

# JDLCCCE-JE 2023

Jharkhand Diploma Level Combined Competitive Exam

**Junior Engineer Examination**  
Jharkhand Staff Selection Commission

## 3500 MCQs

Fully solved multiple choice questions  
*with* detailed explanations

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Practice Book  
**Civil Engineering**





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**3500 MCQs for JDLCCCE-JE : Civil Engineering**

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# Syllabus of Engineering Subjects

## Civil Engineering : JDLCCE-JE 2023

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**Building Materials:** Physical and chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building Stones, silicate based materials, cement, asbestos products, timber and wood based products, laminates, bituminous materials, paints, varnishes.

**Estimating, Costing and Valuation:** Estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Item of works- Earth work, Brick work (Modular and traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic Tank, Bar Bending Schedule, Center line method, Mid- section formula, Trapezoidal formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well, isolate and combined footing, Steel Truss, Piles and pile- caps. Valuation- value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

**Surveying:** Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite. Leveling, Definition of terms used in leveling, contouring, curvature and refraction corrections, temporary and permanent adjustment of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipments.

**Soil Mechanics:** Origin of soil, phase diagram, Definitions- void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and inter relationship of different parameters, Grain size distribution curves and their uses. Index properties of soils, Atterberg's limits, IS soil classification and plasticity chart. Permeability of soil, coefficient of permeability, determination of coefficient of permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, degree of consolidation, pre- consolidation pressure, normally consolidated soil, e-log p curve, computation of ultimate settlement. Shear strength of soils, direct shear test, Vane shear test, Tri axial test. Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressure, Bearing capacity of soils, plate load test, standard penetration test.

**Hydraulics:** Fluid properties, hydrostatics, measurement of flow, Bernoulli's theorem and its application, flow through pipes, flow in open channel, weirs, flumes, spillways, pumps and turbines.

**Irrigation Engineering:** Definition, necessity, benefits, effect of irrigation, types and methods of irrigation, Hydrology- Measurement of rainfall, run off coefficient, rain gauge, losses from precipitation- evaporation, infiltration etc. Water requirement of crops, duty, delta and base period, Kharif and Rabi crops, Command Area, Time factor, Crop ratio, Overlap allowance, irrigation efficiencies. Different types of canals, types of canal irrigation, losses of water in canals. Canal lining- types and advantages. Shallow and deep tube wells, yield from a well. Weir and barrage, failure of weirs and permeable foundation, Slit and Scour, Kennedy's theory of critical velocity. Lacey's theory of uniform flow. Definition of flood, causes and effects, methods of flood control, water logging, preventive measure. Land reclamation, Characteristics of affecting fertility of soils, purposes, methods, description of land and reclamation processes. Major irrigation projects in India.

**Transportation Engineering:** Highway Engineering- cross sectional elements, geometric design, types of pavements, pavement materials- aggregates and bitumen, different tests, Design of flexible and rigid pavements- Water bound Macadam(WBM) and Wet Mix Macadam(WMM), Gravel Road, Bituminous construction, Rigid Pavement Joint, pavement maintenance, Highway drainage, Railway Engineering- Components of permanent

way- sleepers, ballast, fixtures and fastening, track geometry, points and crossings, track junctions, stations and yards. Traffic Engineering- Different Traffic Survey, speed- flow- density and their inter relationship, intersections and interchanges, traffic signals, traffic operation, traffic signs and marking, road safety.

**Environmental Engineering:** Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage system, circular sewer, oval sewer, sewer appurtenances, sewage treatment. Surface water drainage. Solid waste management- types, effects, engineered management system. Air pollution- pollutants, causes, effects, control. Noise pollution- cause, health effect, control.

## **Structural Engineering**

**Theory of structures:** Elasticity constants, types of beams- determinate and indeterminate, bending moment and shear force diagram of simply supported, cantilever and over hanging beams. Moment of area and moment of inertia for rectangular and circular sections, bending moment and shear stress for tee, channel and compound section, chimneys, dams and retaining walls, eccentric loads, slope deflection of simply supported and cantilever beams, critical load and columns, Torsion of circular section.

**Concrete Technology:** Properties, Advantages and uses of concrete, cement aggregates, importance of water quality, water cement ratio, workability, mix design, storage, batching, mixing, placement, compaction, finishing and curing of concrete, quality control of concrete, hot weather and cold weather concreting, repair and maintenance of concrete structure.

**RCC Design:** RCC beams-flexural strength, shear strength, bond strength, design of singly reinforced and doubly reinforced beams, cantilever beams. T-beams, lintels. One way and two way slabs, isolated footings. Reinforced brick works, columns, staircases, retaining walls, water tanks (RCC design questions may be based on both Limit State and Working Stress methods).

**Steel Design:** Steel design and construction of steel columns, beams, roof, trusses, plate, girders.



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# UNIT 1

## Building Materials

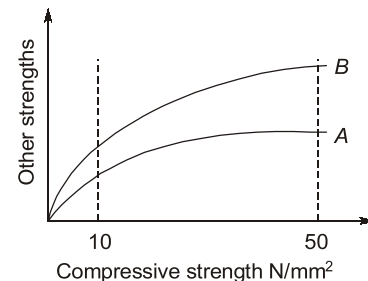
- Q.1** In a creation, the background is termed as  
(a) negative space (b) positive space  
(c) null space (d) void space
- Q.2** The specific gravity of commonly available ordinary portland cement is  
(a) 4.92 (b) 3.15  
(c) 2.05 (d) 1.83
- Q.3** Double bullnose shaped bricks is used for  
(a) coping (b) hearting  
(c) backing (d) filling
- Q.4** A wall with continuous vertical joints will have the tendency of  
(a) settlement (b) cracking  
(c) sliding (d) buckling
- Q.5** A good and satisfactory bondage should have lap equal to  
(a)  $\frac{1}{10}$  th of the brick  
(b)  $\frac{1}{8}$  th of the brick  
(c)  $\frac{1}{4}$  th of the brick  
(d)  $\frac{1}{6}$  th of the brick
- Q.6** The stretcher bond is suitable for walls of thickness equal to  
(a) 1 brick (b)  $1\frac{1}{2}$  brick  
(c)  $\frac{1}{2}$  brick (d) 2 brick
- Q.7** Which of the following is not a stone's defect?  
(a) mottle (b) vent  
(c) shake (d) cleavage
- Q.8** Exposed vertical surface perpendicular to the door frame is known as  
(a) jamb (b) reveal  
(c) mullion (d) scabbling
- Q.9** The stone surface is levelled by  
(a) drag (b) gad  
(c) jumper (d) feather
- Q.10** Crack in stone masonry is repaired by  
(a) citrating (b) grouting  
(c) pumice (d) riveting
- Q.11** External vertical member of a shutter (door) is called  
(a) lock rail (b) sash  
(c) style (d) sill
- Q.12** The gable window is mostly used at  
(a) hospitals (b) auditoriums  
(c) gable end of inclined roof building  
(d) all of the above
- Q.13** Pitch of the stairs normally varies between  
(a) 15 to 25° (b) 40° to 55°  
(c) 25° to 40° (d) 0° to 90°
- Q.14** The roof having slope in all four directions is called  
(a) hip-pitch roof (b) shed roof  
(c) gambrel roof (d) north light roof
- Q.15** 'Shingles' are used in  
(a) dome construction  
(b) roof covering material  
(c) north light shell roof  
(d) none of the above
- Q.16** The BAHAI temple alias LOTUS temple at Delhi is an example of  
(a) folded plate construction  
(b) doubly curved shell structure  
(c) shell of revolution  
(d) corrugated structure
- Q.17** To facilitate quick flow of rain water on R.C.C. flat roof towards spouts it is usually given a slope of  
(a) about 2 to 3° (b) about 8 to 10°  
(c) 15° (d) 220°/2

- Q.18** 'Dowel' is a small  
 (a) timber piece (b) mild steel piece  
 (c) metallic piece (d) wrought iron piece
- Q.19** The commonly used lime in white washing is  
 (a) quick lime (b) fat lime  
 (c) lean lime (d) hydraulic lime
- Q.20** Shrinkage of cement concrete may be reduced by  
 (a) proper curing  
 (b) giving minimum water  
 (c) adding more aggregate  
 (d) adding m.s. bar
- Q.21** The example of hydrophobic aggregate is  
 (a) silica (b) bitumen  
 (c) bentonite (d) lime stone
- Q.22** The product of curing period of concrete and the curing temperature is called  
 (a) maturity of concrete  
 (b) immaturity of concrete  
 (c) curing constant  
 (d) concrete index
- Q.23** An addition of lime to cement concrete  
 (a) is required for manufacture of cement  
 (b) increases workability  
 (c) increases durability  
 (d) all of the above
- Q.24** The affinity of wood for moisture causes  
 (a) warping (b) shrinking  
 (c) swelling (d) cracking
- Q.25** In timber, dry rot is caused due to  
 (a) attack of fungi  
 (b) alternate wet and dry conditions  
 (c) insufficient circulation of air  
 (d) prolonged submergence
- Q.26** The hardness of bitumen is determined from  
 (a) Penetrometer (b) Shore test  
 (c) Barcol meter (d) Mho's test
- Q.27** Glazing is used to make earthenware  
 (a) soft (b) impervious  
 (c) hard (d) porous
- Q.28** The concrete hardness with  
 (a) increase in time  
 (b) no time factor involved  
 (c) more aggregate content  
 (d) all of the above

- Q.29** A good concrete mass should have  
 (a) minimum voids (b) optimum void  
 (c) 5% void (d) maximum void

- Q.30** Concrete shrinking is more pronounced in  
 (a) rich mix (b) lean mix  
 (c) very lean mix (d) normal mix

- Q.31** Figure shows relation between compressive strength and other strengths of concrete. The curve marked A shows



- (a) compressive strength  
 (b) tensile strength  
 (c) torsional strength  
 (d) fatigue strength

- Q.32** The 'leaching action' in concrete is the example of  
 (a) crystallization (b) chemical reaction  
 (c) decomposition (d) creeping
- Q.33** The shrinkage in concrete is directly proportional to  
 (a) water content at the time of mixing  
 (b) sand content  
 (c) coarse aggregate  
 (d) aggregate to cement ratio
- Q.34** C.R.R.I. charts are used to obtain a relationship between strength of concrete and  
 (a) water cement ratio  
 (b) workability  
 (c) grading of aggregate  
 (d) fineness modulus
- Q.35** Percentage of dicalcium silicate in cement is  
 (a) about 30 (b) about 90  
 (c) about 50 (d) about 70
- Q.36** The major constituents of portland cement are  
 (a) lime and calcium  
 (b) lime and silica  
 (c) silica and calcium  
 (d) potassium and silica



- Q.37** What is the approximate share of lime in cement?  
(a) 70% (b) 20%  
(c) 5% (d) 3%
- Q.38** Which cement is expected to have the highest compressive strength after 72 hours?  
(a) Quick setting cement  
(b) Air-entrained cement  
(c) High alumina cement  
(d) Portland pozzolana cement
- Q.39** The shrinking of concrete will be least when the aggregate is of  
(a) quartz (b) granite  
(c) gravel (d) all of the above
- Q.40** The name 'herculite' stands for aggregate such as  
(a) expanded shale (b) vermiculite  
(c) normal weight (d) processed
- Q.41** 'Foamed slag' is a suitable aggregate used to make  
(a) expandable concrete  
(b) light weight concrete  
(c) cheap quality concrete  
(d) unwettable concrete
- Q.42** Calcium sulphoaluminate forms due to reaction of hydrated tricalcium aluminate with  
(a) gypsum (b) water  
(c) lime (d) all of the above
- Q.43** The tributyl phosphate used as an admixture serves the purpose of  
(a) set-controlling (b) water-reducing  
(c) air-detraining (d) grouting
- Q.44** The process involved in producing light weight aggregate is called  
(a) bloating (b) filling  
(c) fulling (d) chaulking
- Q.45** The wire-mesh used in ferro-cement is of  
(a) dead mild steel (b) aluminium wire  
(c) galvanized iron (d) glass fibres
- Q.46** Which of the following ingredient is used for making light weight concrete?  
(a) cinder (b) lime  
(c) wood (d) algae
- Q.47** The term 'slump' is known as  
(a) vertical settlement  
(b) vertical shrinkage  
(c) horizontal settlement  
(d) horizontal shrinkage
- Q.48** The joints in concrete used in road slab should be filled by  
(a) shear key (b) bitumen  
(c) dowel bar (d) cement
- Q.49** When deep foundation work under water is carried out, the concrete is worked with the method called  
(a) shutter (b) tremie  
(c) sonar (d) ultramarine
- Q.50** The process of fast-reaction of  $C_3A$  with water, resulting in immediate stiffening, is called  
(a) flash set (b) flocculation  
(c) flocs (d) set
- Q.51** According to Himsworkth, when coefficient of variation is less than 10% the test result is  
(a) poor (b) very good  
(c) rejectable (d) just acceptable
- Q.52** Width of the concrete crack may be measured by  
(a) comparator (b) brittle lacquer coating  
(c) Moivre fringe (d) all of the above
- Q.53** Pick up the correct statement from the following  
(a) Insufficient quantity of water makes the concrete mix harsh  
(b) Excess quantity of water makes the concrete segregated  
(c) Excess quantity of water causes bleeding in concrete  
(d) All of the above
- Q.54** Decrease in stress at a constant strain in a material is known as  
(a) anelasticity (b) relaxation  
(c) creep (d) rubber action
- Q.55** A broken concrete beam may be repaired by  
(a) providing additional reinforcement in the bottom  
(b) providing new stirrups  
(c) providing shear connectors  
(d) All of the above

- Q.56** Pick up the correct statement.  
(a) Water/cement ratio by weight is higher as to that by volume  
(b) Modulus of elasticity for concrete improves with age  
(c) Shrinkage in concrete can be reduced by using presaturated aggregates  
(d) Low heat cement is used for mass concreting.
- Q.57** Portland blast furnace cement compared to ordinary Portland cement has  
(a) a lower heat of hydration.  
(b) a lower strength.  
(c) an earlier setting time.  
(d) None of the above.
- Q.58** A brick which is cut in such a way that the width of its one end is half that of a full brick, is called  
(a) king closer (b) mitred closer  
(c) bevelled closer (d) queen closer
- Q.59** Coping is defined as a  
(a) horizontal course of masonry projecting from the face of the wall  
(b) horizontal moulded projection provided near the top of a building  
(c) covering placed on the exposed top of an external wall  
(d) triangular shaped portion of masonry at the end of a sloped roof
- Q.60** A course of stone provided immediately below a cornice, is called  
(a) blocking course (b) coping  
(c) frieze (d) parapet
- Q.61** A type of bond in a brick masonry consisting of alternate course of headers and stretchers, is called  
(a) English bond (b) Flemish bond  
(c) stretching bond (d) heading bond
- Q.62** In a stretching bond  
(a) all the bricks are laid as headers  
(b) all the bricks are laid as stretchers  
(c) the arrangement of bricks is similar to English bond  
(d) the bonding bricks are laid at any angle other than zero or ninety degrees
- Q.63** A stone wall provided to protect the slopes of cutting in natural ground from the action of weather, is known as  
(a) retaining wall (b) breast wall  
(c) parapet wall (d) buttress
- Q.64** In constructing concrete partition wall, the concrete mixture usually adopted is  
(a) M 10 (b) M 15  
(c) M 20 (d) M 25
- Q.65** The horizontal upper part of a step on which foot is placed in ascending or descending a stairway, is called  
(a) riser (b) tread  
(c) flight (d) nosing
- Q.66** A series of steps without any platform, break or landing in their direction, is called  
(a) riser (b) tread  
(c) flight (d) nosing
- Q.67** The flooring made with small pieces of broken tiles of china glazed or of marble arranged in different pattern, is known as  
(a) asphalt flooring (b) mosaic flooring  
(c) terrazzo flooring (d) granolithic flooring
- Q.68** In stairs, the soffit is  
(a) a vertical portion of a step providing a support to the tread  
(b) a straight step having a parallel width of tread  
(c) the under surface of a stair  
(d) the angle which the line of nosing of the stair makes with the horizontal
- Q.69** The projecting part of the tread beyond the face of riser is called  
(a) pitch (b) nosing  
(c) baluster (d) stringer
- Q.70** The angle which the line of nosing of the stair makes with the horizontal, is called  
(a) riser (b) flier  
(c) soffit (d) pitch or slope
- Q.71** In stairs, the vertical portion of a step providing a support to the tread, is known as  
(a) riser (b) flier  
(c) soffit (d) pitch or slope

- Q.72** The surface of the abutment on which the arch rests, is known as  
(a) span (b) keystone  
(c) skew back (d) crown
- Q.73** The depth of arch is the  
(a) vertical distance between the springing line and the highest point on the intrados  
(b) vertical distance between the springing line and the highest point on the extrados  
(c) perpendicular distance between the intrados and extrados  
(d) horizontal distance between is called
- Q.74** The cement which is commonly used in all types of structures and require no special consideration, is called  
(a) rapid hardening cement  
(b) normal setting cement  
(c) quick setting cement  
(d) white cement
- Q.75** High alumina cement is  
(a) made by fusing together a mixture of lime-stone and bauxite  
(b) highly resistant to heat, chemical and other corrosive acids  
(c) used for structures subjected to the action of sea water  
(d) all of the above
- Q.76** The higher water cement ratio in concrete results in  
(a) a weak mix  
(b) a stronger mix  
(c) better workable mix  
(d) less bleeding
- Q.77** A ridge formed by the intersection of two sloped surfaces having an exterior angle greater than  $180^\circ$ , is called  
(a) gable (b) hip  
(c) verge (d) template
- Q.78** The horizontal members of wood or steel used to support the common rafter of a sloping roof, are called  
(a) purlins (b) cleats  
(c) hip rafters (d) valley rafters
- Q.79** The process of filling up all nail holes, cracks etc. with putty is known as  
(a) knotting (b) priming  
(c) stopping (d) finishing
- Q.80** The breaking up of cohesion in a mass of concrete is called  
(a) workability (b) bleeding  
(c) segregation (d) creep
- Q.81** Segregation in concrete results in  
(a) honey combing (b) porous layers  
(c) surface scaling (d) all of these
- Q.82** Harshness in concrete is due to the excess of  
(a) water  
(b) finer particles  
(c) middle sized particle  
(d) coarser particles
- Q.83** In lime concrete, lime is used as  
(a) coarse aggregate (b) fine aggregate  
(c) binding material (d) admixture
- Q.84** Ferro-concrete is another name given to  
(a) plain cement concrete  
(b) reinforced cement concrete  
(c) prestressed cement concrete  
(d) none of these
- Q.85** Reinforced cement concrete is equally strong in taking  
(a) tensile and compressive stresses  
(b) compressive and shear stresses  
(c) tensile, compressive and shear stresses  
(d) tensile and shear stresses
- Q.86** The light-weight concrete is prepared by  
(a) mixing Portland cement with sawdust in specified proportion in the concrete  
(b) using coke-breeze, cinder or slag as aggregate in the concrete  
(c) mixing aluminium in the concrete  
(d) none of the above
- Q.87** In making precast structural units for partition and wall lining purposes, the concrete should be  
(a) sawdust concrete  
(b) air-entrained concrete  
(c) light-weight concrete  
(d) vacuum concrete
- Q.88** In the manufacture of cement, the dry or wet mixture of calcareous and argillaceous materials is burnt at a temperature between  
(a)  $900^\circ\text{C}$  to  $1000^\circ\text{C}$  (b)  $1000^\circ\text{C}$  to  $1200^\circ\text{C}$   
(c)  $1200^\circ\text{C}$  to  $1500^\circ\text{C}$  (d)  $1500^\circ\text{C}$  to  $1600^\circ\text{C}$

- Q.89** The gypsum is added to the cement for  
(a) providing high strength to the cement  
(b) controlling the initial setting time of cement  
(c) lowering the clinkering temperature of cement  
(d) all of the above
- Q.90** The presence of tricalcium silicate in cement  
(a) hydrates the cement rapidly  
(b) generates less heat of hydration  
(c) offers high resistance to sulphate attack  
(d) all of these
- Q.91** The presence of dicalcium silicate in cement  
(a) hydrates the cement rapidly  
(b) generates less heat of hydration  
(c) has more resistance to sulphate attack  
(d) all of these
- Q.92** The tricalcium aluminate in cement has the property of  
(a) reacting fast with water  
(b) causing initial setting of cement  
(c) generating large amount of heat hydration  
(d) all of these
- Q.93** High percentage of tricalcium silicate and low percentage of dicalcium silicate in cement results in  
(a) rapid hardening  
(b) high early strength  
(c) high heat generation  
(d) all of these
- Q.94** Low percentage of tricalcium silicate and high percentage of dicalcium silicate in cement results in  
(a) rapid hardening  
(b) high early strength  
(c) high heat generation  
(d) none of these
- Q.95** Blast furnace slag cement  
(a) develops low heat of hydration  
(b) has less early strength  
(c) develops high heat of hydration  
(d) has high early strength
- Q.96** For a structure subjected to the action of sea water, the cement used is  
(a) rapid hardening cement  
(b) low heat cement  
(c) high alumina cement  
(d) sulphate resisting cement
- Q.97** Vicat's apparatus is used to perform  
(a) fineness test  
(b) soundness test  
(c) consistency test  
(d) compressive strength test
- Q.98** To perform the compressive strength test of cement, water is added at the rate of  
(a)  $0.72P + 3\%$  of water  
(b)  $0.85P + 4\%$  of water  
(c)  $P/4 + 3\%$  of water  
(d)  $P/4 + 4\%$  of water
- Q.99** The aggregate is said to be flaky when  
(a) its least dimension is three-fifth of its mean dimension  
(b) its least dimension is equal to its mean dimension  
(c) its length is equal to its mean dimension  
(d) its length is equal to 1.8 times its mean dimension
- Q.100** The aggregate is said to be elongated when  
(a) its least dimension is three-fifth of its mean dimension  
(b) its least dimension is equal to its mean dimension  
(c) its length is equal to its mean dimension  
(d) its length is equal to 1.8 times its mean dimension
- Q.101** The apparent specific gravity of an aggregate is defined as  
(a) the weight of oven dry aggregate divided by its absolute volume, excluding the natural pores in the aggregate particles  
(b) the weight of oven dry aggregate divided by its absolute volume, including the natural pores in the aggregate particles  
(c) the weight of aggregate required to fill a container of unit volume  
(d) the difference in weight of the aggregate in saturated surface dry condition and in moist condition
- Q.102** The resistance of an aggregate to the effect of hydration of cement and weather is called  
(a) crushing value      (b) impact value  
(c) abrasion value      (d) soundness

**Q.103** The value of fineness modulus for fine sand may range between

- (a) 1.1 to 1.3 (b) 1.3 to 1.6  
(c) 1.6 to 2.2 (d) 2.2 to 2.6

**Q.104** The percentage of fine aggregate to be combined with coarse aggregate ( $x$ ) is determined by

- (a)  $x = \frac{F + F_1}{F + F_2} \times 100$  (b)  $x = \frac{F + F_2}{F + F_1} \times 100$   
(c)  $x = \frac{F_2 - F}{F - F_1} \times 100$  (d)  $x = \frac{F - F_1}{F_2 - F} \times 100$

**Q.105** The standard sand now used in India is obtained from

- (a) Ennore (Chennai) (b) Mumbai  
(c) Odisha (d) Jaipur

**Q.106** The rule of water cement ratio was established by

- (a) Duff Abram (b) Plowman  
(c) W. Simms (d) Dr. Karl Terzaghi

**Q.107** For high degree of workability, the slump value should vary between

- (a) 0 to 25 mm (b) 25 to 50 mm  
(c) 50 to 80 mm (d) 80 to 100 mm

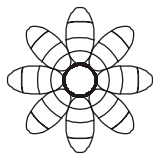
**Q.108** For high degree of workability, the compaction factor is

- (a) 0.65 (b) 0.75  
(c) 0.85 (d) 0.95

**Q.109** The workability of concrete by slump test is expressed as

- (a) minutes (b) mm/h  
(c) mm<sup>2</sup>/h (d) mm

**Q.110** The figure indicates



- (a) Star shakes (b) Wind cracks  
(c) Heart shakes (d) None of these

**Q.111** The test conducted in the laboratory on the specimen made out of trial concrete mix is called

- (a) preliminary test (b) slump test  
(c) works test (d) none of these

**Q.112** The ratio of different ingredients (cement, sand and aggregate) in concrete mix of grade M 20 is

- (a) 1 : 1 : 2 (b) 1 : 1.5 : 3  
(c) 1 : 2 : 4 (d) 1 : 3 : 6

**Q.113** The maximum quantity of aggregate per 50 kg of cement should not exceed

- (a) 100 kg (b) 200 kg  
(c) 350 kg (d) 450 kg

**Q.114** The concrete in which no preliminary tests are performed for designing the mix is called

- (a) rich concrete (b) controlled concrete  
(c) lean concrete (d) ordinary concrete

**Q.115** The ordinary concrete is not used for \_\_\_\_\_ grade of concrete mix.

- (a) M10 (b) M20  
(c) M25 (d) M40

**Q.116** The factor which effects the design of concrete mix is

- (a) fineness modulus (b) water-cement ratio  
(c) slump (d) all of these

**Q.117** To prevent the cement bags from any possible contact with moisture, the main point that should be kept in mind is that the

- (a) space between the exterior walls and piles should be 30 cm  
(b) cement bags should be placed closer together in the piles  
(c) width and height of the pile should not exceed 3 m and 2.70 m respectively  
(d) all of the above

**Q.118** For compacting large sections of mass concrete in structures, the type of vibrator used is

- (a) internal vibrator (b) screed vibrator  
(c) form vibrator (d) all of these

**Q.119** The levelling operation that removes humps and hollows and give a true, uniform concrete surface is called

- (a) screeding (b) floating  
(c) trowelling (d) compacting

**Q.120** The final operation of finishing the concrete surface is called

- (a) screeding (b) floating  
(c) trowelling (d) none of these

**Q.121** After the curing of 28 days, the concrete gains strength upto

- (a) 40% (b) 67%  
(c) 100% (d) 122%



- Q.122** Under normal circumstances, the beam soffits may be removed after  
(a) 2 days (b) 7 days  
(c) 14 days (d) 21 days
- Q.123** The construction joints in cement concrete  
(a) should be located where bending moment is large  
(b) should be located where shear force is large  
(c) should not be provided at the corners  
(d) should be spaced at a distance of 3 m apart in case of huge structures
- Q.124** If 'p' is the standard consistency of cement, the amount of water used in conducting the initial setting time test on cement is  
(a) 0.65p (b) 0.85p  
(c) 0.6p (d) 0.8p
- Q.125** Before testing setting time of cement one should test for  
(a) soundness (b) strength  
(c) fineness (d) consistency
- Q.126** The proper size of mould for testing compressive strength of cement is  
(a) 7.05 cm cube (b) 10.05 cm cube  
(c) 15 cm cube (d) 12.05 cm cube
- Q.127** In cements, generally the increase in strength during a period of 14 days to 28 days is primarily due to  
(a)  $C_3A$  (b)  $C_2S$   
(c)  $C_3S$  (d)  $C_4AF$
- Q.128** Ultimate strength of cement is influenced by which one of the following?  
(a) Tricalcium silicate  
(b) Dicalcium silicate  
(c) Tricalcium aluminate  
(d) Tetracalcium aluminoferrite
- Q.129** What is the requirement of water (expressed as % of cement w/w) for the completion of chemical reactions in the process of hydration of OPC ?  
(a) 10 to 15% (b) 15 to 20%  
(c) 20 to 25% (d) 25 to 30%
- Q.130** A cement bag contains 0.035 cubic meter of cement by volume. How many bags will one tonne of cement comprise?  
(a) 16 (b) 17  
(c) 18 (d) 20
- Q.131** Fineness of cement is measured in the units of  
(a) volume/mass (b) mass/volume  
(c) area/mass (d) mass/area
- Q.132** Gypsum is added into the raw materials during manufacture of cement so that the final product exhibits  
(a) retarded initial setting time  
(b) improved modularity for cornices, etc.  
(c) increased compressive strength  
(d) augmented bond strength
- Q.133** The constituent compound in Portland cement which reacts immediately with water, and also sets earliest, is  
(a) Tricalcium silicate  
(b) Dicalcium silicate  
(c) Tricalcium aluminate  
(d) Tetracalcium aluminoferrite
- Q.134** The approximate proportion of dry cement mortar required for brickwork is  
(a) 60% (b) 45%  
(c) 33% (d) 10%
- Q.135** A mortar for which both cement and lime are mixed is called  
(a) gauged mortar (b) cement mortar  
(c) lime mortar (d) light weight mortar
- Q.136** The maximum bulking of sand is likely to occur at a moisture content of  
(a) 5% (b) 8%  
(c) 11% (d) 14%
- Q.137** Lime mortar is generally made with  
(a) quick lime (b) fat lime  
(c) hydraulic lime (d) white lime
- Q.138** The modulus of rupture of hydraulic lime mortar (28 days curing) should NOT be less than  
(a) 1 N/mm<sup>2</sup> (b) 2 N/mm<sup>2</sup>  
(c) 2.5 N/mm<sup>2</sup> (d) 3.0 N/mm<sup>2</sup>
- Q.139** One of the main demerits in using the lime mortar is that it  
(a) is not durable (b) does not set quickly  
(c) swells (d) is plastic
- Q.140** Why is lime added to cement slurry for the topcoat of plastering?  
(a) To improve the strength of plaster  
(b) To stiffen the plaster  
(c) To smoothen the plaster for ease of spread  
(d) To make the plaster non-shrinkable

Answers		Building Materials					
1. (a)	2. (b)	3. (a)	4. (a)	5. (c)	6. (c)	7. (d)	8. (b)
9. (c)	10. (b)	11. (c)	12. (c)	13. (c)	14. (a)	15. (b)	16. (a)
17. (b)	18. (a)	19. (d)	20. (a)	21. (d)	22. (a)	23. (b)	24. (c)
25. (c)	26. (a)	27. (b)	28. (a)	29. (a)	30. (a)	31. (b)	32. (c)
33. (a)	34. (a)	35. (d)	36. (b)	37. (c)	38. (c)	39. (c)	40. (a)
41. (b)	42. (a)	43. (c)	44. (a)	45. (c)	46. (a)	47. (a)	48. (b)
49. (b)	50. (a)	51. (b)	52. (d)	53. (d)	54. (b)	55. (d)	56. (d)
57. (a)	58. (a)	59. (c)	60. (c)	61. (a)	62. (b)	63. (b)	64. (b)
65. (b)	66. (c)	67. (b)	68. (c)	69. (b)	70. (d)	71. (a)	72. (c)
73. (c)	74. (b)	75. (d)	76. (a, c)	77. (b)	78. (a)	79. (c)	80. (c)
81. (d)	82. (c)	83. (c)	84. (b)	85. (c)	86. (b)	87. (c)	88. (d)
89. (b)	90. (a)	91. (b)	92. (d)	93. (b)	94. (d)	95. (a, b)	96. (d)
97. (c)	98. (c)	99. (a)	100. (d)	101. (a)	102. (d)	103. (d)	104. (c)
105. (a)	106. (a)	107. (d)	108. (d)	109. (d)	110. (b)	111. (a)	112. (b)
113. (d)	114. (d)	115. (d)	116. (d)	117. (d)	118. (a)	119. (a)	120. (c)
121. (c)	122. (b)	123. (c)	124. (b)	125. (d)	126. (a)	127. (c)	128. (b)
129. (c)	130. (d)	131. (c)	132. (a)	133. (c)	134. (c)	135. (a)	136. (a)
137. (c)	138. (a)	139. (b)	140. (c)	141. (b)	142. (b)	143. (d)	144. (b)
145. (b)	146. (c)	147. (b)	148. (a)	149. (b)	150. (a)	151. (d)	152. (a)
153. (c)	154. (b)	155. (d)	156. (b)	157. (d)	158. (b)	159. (d)	160. (d)
161. (b)	162. (a)	163. (c)	164. (d)	165. (b)	166. (d)	167. (b)	168. (c)
169. (c)	170. (d)	171. (d)	172. (c)	173. (a)	174. (d)	175. (a)	176. (a)
177. (d)	178. (d)	179. (c)	180. (b)	181. (a)	182. (a)	183. (c)	184. (a)
185. (c)	186. (a)	187. (c)	188. (c)	189. (b)	190. (a)	191. (c)	192. (c)
193. (a)	194. (c)	195. (c)	196. (b)	197. (c)	198. (a)	199. (c)	200. (a)
201. (a)	202. (b)	203. (b)	204. (c)	205. (b)	206. (a)	207. (a)	208. (b)
209. (a)	210. (a)	211. (c)	212. (d)	213. (b)	214. (c)	215. (b)	216. (b)
217. (d)	218. (d)	219. (a)	220. (d)	221. (a)	222. (b)	223. (a)	224. (b)
225. (b)	226. (d)	227. (b)	228. (d)	229. (a)	230. (d)	231. (c)	232. (b)
233. (d)	234. (a)	235. (c)	236. (d)	237. (d)	238. (d)	239. (b)	240. (a)
241. (d)	242. (c)	243. (a, c)	244. (a)	245. (a)	246. (b)	247. (a)	248. (b)

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249. (b)	250. (b)	251. (a)	252. (a)	253. (a)	254. (b)	255. (b)	256. (a)
257. (d)	258. (d)	259. (d)	260. (b)	261. (d)	262. (b)	263. (d)	264. (c)
265. (b)	266. (d)	267. (c)	268. (a)	269. (d)	270. (d)	271. (a)	272. (d)
273. (d)	274. (a)	275. (b)	276. (d)	277. (b)	278. (a)	279. (d)	280. (d)
281. (b)	282. (c)	283. (d)	284. (d)	285. (a)	286. (d)	287. (b)	288. (c)
289. (c)	290. (d)	291. (a)	292. (b, d)	293. (d)	294. (a)	295. (d)	296. (b)
297. (a)	298. (a)	299. (b)	300. (c)	301. (c)	302. (c)	303. (a)	304. (c)
305. (d)	306. (c)	307. (b)	308. (d)	309. (b)	310. (d)	311. (b)	312. (a)
313. (b)	314. (d)	315. (a)	316. (a)	317. (b)	318. (a)	319. (c)	320. (d)
321. (d)	322. (c)	323. (c)	324. (a)	325. (c)	326. (d)	327. (b)	328. (b)
329. (c)	330. (a)	331. (d)	332. (d)	333. (d)	334. (d)	335. (d)	336. (d)
337. (b)	338. (a)	339. (d)	340. (d)	341. (d)	342. (d)	343. (a)	344. (d)
345. (d)	346. (d)	347. (b)	348. (d)	349. (d)	350. (d)	351. (a)	352. (a)
353. (a)	354. (d)	355. (d)	356. (d)	357. (d)	358. (d)	359. (d)	360. (b)
361. (b)	362. (c)	363. (d)	364. (b)	365. (d)	366. (a)	367. (b)	368. (c)
369. (a)	370. (d)	371. (c)	372. (d)	373. (a)	374. (b)	375. (c)	376. (d)
377. (a)	378. (d)	379. (a)	380. (c)	381. (a)	382. (c)	383. (d)	384. (c)
385. (b)	386. (b)	387. (d)	388. (b)	389. (c)	390. (d)	391. (b)	392. (c)
393. (d)	394. (d)	395. (b)	396. (c)	397. (b)	398. (d)	399. (d)	400. (a)
401. (c)	402. (a)	403. (c)	404. (b)	405. (b)	406. (d)	407. (a)	408. (b)

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## Explanations

**1. (a)**

Negative space, in a creation, is the space around and between the subject(s) of an image.

**2. (b)**

Specific gravity of commonly available ordinary portland cement is 3.15.

**3. (a)**

Bullnose brick can be used to create soft and attractive curved edges to steps, sills or in coping walls.

**6. (c)**

Stretcher bond is provided with 'half brick thick wall' is required.

**19. (d)**

Hydraulic line is generally used for white washing.

**20. (a)**

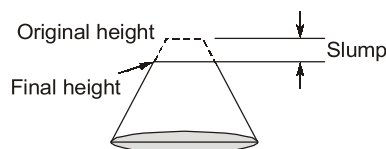
Shrinkage of cement concrete may be reduced by proper curing under moderate weather conditions.

**21. (d)**

Maturity concrete = (curing period) \* (curing temperature)

**28. (a)**

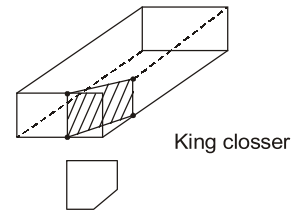
Concrete gain it's strength in gradual manner due to  $C_3S$  and  $C_2S$ .

**47. (a)****48. (b)**

Concrete joint in road must be filled with bitumen, so that no water can enter into it.

**49. (b)**

Long pipe that carry concrete in under water construction is called tremie.

**58. (a)****61. (a)**

In English bond, the arrangement of bonding that consists of alternates coarse of stretchers and header placed one over each other.

**62. (b)**

In stretcher bond, stretcher placed in each bond.

**73. (c)**

Perpendicular distance between the intrados and extrados is known as depth of arch.

**74. (b)**

Normal setting cement have the property of satisfying all normal conditions of constructions without any special attention.

**75. (d)**

High alumina cement is obtained by integrinding the clinkers obtain by the calcination of bauxite and lime stone. This cement can also resist 'high temperature' and 'action of acids' up to greater extent.

**76. (a, c)**

High water cement ratio produce more workable but of less strength mix.

**78. (a)**

In sloping roof, the supporter of common rafter are called purlins and these purlins support the weight of roof materials.

**80. (c)**

In concrete mix, when ingredients are separated due to gravity, then it is called segregation. Generally it is due to more water.

**81. (d)**

Various layer of different materials are formed that results in honey combing, scaling and increase the pores.

**82. (c)**

Less workable mix (harsh mix) is produced due to majority of same size particles.

**83. (c)**

Basic ingredients in concrete are: fine aggregate coarse aggregate, binding material and water. Binding material are generally cement and lime.

**84. (b)**

Ferro-cement is a system of reinforced mortar plaster applied over layer of metal mesh and closely spaced thin steel rods such as rebar.

**85. (c)**

RCC section is a balanced section that is equality strong in tension, compression and shear.

**86. (b)**

For light-weight concrete, the loose porous materials are used as the aggregates and these are obtained from porous rocks and industrial wastes.

**87. (c)**

Partition and wall lining are non-loading bearing members, so light weight concrete is used.

**88. (d)**

In burning zone ( $1400^{\circ}\text{C}$ - $1600^{\circ}\text{C}$ ) the calcined product is formed and nodules are converted into small hard dark greenish blue balls which known as clinkers.

**89. (b)**

Gypsum is called the retarding agent of cement which is mainly used for regulating the setting time of cement.

**90. (a)**

Tricalcium silicate undergoes hydration within a week or so, after the addition of water into cement and responsible for 'early strength'.

**91. (b)**

Dicalcium silicate undergoes hydration within a year also after addition of water into the cement. It generates the less heat of hydration in comparison to other bogue's compound.

**92. (d)**

Tricalcium aluminate generate the maximum heat of hydration among all bogue's compound.

**93. (b)**

$\text{C}_3\text{S}$  is responsible for early strength and  $\text{C}_2\text{S}$  is for progressive strength.

**94. (d)**

Due to high percentage of  $\text{C}_2\text{S}$ , progressive strength will be developed.  $\text{C}_2\text{S}$  and  $\text{C}_3\text{S}$  have lower rate of heat of hydration.

**95. (a, b)**

Blast furnace slag cement strength in early days is less and hence it requires longer curing period.

**96. (d)**

Sulphate resisting cement is used in marine construction.

**97. (c)**

Vicat's apparatus is used to find out the consistency of the cement paste.

**98. (c)**

For compressive strength test of concrete, water is added in the mortar in the preparation of

$\left(\frac{P}{4} + 3\right)\%$ . (where  $P\%$  is the water required to prepare the cement paste of standard consistency).

**99. (a)**

Aggregate is said to be flaky when their least dimension smaller than  $(3/5^{\text{th}})$  of the mean dimension.

**100. (d)**

Aggregate is said to be elongated when their greatest dimension size greater than 1.8 times of their mean size.

**101. (a)**

Apparent specific gravity is defined as total dry weight of aggregate divided by its total volume including voids.

**102. (d)**

Significant change in the volume of the cement takes place after its setting as it affects the durability called soundness of cement.

**103. (d)**

Values of fineness modulus:

Fine sand: 2.2-2.6

Medium sand: 2.6-2.9

Coarse sand: 2.9-3.2

**105. (a)**

Ennore (Chennai) sand is considered as standard sand in India.

**106. (a)**

Duff A. Abram, an American researcher, who define the concept of water cement ratio, fineness modulus and workability etc.

**107. (d)**

For normal RCC works, sufficient workability is required and generally having the slump value of 80-150 mm.

**108. (d)**

For high degree of workability, the compaction factor is in range of 0.95-0.96.

**109. (d)**

Unit of workability in slump test is mm.

**110. (b)**

Twisted fibres is due to torsional action by wind. This defect is close known as wandering fibres.

**112. (b)**

For M 20 grade of concrete mix cement : sand : aggregate = 1 : 1.5 : 3.

**116. (d)**

Design of concrete mix affected by the various its ingredient, method of preparation and after that monitoring and using.

**118. (a)**

In case of mass concreting, internal vibrator is more effective.

**119. (a)**

Screeding: a levelled layer of material (concrete) applied to a floor or other surface.

**120. (c)**

Final finishing operation of concrete is called trowelling and it is done with the help of trowel.

**121. (c)**

It is assumed that after curing of 28 days, the concrete gains strength upto 100%, though it is progressive in nature and make developed upto a year.

**122. (b)**

As per IS : 456-2000, the beam soffits may be removed after 7 days.

**124. (b)**

In order to perform initial setting time test cement sample is gauged with 0.85p water and paste prepared is filled in the mould.

**125. (d)**

Water required in testing setting time is calculated on the basis of normal consistency test.

**126. (a)**

For the testing of compressive strength of cement the size of mould are 70.6 mm or 75 mm.

**127. (c)**

14-28 day strength is mainly contributed by  $C_3S$ . Ultimately both  $C_3S$  and  $C_2S$  contribute to the strength.

**129. (c)**

It may be noted that  $C_3S$  requires 23% of water by weight of cement and  $C_2S$  requires 21%. It means that on an average 23% of water by weight of cement is required for chemical reaction with portland cement compounds. This 23% of water chemically combines with cement and therefore, it is called bound water. A certain quantity of water (about 15% by weight of cement) is imbedded within the gel pores. This water is known as gel-water. Therefore, a total 38% of water by weight of cement is required for the complete chemical reactions and to occupy the space within gel pores.