

OPSC 2019

Odisha Public Service Commission

Civil Engineering

Objective Practice Sets

Building Materials

Contents

Sl. Topic	Page No.
1. Cement	2
2. Mortar	10
3. Lime	12
4. Concrete	14
5. Bricks	26
6. Timber and Stone	31



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- Q.1** In the manufacture of cement definite proportions of argillaceous and calcareous materials are burnt at a temperature of
(a) 425°C (b) 875°C
(c) 1450°C (d) 1650°C
- Q.2** The percentage of gypsum added to the clinker during manufacturing process is
(a) 0.2 (b) 0.25 to 0.35
(c) 2.5 to 3.5 (d) 5 to 10
- Q.3** The setting and hardening of cement after addition of water is due to
(a) the presence of gypsum.
(b) binding action of water.
(c) hydration of some of the constituent compounds of cement.
(d) evaporation of water.
- Q.4** The tricalcium aluminate compound present in cement
(a) provides weak resistance against sulphate attack.
(b) is responsible for highest heat of evaluation.
(c) is characteristically fast reacting with water.
(d) all of the above.
- Q.5** The constituent compounds of cement in decreasing order of rate of hydration are
(a) C_2S , C_3S and C_3A
(b) C_3S , C_3A and C_2S
(c) C_3A , C_3S , and C_2S
(d) C_3A , C_2S and C_3S
- Q.6** When water is added to the cement
(a) chemical reaction starts.
(b) heat is absorbed.
(c) heat is generated.
(d) impurities are washed out.
- Q.7** Snowcem is
(a) chalk powder
(b) powdered lime
(c) mixture of chalk powder and lime
(d) coloured-cement
- Q.8** Initial setting time is maximum for
(a) portland-pozzolana cement
(b) portland-slag cement
(c) low-heat portland-pozzolana cement
(d) high strength portland cement
- Q.9** In medium-strength concrete, the water-cement ratio should not be less than
(a) 0.25 (b) 0.35
(c) 0.4 (d) 0.45
- Q.10** An excess of free lime in portland cement
(a) results in an increase in strength.
(b) increases the initial setting time.
(c) causes unsoundness in the product.
(d) improves the quality of the product.
- Q.11** In the air permeability test of cement, the specific surface (in mm^2/g) is of the order of
(a) 1000 (b) 2000 - 2500
(c) 2500 - 5000 (d) 225000 - 350000
- Q.12** The mass of water required for testing cement cubes of average composition in compression is:
(a) 15 kg (b) 25 kg
(c) 35 kg (d) 40 kg
- Q.13** The field test for the quality of cement consists in putting a small quantity of cement in a bucket containing water. A good quality cement will
(a) immediately dissolve in the water.
(b) float on the water surface.
(c) sink to the bottom of the bucket.
(d) produce steam.

Q.14 In fineness test of rapid hardening portland cement, the residue on IS sieve No. 9 should not be more than

- (a) 1.0% (b) 5%
(c) 10% (d) 15%

Q.15 A sample of cement is said to be sound when it does not contain free

- (a) lime (b) silica
(c) iron oxide (d) alumina

Q.16 The number of cement bags in a pile of size 4 m × 3 m × 0.9 m height in a cement store could be

- (a) 100 (b) 150
(c) 175 (d) 200

Q.17 The cement used in construction of docks and harbours is

- (a) blast-furnace slag cement.
(b) water proof cement.
(c) hydrophobic cement.
(d) sulphate-resisting portland cement.

Q.18 For ordinary portland cement the maximum expansion by Le Chatelier's method should not exceed

- (a) 2 mm (b) 5 mm
(c) 7.5 mm (d) 10 mm

Q.19 The DoE mix design method

- (a) determines aggregate-cement ratio.
(b) uses free water content determined by the size and type of aggregate and the level of workability.
(c) uses free water-cement ratio based on target mean compressive strength.
(d) all of the above.

Q.20 Le Chatelier's device is used for determining the

- (a) setting time of cement.
(b) soundness of cement.
(c) tensile strength of cement.
(d) compressive strength of cement.

Q.21 The initial setting time for ordinary Portland cement as per IS specifications should not be less than

- (a) 10 minutes
(b) 30 minutes
(c) 60 minutes
(d) 600 minutes

Q.22 As per IS specifications, the maximum final setting time for ordinary Portland cement should be

- (a) 30 minutes (b) 1 hour
(c) 6 hour (d) 10 hours

Q.23 Gypsum consists of

- (a) H_2S and CO_2
(b) $CaSO_4$ and H_2O
(c) Lime and H_2O
(d) CO_2 and calcium

Q.24 Match **List-I** with **List-II** and select the correct answer by using the codes given below the list:

- | List-I | List-II |
|------------------------|-------------------------------------|
| A. Argillaceous | 1. Sand (silica SiO_2) |
| B. Silicious | 2. Lime (CaO) |
| C. Calcareous | 3. Clay (alumina Al_2O_3) |

Codes:

- | | A | B | C |
|-----|----------|----------|----------|
| (a) | 1 | 2 | 3 |
| (b) | 3 | 2 | 1 |
| (c) | 2 | 1 | 3 |
| (d) | 3 | 1 | 2 |

Q.25 Regarding the composition of raw materials used for manufacturing ordinary Portland cement, match **List-I** with **List-II** and select the correct answer by using the codes given below the lists:

- | List-I | List-II |
|---|----------------|
| A. Calcium oxide (CaO) | 1. 2% |
| B. Silica (SiO_2) | 2. 3% |
| C. Aluminium oxide (Al_2O_3) | 3. 5% |
| D. Ferrous oxide (Fe_2O_3) | 4. 65% |
| E. Magnesium oxide (MgO) | 5. 25% |

Codes:

- | | A | B | C | D | E |
|-----|----------|----------|----------|----------|----------|
| (a) | 4 | 5 | 3 | 2 | 1 |
| (b) | 1 | 2 | 3 | 4 | 5 |
| (c) | 2 | 4 | 5 | 1 | 2 |
| (d) | 2 | 1 | 3 | 5 | 4 |

Q.26 Match **List-I** with **List-II** and select the correct answer by using the codes given below the lists:

List-I

- A. Water and cement
- B. Tricalcium silicate
- C. Di-calcium silicate
- D. Tri-calcium aluminate

List-II

- 1. Fast in reaction
- 2. Slow in reaction
- 3. Slowest in reaction
- 4. Hydrates

Codes:

- | | A | B | C | D |
|-----|---|---|---|---|
| (a) | 4 | 2 | 3 | 1 |
| (b) | 1 | 3 | 2 | 4 |
| (c) | 4 | 1 | 2 | 3 |
| (d) | 3 | 2 | 1 | 4 |

Q.27 Match **List-I** with **List-II** and select the correct answer by using the codes given below the list:

List-I

- A. Soundness of cement
- B. Initial setting time of cement
- C. Fineness of cement
- D. Consistency of cement

List-II

- 1. Le Chatelier's apparatus
- 2. Vicat's apparatus
- 3. Sieve analysis

Codes:

- | | A | B | C | D |
|-----|---|---|---|---|
| (a) | 1 | 2 | 3 | 2 |
| (b) | 2 | 1 | 1 | 3 |
| (c) | 1 | 3 | 3 | 2 |
| (d) | 3 | 1 | 2 | 2 |

Q.28 Match **List-I** with **List-II** and select the correct answer using the codes given below the lists:

List-I

- A. Vicat's needle
- B. Michaeli's compound
- C. Le-Chatelier's apparatus
- D. Turbidimeter

List-II

- 1. Setting time
- 2. Specific surface lever apparatus
- 3. Tensile Strength apparatus
- 4. Soundness

Codes:

- | | A | B | C | D |
|-----|---|---|---|---|
| (a) | 1 | 2 | 3 | 4 |
| (b) | 1 | 3 | 4 | 2 |
| (c) | 2 | 4 | 3 | 1 |
| (d) | 3 | 4 | 1 | 2 |

Q.29 Assertion (A) : Pozzolana is added to cement to increase early strength.

Reason (R) : It reduces the heat of hydration.

- (a) both A and R are true and R is the correct explanation of A
- (b) both A and R are true but R is not a correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Q.30 Consider the following statements:

The effect of air entrainment in concrete is to

- 1. increase resistance to freezing and thawing
- 2. improve workability
- 3. decrease strength

Which of these statements are correct?

- (a) 2 and 3
- (b) 1 and 3
- (c) 1 alone
- (d) 1, 2 and 3

Q.31 Match **List-I** (Apparatus) with **List-II** (Purpose) and select the correct answer using the code given below the lists :

List-I

- A. Le-Chatelier's apparatus
- B. Vicat Needle
- C. Vee-Bee apparatus
- D. Briquettes test machine

List-II

- 1. Workability of concrete.
- 2. Soundness of cement.
- 3. Tensile strength.
- 4. Final setting time of cement.

Q.53 Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I (Type of cement)

- A. Rapid hardening
- B. Quick setting
- C. High Alumina
- D. Low heat

List-II (Uses)

1. Refractory concrete in industries
2. Dams
3. Concrete under water
4. Concrete for cold weather
5. Repair of bridges

Codes:

- | | | | | |
|-----|----------|----------|----------|----------|
| | A | B | C | D |
| (a) | 1 | 3 | 5 | 4 |
| (b) | 5 | 3 | 1 | 2 |
| (c) | 5 | 1 | 3 | 2 |
| (d) | 3 | 2 | 5 | 4 |

Q.54 If 'P' is percentage of water required for standard consistency of cement, water to be added for determination of unsoundness due to lime is

- (a) 0.65 P
- (b) 0.85 P
- (c) 0.78 P
- (d) 0.5 P

Q.55 Statement-1 : Presence of excess sulphur results in unsoundness of cement.

Statement-2 : Unsoundness of cement due to sulphur can not be measured.

Of the above statements

- (a) Statement 1 is true, but 2 is false.
- (b) Statement 2 is true, but 1 is false.
- (c) Both statements are true.
- (d) Both statements are false.



Answers		Cement							
1. (c)	2. (c)	3. (c)	4. (d)	5. (c)	6. (c)	7. (d)	8. (c)	9. (c)	10. (c)
11. (d)	12. (a)	13. (b)	14. (b)	15. (a)	16. (d)	17. (d)	18. (d)	19. (d)	20. (b)
21. (b)	22. (d)	23. (b)	24. (d)	25. (a)	26. (a)	27. (a)	28. (b)	29. (d)	30. (d)
31. (b)	32. (c)	33. (d)	34. (a)	35. (c)	36. (a)	37. (d)	38. (d)	39. (d)	40. (d)
41. (b)	42. (b)	43. (a)	44. (a)	45. (c)	46. (d)	47. (a)	48. (d)	49. (b)	50. (d)
51. (d)	52. (c)	53. (b)	54. (c)	55. (c)					