compounds and their quantities present in cement
- For casting concrete in low temperature environments, the heat of hydration values are
beneficial as it provides information about the activation energy for hydration
- The total heat evolution trend helps to understand precisely the chemical reactions occurring during the cement hydration process
- Specific heat of concrete is one parameter that determines the dissipation of heat within concrete

No, the answer is incorrect.
Score: 0

Accepted Answers:
The total heat evolution trend helps to understand precisely the chemical reactions occurring during the cement hydration process

8) Identify the FALSE statement with regard to heat of hydration of Portland cement based paste systems
- Thermal stresses are generated inside concrete if the rate of dissipation of heat is lower than the rate of evolution of heat
- The time taken to reach the maximum temperature in a concrete mixture increases with the increase in the thickness of the member
- The rate of heat evolution during hydration of C3A decreases with increase in the amount of the gypsum present in cement
- Coefficient of thermal expansion of coarse aggregates is one parameter that determines the heat of hydration in concrete

No, the answer is incorrect.
Score: 0

Accepted Answers:
Coefficient of thermal expansion of coarse aggregates is one parameter that determines the heat of hydration in concrete

9) Identify the TRUE statement with regard to mass concrete
- Cement used should have lower C2S and C3A from the standpoint of temperature rise in concrete
- Reducing the cement content by using higher coarse aggregate content helps in reducing the temperature rise
- Cement having lower fineness is preferred as it allows the dissipation of heat at a faster rate
- The heat dissipation is easier in members having a larger volume-to-surface area ratio

No, the answer is incorrect.
Score: 0

Accepted Answers:
Reducing the cement content by using a higher coarse aggregate content helps in reducing the temperature rise

10) Identify the TRUE statement with regard to Thermal Cracking Index (TCI)
- Thermal Cracking Index (TCI) as defined as the ratio of the instantaneous thermal stress to the instantaneous tensile strength of the concrete
- Thermal Cracking Index (TCI) is an intrinsic property of a given concrete
- An equation of the type $E=5000\sqrt{f_{ck}}$ can be used in the computation of the TCI
- As the TCI increases, the likelihood of occurrence of thermal cracking in the concrete also increases

No, the answer is incorrect.
Score: 0

Accepted Answers:
Thermal Cracking Index (TCI) as defined as the ratio of the instantaneous thermal stress to the instantaneous tensile strength of the concrete.