

RPSC 2024

Rajasthan Public Service Commission

Assistant Engineer Examination

3500 MCQs

Fully solved multiple choice questions
with detailed explanations

Practice Book Civil Engineering

Including Previous Years Solved Papers
of RPSC-AE 2013 and 2018





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3500 MCQs for Rajasthan Public Service Commission -Assistant Engineer : Civil Engineering

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PREFACE



With the announcement of vacancies by RPSC for the post of Assistant Engineer, it has given hope for many engineers between jobs. MADE EASY has always been a success partner for engineers right from the onset of engineering education up to they get a formal tag of engineer.

Owing to needs of students to utilise this opportunity in a fruitful way, it gives me great happiness to introduce the first edition of the Civil Engineering Practice book for Rajasthan Public Service Commission - Assistant Engineer Examination. While preparing this book utmost care has been taken to cover all the chapters and variety of concepts which may be asked in the exam. It contains more than 3500 multiple choice questions with answer key and detailed explanations, segregated in subject wise manner to disseminate all kind of exposure to students in terms of quick learning. Attempt has been made to bring out all kind of probable competitive questions for the aspirants preparing for Rajasthan Public Service Commission. This book also contains solved paper of RPSC 2013 (CE) to boost the exam time confidence level and help every student to perform in an extraordinary way.

Full efforts have been made by MADE EASY team to provide error free solutions and explanations. The book not only covers the syllabus of RPSC but is also useful for other examinations conducted by RPSC and various Public Service Commissions.

Our team has made their best efforts to make the book error-free. Nonetheless, we would highly appreciate and acknowledge if you find and share any printing/conceptual error. It is impossible to thank all individuals who helped us, but I would like to sincerely acknowledge all the authors, editors and reviewers for putting in their efforts to publish this book.

B. Singh (Ex. IES)
Chairman and Managing Director
MADE EASY Group

Syllabus

Optional Paper (Preliminary Examination)

CIVIL ENGINEERING

(Each portion to have roughly equal weightage)

- A. Engineering Materials and Construction Technology :** Selection of site for the construction of various types of buildings: Planning and orientation of buildings. Bonds in masonry. Damp proof course. Scaffolding, underpinning and ranking. Floors. Staircases. Roofs. Doors and Windows. Requirements of fire protection. Ventilation and air conditioning and acoustics. Building and highway materials and their IS codal provisions. Stones, Bricks, timber, Lime, Cement, Mortar, Plain and reinforced Cement Concrete, Bitumen, Asphalt.
- B. Surveying :** Generally adopted Scales, Chain and Compass surveying ; Leveling ; temporary and permanent adjustments of levels and Theodolite. Use of Theodolite, tacheometry, Trigonometrical and Triangulation survey. Traversing and Traverse Adjustment, Contours and contouring, Simple Circular Compound and Transition Curves and their setting out, Theory of errors and survey adjustment. Computations of areas and volumes.
- C. Soil/ Geotechnical Engineering :** Classification of soil as per I.S. code, Field identification tests for soils; water content, specific gravity, voids ratio, porosity, degree saturation; unit weight, density index etc; and their inter – relationship, determinations of various properties of soils as noted above as well as grain size distribution, consistency limits etc.
- Soil permeability and its determination in the laboratory and field; Darcy's law, Flow nets, its Characteristics and uses.
- Compaction and consolidation of soil. Quality control, soil stabilization methods. Boussinesq's methods. Newmark's chart and its uses.
- Shear strength parameters and their determination Bearing capacity, local and general shear failures, design Criteria for shallow foundation, Plate load test and standard penetration test. Earth pressures on retaining wall. Stability of simple slopes. Significant depth of exploration, design features of undisturbed sampler.
- D. Structural Mechanics :** Stress and strains, elastic constants, factor of safety, relation among elastic constants. Bending moment and shear force diagrams for cantilever, simply supported and overhanging, fixed and continuous beams subjected to static loads :- concentrated, uniformly distributed and uniformly varying. Theory of simple bending. Shear Stress, Influence lines. Deflection of cantilever, simply supported fixed and continuous beams. Determinate and Indeterminate structures and frames pin jointed, Plane and space frames.
- E. Steel Structures :** Design of ordinary and plate girder beams, roof trusses welded joints, axially and eccentrically loaded columns, Grillage, Gusseted and slab base foundations. Provisions of IS : 800 and 875. Economic span of bridges.
- F. Reinforced Concrete Structures :** Provisions of latest IS : 456, design of beams singly and doubly reinforced, design of shear reinforcement. Design of slabs spanning in two directions and T-beam slabs. Design of column axially and uniaxially eccentrically loaded. Design of isolated and combined column footings : Design of simple RCC cantilever and counterfort retaining walls. Reinforcement in overhead and underground water tanks.
- G. Fluid Mechanics Including Hydrology And Irrigation :** Hydraulic pressure at a point and its measurement. total pressure and centre of pressure on plane and curved immersed surfaces, Buoyancy. conditions of equilibrium of floating bodies; fluid flow conditions, Bernoulli's, Navier-Stokes, Reynold's equations, flow through orifices venturimeter, notches and wires, flow through pipes and open channels, Gradually and rapidly varied flow, Dimensional analysis, Momentum and angular momentum principles as applied to fluid in a control volume, applications of jets, Viscous flow, concept of drag, flow through pipes.
- Engineering hydrology; Hydrology of floods and drought reservoirs and dams; overflow structures, ground water hydrology. Irrigation: canals, Kennedy's Lacey's theories, Khosla's theories for design of hydraulic structures. Ground water and well irrigation, water logging.

H. Public Health Engineering : Per capita requirement of water for urban and rural areas, Forecast of population. Sources. Water supply standards of purity of public water supplies with various methods of purification; House drainage system Distribution network with all the ancillaries: system of drainage. Layout of sewerage systems. Primary, secondary treatments, trickling filters, lagoons and other treatment units and their design criteria. Flushing of sewers; sewage treatment; rural water supply and sanitation.

I. Highway And Bridges : Principles of highway planning; classification of road land width, building line, center line, formation width, terrain classification, pavement width, Camber, longitudinal gradient sight distance, horizontal curve, super elevation, vertical curve, lateral and vertical clearances.

Flexible pavements. Sub-base, base course and shoulder stone / Kankar brick soling, WBM courses, shoulders. Granular sub-base, stabilized soil roads cement / lime stabilized sub base, sand bitumen base course, crushed cement concrete base/ sub-base course.

Prime and tack coats, surface dressing, open graded premix carpet, semi dense carpet, build-up spray grout base course, bituminous base binder course. Asphaltic concrete, seal coats, mixed seal surfacing. Penetration macadam base/binder course, full and semi groups.

Traffic Engineering : traffic characteristics, road user characteristics, vehicular characteristics, volume, speed and delay studies origin and destination study, traffic flow characteristics, traffic capacity and parking studies, traffic regulation, traffic control devices, Intersection control. Alignment: traffic engineering, pavement design, paving materials and highway construction and maintenance of different types of roads. Need for highway drainage and arboriculture, types of bridges: choice of type of bridge, economical considerations of fixing spans culverts.



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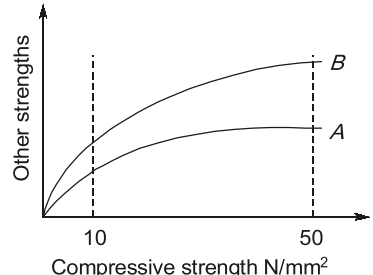
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UNIT 1

Engineering Materials and Construction Technology

- 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) Lintels
- 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) caulking
- 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° , 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°C to 1000°C (b) 1000°C to 1200°C
(c) 1200°C to 1500°C (d) 1500°C to 1600°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

Answers								Engineering Materials and Construction Technology																																																																																																																																																																																																																															
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. (b)	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. (a)	36. (b)	37. (a)	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. (b)	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. (c)	239. (b)	240. (a)
241. (d)	242. (c)	243. (a, c)	244. (a)	245. (a)	246. (b)	247. (a)	248. (b)
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. (a, d)	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. (d)	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. (b)		

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. (b)

Fat lime is generally used for white washing.

20. (a)

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

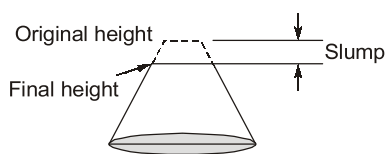
21. (d)

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)



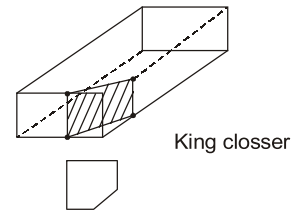
48. (b)

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 intergrinding 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°C-1600°C) the calcined product is formed and nodules are converted into small hard dark grunish 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 an year also after addition of water into the cement. It generates the less heat of hydration in comparison to other bogues compound.

92. (d)

Tricalcium aluminate generate the maximum heat of hydration among all bogues compound.

93. (b)

C₃S is responsible for early strength and C₂S is for progressive strength.

94. (d)

Due to high percentage of C₂S, progressive strength will be developed. C₂S and C₃S 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)

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

$$\left(\frac{P}{4} + 3\right)\% . \text{ (where } P\% \text{ is the water required to}$$

prepare the cement past of standard consistency).

99. (a)

Aggregate is said to be flaky when their least dimension smaller them (3/5th) 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.

UNIT 13

RPSC Assistant Engineer Preliminary Exam : 2013

- Q.1** For walls having thickness of wall more than one and a half brick, the following bond is more compact and stronger:
(a) Double Flemish Bond
(b) English Bond
(c) Garden Wall Bond
(d) Dutch Bond
- Q.2** In a wooden door, "Style" is the:
(a) outside vertical member of the shutter
(b) topmost horizontal member of the shutter
(c) middle horizontal member of the shutter
(d) horizontal projection of head
- Q.3** From practical considerations and effective working of the ventilation system, the desired value of rate of air changes per hour is:
(a) one (b) five
(c) twenty (d) thirty
- Q.4** Quick lime is:
(a) Calcium carbonate
(b) Calcium oxide
(c) Calcium hydroxide
(d) Calcium chloride
- Q.5** The pressure acting on the stones in stone masonry construction should be
(a) along the direction of bedding planes
(b) at 30° to the direction of bedding planes
(c) at 45° to the direction of bedding planes
(d) perpendicular to the direction of bedding planes
- Q.6** Efflorescence in the bricks is caused due to
(a) Lime (b) Organic matter
(c) Iron (d) Alkalies
- Q.7** Dry Rot and Wet Rot are the
(a) Defects of timber
(b) Diseases of timber
(c) Characteristics of timber
(d) Structure of timber
- Q.8** Which one of the following is responsible for initial set and high heat of hydration?
(a) Tri-calcium silicate
(b) Di-calcium silicate
(c) Tri-calcium aluminate
(d) Tetra-calcium alumina ferrite
- Q.9** The vertical distance between the springing line and highest point of the inner curve of an arch is known as:
(a) spandrel (b) rise
(c) intrados (d) extrados
- Q.10** Ring and Ball apparatus is used for the following test of bitumen:
(a) Penetration (b) Viscosity
(c) Ductility (d) Softening point
- Q.11** Error due to bad ranging is:
(a) Cumulative positive
(b) Cumulative negative
(c) Compensative
(d) Never serious
- Q.12** Imaginary line joining the points of zero declination on the surface of earth is known as:
(a) Isogonic line
(b) Isoclinic line
(c) Magnetic declination line
(d) Agonic lines
- Q.13** The curved surface which at every point is perpendicular to the direction of gravity at that point is known as:
(a) A level plane
(b) A level surface
(c) A horizontal surface
(d) A vertical surface
- Q.14** Spire test is used for the permanent adjustment of a theodolite for:
(a) Adjustment of horizontal axis
(b) Adjustment of vertical axis
(c) Adjustment of plate levels
(d) Adjustment of line of sight

- Q.15** If a tripod settles in the interval that elapses between taking a back sight reading and the following foresight reading, then the elevation of turning point will:
 (a) increase
 (b) decrease
 (c) not change
 (d) may increase or decrease
- Q.16** Axis method of traverse correction is used when:
 (a) The lengths are measured very accurately
 (b) The angle are measured very accurately
 (c) The percentage error in angles and lengths is same
 (d) Neither angles nor lengths are measured accurately
- Q.17** If the R.L. of a B.M. is 100.00 m, the back-sight is 1.215 m and the foresight is 1.870 m, the R.L. of the forward station is:
 (a) 99.345 m (b) 101.215 m
 (c) 100.655 m (d) 101.870 m
- Q.18** A curve of varying radius introduced between two branches of a compound curve is known as:
 (a) Mean curve (b) Base curve
 (c) Common curve (d) Transition curve
- Q.19** Contour lines of different elevation can unite to form one line only in the case of:
 (a) Plane ground (b) Cave
 (c) Vertical cliff (d) Valley
- Q.20** The method which gives more accurate results in the measurement of areas is:
 (a) Average ordinate rule
 (b) Mid ordinate rule
 (c) Trapezoidal rule
 (d) Simpson's one third rule
- Q.21** The porosity of a soil sample is 35% and the specific gravity of its particles is 2.7. The dry density of soil sample is:
 (a) 1.755 g/cm³ (b) 0.755 g/cm³
 (c) 1.57 g/cm³ (d) 2.105 g/cm³
- Q.22** The coefficient of uniformity of a soil is given by:
 (a) $\frac{D_{10}}{D_{60}}$ (b) $\frac{D_{60}}{D_{10}}$
 (c) $\frac{D_{60}}{D_{30}}$ (d) $\frac{D_{30}}{D_{60}}$
- Q.23** If the natural water content of soil mass lies between its liquid limit and plastic limit, the soil mass is said to be in:
 (a) liquid state (b) plastic state
 (c) semi-solid state (d) solid state
- Q.24** Discharge through the body of an earth dam may be calculated using flow net as
 (a) $q = (k/h) (N_f/N_d)$
 (b) $q = (k/h) (N_d/N_f)$
 (c) $q = (k \cdot h) (N_f/N_d)$
 (d) $q = (k \cdot h) (N_d/N_f)$
 where, k is coefficient of permeability, h is head, N_f is number of flow fields and N_d is number of potential drops.
- Q.25** The critical gradient of a soil having specific gravity as 2.67 and voids ratio as 0.67 is:
 (a) 2.0 (b) 1.0
 (c) 4.0 (d) 2.5
- Q.26** Select the correct statement:
 (a) The greater the viscosity, the greater is permeability
 (b) The greater the unit weight, the greater is permeability
 (c) The greater the unit weight, the smaller is permeability
 (d) Unit weight does not affect permeability
- Q.27** The phenomenon when soil loses its shear strength due to oscillatory motion is known as:
 (a) Consolidation (b) Shear failure
 (c) Liquefaction (d) Sloughing
- Q.28** Degree of consolidation is:
 (a) directly proportional to time and inversely proportional to drainage path
 (b) directly proportional to time and inversely proportional to square of drainage path
 (c) directly proportional to drainage path and inversely proportional to time
 (d) directly proportional to square of drainage path and inversely proportional to time
- Q.29** The shear strength of a soil:
 (a) is directly proportional to the angle of internal friction of the soil
 (b) is inversely proportional to the angle of internal friction of the soil
 (c) decreases with increase in normal stress
 (d) decreases with decrease in normal stress

- Q.94** The maximum super-elevation on hill roads should not exceed:
 (a) 8% (b) 9%
 (c) 10% (d) 11%
- Q.95** The distance travelled by the vehicle during the total reaction time is known as:
 (a) Braking distance
 (b) Lag distance
 (c) Stopping distance
 (d) Sight distance
- Q.96** Select the correct statement:
 (a) Traffic volume should always be more than traffic capacity.
 (b) Traffic capacity should always be more than traffic volume.
 (c) Spot speed is the average speed of a vehicle at a specified section.
 (d) 85th percentile speed is more than 98th percentile speed.
- Q.97** Bankelman beam deflection method is used for design of:
 (a) Rigid overlay on rigid pavement
 (b) Flexible overlay on flexible pavement
 (c) Rigid overlay on flexible pavement
 (d) Flexible overlay on rigid pavement
- Q.98** Bituminous surfacing done on already existing impervious pavement, is known as:
 (a) Prime coat (b) Seal coat
 (c) Tack coat (d) Wear coat
- Q.99** Desire Lines are plotted in:
 (a) Traffic volume studies
 (b) Speed studies
 (c) Accident studies
 (d) Origin and Destination studies
- Q.100** The best angle in angle parking, considering the road obstruction and the convenience of driver, is:
 (a) 30 degree (b) 45 degree
 (c) 60 degree (d) 90 degree

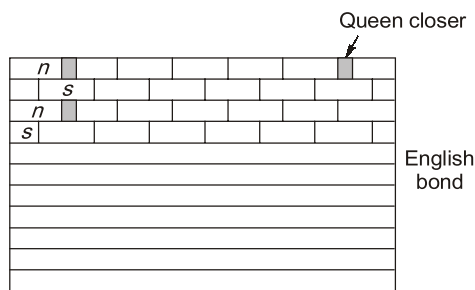


Answers RPSC Assistant Engineer Preliminary Exam : 2013									
1. (b)	2. (a)	3. (c)	4. (b)	5. (d)	6. (d)	7. (a)	8. (c)	9. (b)	10. (d)
11. (a)	12. (d)	13. (b)	14. (a)	15. (a)	16. (b)	17. (a)	18. (d)	19. (c)	20. (d)
21. (a)	22. (b)	23. (b)	24. (c)	25. (b)	26. (b)	27. (c)	28. (b)	29. (d)	30. (b)
31. (d)	32. (d)	33. (a)	34. (c)	35. (a)	36. (c)	37. (c)	38. (c)	39. (a)	40. (b)
41. (b)	42. (b)	43. (a)	44. (d)	45. (c)	46. (b)	47. (d)	48. (a)	49. (c)	50. (c)
51. (c)	52. (d)	53. (a)	54. (d)	55. (a)	56. (b)	57. (c)	58. (b)	59. (a)	60. (c)
61. (d)	62. (a)	63. (b)	64. (b)	65. (a)	66. (a)	67. (c)	68. (a)	69. (c)	70. (b)
71. (c)	72. (a)	73. (c)	74. (c)	75. (b)	76. (a)	77. (b)	78. (d)	79. (d)	80. (b)
81. (c)	82. (b)	83. (b)	84. (b)	85. (a)	86. (b)	87. (d)	88. (b)	89. (c)	90. (c)
91. (b)	92. (a)	93. (d)	94. (c)	95. (c)	96. (b)	97. (c)	98. (c)	99. (d)	100. (c)

Explanations

1. (b)

- English bond is stronger than Flemish bond for walls thicker than $1\frac{1}{2}$ brick.
- This is due to the fact that it is made by alternately laying a row of two bricks "longwise" side by side (stretchers) and then a row of bricks "crosswise" (headers). The joints are staggered so that the header bricks & mortar lock in the stretcher bricks in the rows above and below them and vice versa.



2. (a)

- Top most horizontal member of the shutter is known as top rail.
- Middle horizontal member is known as lock rail.
- Vertical outside member of the shutter is known as stiles or styles.

3. (c)

Air changes per hour or air change rate, (ACH or ACPH) is a measure of the air volume added to or removed from a space divided by the volume of the space.

$$\text{ACPH} = \frac{60\theta}{vol}$$

Where, θ = Volumetric flow rate

It varies from a minimum value of 4 to 30. For ventilation purpose the value of ACPH should be kept around 20.

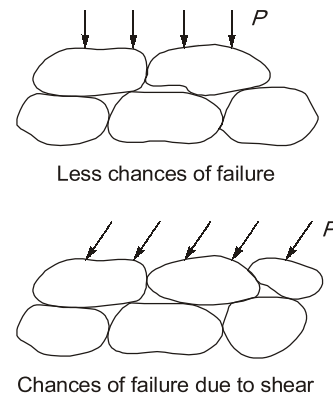
4. (b)

Quick lime is a common name used for calcium oxide its chemical formula is CaO .

- Calcium hydroxide - Ca(OH)_2 – hydrated lime
- Calcium carbonate - CaCO_3
- Calcium chloride - CaCl_2

5. (d)

Stones are strong in compression but have less strength in shear due to joints. Hence the load application on stones is preferred in a direction perpendicular to the bedding plane so that compressive stress are generated & no shear stress is generated. This effect is also known as anisotropy affect.



6. (d)

Efflorescence is a crystalline, salty deposits that occurs on surface of bricks. It occurs when alkali salts are present in the bricks. Water on evaporation leaves behind the salts on the surface of the brick which give rise to efflorescence.

7. (a)

Dry rot and wet rot are defects in timber caused by fungi attack.

8. (c)

In keeping with its high basicity, tricalcium aluminate reacts most strongly with water of all. It is the most reactive of the portland clinker phase. Its hydration to phases of the form $\text{Ca}_2\text{AlO}_3(\text{OH})\cdot n\text{H}_2\text{O}$ leads to initial set and high heat generation.

9. (b)

