RPSC 2025

Rajasthan Public Service Commission

Assistant Engineer Examination

3700 MCQs

Fully solved multiple choice questions
with detailed explanations

Practice Book

Civil Engineering

Including Previous Years Solved Papers
of RPSC-AE 2013, 2018 and 2023

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PREFACE

B. Singh (Ex. IES)

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 second 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 3700 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 papers of RPSC-AE 2013, RPSC-AE 2018 and RPSC-AE (DLB) Exam-2023 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 Techonology :** 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 Engineeing :** 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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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

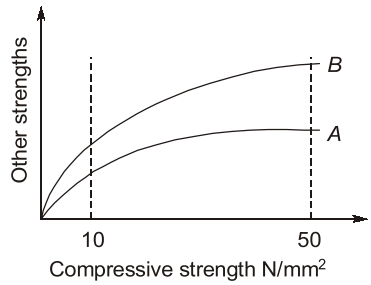
Q.27 Glazing is used to make earthenware
(a) soft (b) impervious
(c) hard (d) porous

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) fillering
(c) fullering (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) terrazo 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

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.

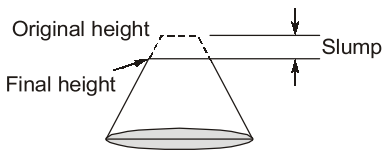
21. (d)

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)



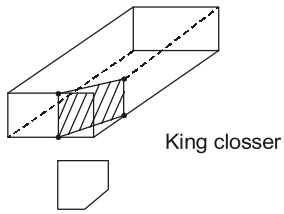
48. (b)

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)

C_3S is responsible for early strength and C_2S is for progressive strength.

94. (d)

Due to high percentage of C_2S, progressive strength will be developed. C_2S and C_3S 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 $\left(\frac{P}{4}+3\right)\%$. (where $P\%$ 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 ($3/5^{th}$) 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.

UNIT 15

RPSC Assistant Engineer (DLB) Exam : 2023

(Exam held on 21-05-2023)

Q.1 Select the correct order of performing engineering survey for roads, railways and irrigation works.
(a) Preliminary Survey, Reconnaissance Survey, Location Survey
(b) Preliminary Survey, Location Survey, Reconnaissance Survey
(c) Location Survey, Reconnaissance Survey, Preliminary Survey
(d) Reconnaissance Survey, Preliminary Survey, Location Survey

Q.2 Read the following statements carefully :
A. Length of Gunter's Chain is 66 ft.
B. Gunter's Chain is divided in 66 links.
C. Gunter's Chain is also known as Surveyor's Chain.
Which of the following statement/s is/are correct?
(a) Only statement A is correct.
(b) Only statement B is correct.
(c) Statement A and C are correct.
(d) All statements are correct.

Q.3 Which of the following triangulation would have longest base line?
(a) First order (b) Second order
(c) Third order (d) Fourth order

Q.4 Select the correct advantage of tacheometric surveying.
(a) Speed of surveying is low but result is highly precise.
(b) Survey can be performed in poor visibility.
(c) Chain can be used to measure the distance between two points.
(d) Cost of surveying is less.

Q.5 _____ is the horizontal distance between two points on any two consecutive contours and _____ is the vertical distance between two consecutive contour lines.
(a) Contour intervals, Contour slope.
(b) Horizontal equivalent, Contour intervals.
(c) Contour gap, Contour slope
(d) Contour gap, Horizontal equivalent.

Q.6 An area of a plan is to be determined by using an Ambler polar planimeter. What does 'N' mean in equation of area = M(F – I ± 10N + C) of this planimeter?
(a) Number of sides of the traverse
(b) Number of cellular units of plan
(c) Number of complete revolutions of the disc
(d) Number of stations in the plan

Q.7 Select the first step to be performed in the procedure for setting the curve.
(a) Swing the arc of chord length C_1 from point A_1 (A_1 lies on the line T_1V, where V is the vertex of the curve).
(b) Locate the tangents Point T_1 and T_2 and determine the length of first and last sub-chords.
(c) Check whether the last point coincides with tangent point T_2.
(d) The closing error is distributed.

Q.8 If the natural state of cohesionless soil is in its densest state then the degree of density becomes
(a) zero (b) unity
(c) negative (d) not defined

Q.9 An oven-dried soil having a mass of 200 g is placed in a pycnometer which is completely filled with water. The mass of empty pycnometer is 125 g. The specific gravity of soil mass shall be calculated as
(a) 2.67 (b) 1.67
(c) 2.65 (d) 1.65

Q.10 Which of the following option is correct if the clay sample has activity 1.49?
(a) Illite clay mineral
(b) Kaolinite clay mineral
(c) Montmorillonite clay mineral
(d) No comments

Q.11 A horizontal stratified soil deposits consists of three uniform layers of thickness 4, 1 and 2 units

respectively. The permeabilities of these three layers are 2, 1 and 4 units. Which relation is correct for effective average permeability of the soil deposits in horizontal and vertical direction?

(a) $k_x < k_z$ (b) $k_x = k_z$
(c) $k_x \cdot k_z = 1$ (d) $k_x > k_z$

Q.12 Complex potential is defined as :

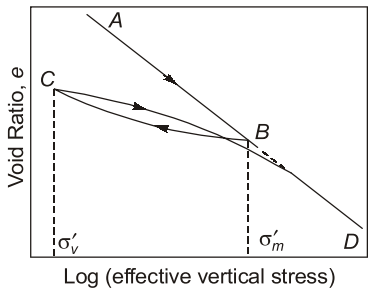
(a) $\phi + i\psi$ (b) $\phi - i\psi$
(c) $\psi + i\phi$ (d) $\psi - i\phi$

Q.13 Match list-I with list-II and select the correct answer by the codes given below :

List-I	List-II
(a) Boussinesq influence factor under concentrated load	1. $\frac{1}{\pi\left[1+2\left(\frac{r}{z}\right)^2\right]^{3/2}}$
(b) Boussinesq influence factor under uniformly distributed circular load	2. $1-\left[\frac{1}{1+\left(\frac{a}{z}\right)^2}\right]^{3/2}$
(c) Westergaard influence factor under point load	3. $1-\left[\frac{1}{1+\left(\frac{a}{\eta z}\right)^2}\right]^{1/2}$
(d) Westergaard influence factor under uniformly distributed circular load	4. $\frac{3}{2\pi}\left[\frac{1}{1+\left(\frac{r}{z}\right)^2}\right]^{5/2}$

(a) a → 1, b → 3, c → 4, d → 2
(b) a → 4, b → 2, c → 1, d → 3
(c) a → 2, b → 1, c → 3, d → 4
(d) a → 3, b → 4, c → 2, d → 1

Q.14 The segment BC shown in pressure void ratio curve for remoulded soil sample represents



(a) Recompression
(b) Virgin compression curve
(c) Expansion
(d) Decompression.

Q.15 The radius of Mohr circle drawn for unconfined compression test on saturated clay is equal to

(a) the apparent cohesion.
(b) the unconfined compressvie strength.
(c) $\sqrt{\left\{\frac{1}{2}(s_y - s_x)^2 + t_{xy^2}\right\}}$
(d) $\frac{s_1 + s_3}{2}$

Q.16 The ratio of horizontal to vertical stress for elastic equilibrium of soil considering the angle of shearing resistance of 30° shall be

(a) 1 (b) 3
(c) 0.33 (d) 0.5

Q.17 The allowable bearing pressure on spreading footing constructed on sand should be such that the differential settlement does not exceed

(a) $\frac{1}{450}$ (b) $\frac{1}{300}$
(c) $\frac{1}{500}$ (d) $\frac{1}{750}$

Q.18 A homogeneous and isotropic material has density 2.5 kN/m^3. The modulus of rigidity and bulk modulus for the material is 100 MPa and 50 MPa respectively. What is the modulus of elasticity for given material?

(a) 1.8 N/mm^2 (b) 180 N/mm^2
(c) 1800 N/mm^2 (d) 180000 N/mm^2

Q.19 An overhanging beam of total length l m, having equal overhangs on both sides carries U.D.L. of w kN/m on the entire span. A beam with given loading condition has number of point/s of contraflexure.

(a) 0 (b) 3
(c) 2 (d) 1

Q.20 A rectangular mild steel specimen of width X cm and depth Y cm is loaded with force P perpendicular to the cross-section, at centroids of specimen. If both width and depth of original specimen is doubled then, determine the ratio of stress in original specimen to modified specimen with same amount of force P.

(a) 1 : 2 (b) 4 :1
(c) 8 : 1 (d) 2 :1

Q.21 A cantilever beam of effective span l, carrying a triangular load of zero per unit length at free support increasing uniformly to w per unit length at fixed support. Read the below statements carefully about the given beam :
A. S.F. diagram has a straight inclined line.
B. B.M. diagram has a cubical curve.
(a) Both statements are correct.
(b) Only first statement is correct.
(c) Only second statement is correct.
(d) Both statements are incorrect.

Q.22 A determinate structure had total cost about 2 lakhs rupees. If the same structure would have made with indeterminate structure, then what amount of total saving in cost may be obtained with indeterminate structure?
(a) Around 35000 to 45000 rupees.
(b) Around 10000 to 16000 rupees.
(c) Around 20000 to 25000 rupees.
(d) Around 20000 to 30000 rupees.

Q.23 What is the ratio of maximum slope to maximum deflection in a cantilever beam of span l m subjected to U.D.L. of w kN/m on the entire span?

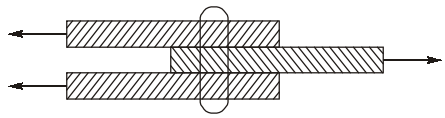
(a) $\frac{2}{3\times l}$ (b) $\frac{2}{4\times l}$
(c) $\frac{4}{3\times l}$ (d) $\frac{4\times l}{3}$

Q.24 A Propped cantilever beam is loaded with uniformly distributed load on whole span, such that deflection at prop end of the beam is zero. The reaction of the prop end of the beam is calculated by (Take usual notations for all quantities).

(a) $\frac{3wl}{8}$ (b) $\frac{7wl}{8}$
(c) $\frac{5wl}{8}$ (d) $\frac{5wl}{7}$

Q.25 A two spans continuous beam is simply supported by three supports A, B and C from left to right end respectively and subjected to U.D.L. of w kN/m throughout the span. Then negative bending moment will be generated at
(a) support A
(b) support C
(c) support B
(d) both supports A and C.

Q.26 Three steel plates are held together by 14 mm diameter rivet. If the load transmitted is 88 kN through this arrangement, estimate the shearing stress in the rivet.



(a) $\frac{4\times10^3}{7}$ (b) $\frac{2\times10^3}{7}$
(c) $\frac{3\times10^3}{7}$ (d) $\frac{7\times10^3}{2}$

Q.27 The displacement of joints is selected as redundant in which method of structural analysis?
(a) Force method
(b) Stiffness method
(c) Flexibility method
(d) Compatibility method

Q.28 What is the maximum length of open gantries beyond which expansion joint shall be provided?
(a) 120 m (b) 150 m
(c) 180 m (d) 230 m

Q.29 If M25 grade concrete is used as a bedding material for a steel column then the maximum bearing pressure shall be limited to
(a) 15 MPa (b) 13.5 MPa
(c) 21.75 MPa (d) 17.5 MPa

Q.30 What is the ratio of most unfavourable slenderness of each member between the intermediate weld connection of two channel section connected back to back if the most unfavourable ratio of slenderness of the member as a whole is 90?
(a) 40 (b) 54
(c) 63 (d) 45

Q.31 In which type of roof truss the diagonals are in tension under gravity loading?
(a) Howe truss (b) King post truss
(c) Pratt truss (d) Warren truss

Q.32 When transverse stiffeners are not provided in plate girder and the web of plate girder is

connected to flange along one longitudinal edge only then the minimum thickness of web shall be taken as

(a) $\frac{d}{200\varepsilon_w}$ (b) $\frac{d}{340\varepsilon_w}$

(c) $\frac{d}{90\varepsilon_w}$ (d) $\frac{d}{400\varepsilon_w}$

Q.33 What is the minimum vertical distance between the rows of bars if the beam is constructed with 20 mm size aggregate and reinforced with 12 mm diameter bars?

(a) 12 mm (b) 14 mm
(c) 15 mm (d) 20 mm

Q.34 If 300 mm × 600 mm rectangular beam cast with M25 grade concrete subjected to flexure, then the cracking moment of the beam is

(a) 63 kNm (b) 48.3 kNm
(c) 31.5 kNm (4) 36 kNm

Q.35 What is the depth of rectangular portion in stress block diagram of concrete?

(a) $\frac{4}{7}X_u$ (b) $\frac{3}{7}X_u$

(c) $\frac{2}{7}X_u$ (d) $\frac{5}{7}X_u$

Q.36 The nominal shear stress should not exceed _____ for solid slab constructed with M40 grade concrete.

(a) 4 N/mm^2 (2) 3.1 N/mm^2
(3) 2 N/mm^2 (4) 2.8 N/mm^2

Q.37 The maximum spacing of shear reinforcement for 230 mm wide and 350 mm deep (effective) beam shall not exceed when inclined stirrups is provided at 45°.

(a) 350 mm (b) 225 mm
(c) 230 mm (d) 300 mm

Q.38 The strength of compression members subjected to helical reinforcement is about _____ percent more than the strength of similar member with lateral ties.

(a) 1.05 (b) 10
(c) 5 (d) 1.10

Q.39 Which of the following criteria is considered while proportioning the size of footing?

(a) $\frac{P}{A}+\frac{M}{Z}<$ A.B.P. and $\frac{P}{A}-\frac{M}{Z}\geq 0$

(b) $\frac{P}{A}-\frac{M}{Z}<$ A.B.P. and $\frac{P}{A}+\frac{M}{Z}\geq 0$

(c) $\frac{P}{A}+\frac{M}{Z}>$ A.B.P. and $\frac{P}{A}-\frac{M}{Z}\leq 0$

(d) $\frac{P}{A}-\frac{M}{Z}>$ A.B.P. and $\frac{P}{A}+\frac{M}{Z}\leq 0$

Q.40 The thickness of base slab for a cantilever retaining wall of 6 m overall height may be considered as

(a) 300 mm (b) 450 mm
(c) 350 mm (d) 380 mm

Q.41 The development length of each bar of bundled bars shall be taken as _____ times more than that of individual bar when four bars in contact.

(a) 1.10 (b) 1.20
(c) 1.30 (d) 1.33

Q.42 The nominal cover to meet the requirements of durability for M45 grade concrete under various exposure condition is given below :

Exposure	Minimum nominal cover (mm)
1. Mild	A. 40
2. Severe	B. 45
3. Very severe	C. 50
	D. 20

(a) 1 → A, 2 → B, 3 → C
(b) 1 → D, 2 → B, 3 → C
(c) 1 → D, 2 → A, 3 → C
(d) 1 → D, 2 → A, 3 → B

Q.43 What is the value of coefficient of discharge when the area of jet of liquid at outlet is equal to the area of mouthpiece?

(a) 0.530 (b) 0.602
(c) 0.608 (d) 0.855

Q.44 The atmospheric pressure at sea level at 15°C is

(a) 10.13 N/cm^2 (2) 14.17 N/cm^2
(3) 19.75 N/cm^2 (4) 22.83 N/cm^2

Q.45 Euler's number has the dimensions as

(a) $ML^{-2}T^2$ (b) $ML^{-1}T^2$
(c) MLT^{-1} (d) $M^0L^0T^0$

Q.46 A cipolletti weir is constructed for the side slope of

(a) 1 horizontal to 4 vertical
(b) 1 horizontal to 2 vertical
(c) 2 horizontal to 1 vertical
(d) 1 horizontal to $2\frac{1}{2}$ vertical

Q.47 Identify the incorrect statement in terms of gradually varied flow.
(a) The energy correction factor is zero.
(b) The flow is steady.
(c) The roughness coefficient is constant for the length of channel.
(d) The channel is prismatic.

Q.48 Which of the following is not come under self-recording type rain gauge?
(a) Tipping bucket rain gauge
(b) Symon's rain gauge
(c) Float type rain gauge
(d) Weighing type rain gauge

Q.49 The reservoir for irrigation may be planned with the value of design yield of about times higher than the firm yield.
(a) 1.10 (b) 1.30
(c) 1.05 (d) 1.20

Q.50 Kennedy gives silt theory for the design of unlined alluvial channels by considering B/D ratio ranging from
(a) 0.8 to 1.2 (b) 1.5 to 3
(c) 3.5 to 12 (d) 1.5 to 2.5

Q.51 In Khosla's theory, if no cutoff is provided at the downstream end of the floor then the exit gradient becomes
(a) infinite (b) zero
(c) unity (d) negative

Q.52 _____ is the rate of flow of water through a vertical strip of aquifer of unit width and extending for the full saturated height under unit hydraulic gradient.
(a) coefficient of transmissibility
(b) coefficient of permeability
(c) coefficient of discharge
(d) Storativity

Q.53 Total quantity of 730 m litres water is required by a town per year having population of 10000. The per capita demand for the town will be of
(a) 0.73 m^3/day (b) 200 m^3/day
(c) 0.2 m^3/day (d) 0.2 litres/day

Q.54 Which of the following method is suitable for forecasting the population of those towns and cities whose development is likely to place according to the national growth of country?
(a) The Master Plan Method
(b) The Apportionment Method
(c) The Comparative Graphical Method
(d) The Logistic Curve Method

Q.55 Ultra-violet rays are highly disinfectants and kill the disease bacteria, in this disinfection method water is allowed to pass in thickness not exceeding before the ultraviolet rays.
(a) 8 cm (b) 15 cm
(c) 12 cm (d) 10 cm

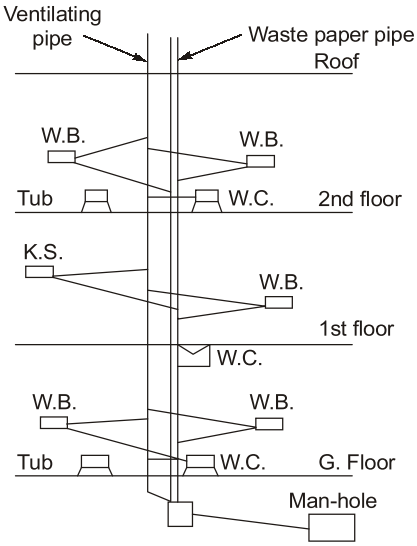
Q.56 The trickling filters are always provided between to remove organic solids produced in filtration.
(a) intermittent filters and contact beds
(b) intermittent filters and final settling tank
(c) primary sedimentation tank and final settling tank
(d) screening and primary sedimentation tank

Q.57 Read the below given statements carefully and identify the correct statements :
A. Generally grit particles lie between 0.1 to 1 mm in size.
B. Stokes law holds good for settling of particles of diameters less than 1 mm.
C. Usually the detention period of grit chambers is 60 min.
D. The loss of head in a grit chamber varies from 0.06 to 0.6 m.
(a) A and D (b) B and C
(c) A and C (d) B and D

Q.58 The sludge index is the ratio of the volume of activated sludge varies from
(a) 0 to 100 (b) 150 to 300
(c) 350 to 500 (d) 400 to 550

Q.59 The gas vent area for Imhoff tank is provided as
(a) 5 to 8% of the plan area.
(b) 30 to 35% of the plan area.
(c) 10 to 15% of the plan area.
(d) 20 to 25% of the plan area.

Q.60 Identify the figure :



(a) Single Stack System
(b) One-Pipe System
(c) Two-Pipe System
(d) Single Stack Partially Ventilated System

Q.61 How many litres of water is required in steel industry for the production of 1 tonne steel?
(a) 1,75,000 (b) 60,000
(c) 4,500 (d) None of these

Q.62 The depth of tank for a high-rate trickling filter may vary from
(a) 1.0 to 1.8 m (b) 2.0 to 2.7 m
(c) 3.0 to 3.9 m (d) 4.0 to 5.3 m

Q.63 In Geometrical design of highways, mechanical widening and psychological widening are provided on
(a) the vertical curves of highways.
(b) the horizontal curves of highways.
(c) the straight path of highways.
(d) the overtaking zones of highways.

Q.64 Match the following list of tests of bituminous materials with its testing apparatus :

Bituminous materials tests	Testing Apparatus
A. Ductility test	P. Ring and Ball test
B. Flash and Fire point test	Q. Penetrometer
C. Softening test	R. Standard briquett mould
D. Penetration test	S. Pensky Martens closed tester

(a) D → R, C → S, A → Q, B → P
(b) D → Q, C → R, A → S, B → P
(c) D → Q, C → P, A → R, B → S
(d) D → Q, C → R, A → P, B → S

Q.65 Select the correct sequence of component parts of road structure from top to bottom.
(a) wearing layer, subgrade, foundation, subsoil
(b) wearing layer, foundation, subsoil, subgrade
(c) wearing layer, foundation, subgrade, subsoil
(d) subsoil, wearing layer, foundation, subgrade

Q.66 Which of the following is a characteristic of rigid pavements?
(a) In design of rigid pavements, the strength of sub grade is most important.
(b) Its failure is usually due to movement of subgrade.
(c) It produces heavy temperature stresses.
(d) It cannot resist tensile stresses.

Q.67 The minimum radii of curve recommended for vehicle moving in a hill road which is not snowbound at a speed of 10 m/s is
(a) 41 m (b) 3.15 m
(c) 46 m (d) 3.5 m

Q.68 The width of entry and the width of non-weaving section for a 4-lane road is 10 m and 7.5 m respectively. The width of weaving section for rotary carriage way should be provided as
(a) 8.75 m (b) 12.25 m
(c) 17.5 m (d) 16 m

Q.69 Choose the correct option in terms of vehicle registration with its colour of letter and the background of number plate.

List-I
(i) In case of transport vehicle
(ii) In case of temporary registrations
(iii) In case of taxies
(iv) In case of registration marks allotted to dealers

List-II
(A) In black on a yellow background
(B) In black on a white background
(C) In white on a red background
(D) In red on a yellow background

(a) (i) → (C), (ii) → (B), (iii) → (A), (iv) → (D)
(b) (i) → (D), (ii) → (C), (iii) → (A), (iv) → (B)

(c) (i) → (B), (ii) → (D), (iii) → (A), (iv) → (C)
(a) (i) → (B), (ii) → (C), (iii) → (A), (iv) → (D)

Q.70 The size of letter for advance direction signs on urban areas may range from
(a) 20-25 cm (b) 25-30 cm
(c) 8-15 cm (d) 8-10 cm

Q.71 Where the needle scaffolding will be most suitable to use?
(a) To do painting and repair work inside the rooms
(b) When ground is strong to support standards
(c) When it is required to keep the ground near to the wall, free for traffic
(d) When construction work in the basement of the building is to be carried out

Q.72 A dog legged stair is to be planned in a stair hall of 2.5 m × 5 m size, having vertical distance between the floors 3.6 m. The height of each flight is half of vertical distance between the floors. Find out number of risers and treads in each flight. Take height of single riser be 15 cm and width of tread 25 cm.
(a) 11,12 (b) 12,11
(c) 12,13 (d) 12,12

Q.73 Which of the following is a correct general arbitrary volumetric proportion for a high strength concrete?
(a) 1 : 1.3 : 2.8 (b) 1 :1.2 : 2.4
(c) 1 :1.2 : 2.6 (d) 1 : 1.1 : 2.6

Q.74 What is the aggregate crushing value for a sample having total dry weight of 2.1 kg and weight of material passing through 2.36 mm I.S. sieve is about 0.84 kg after the crushing of aggregates?
(a) 40% (b) 45%
(c) 38% (d) 42%

Q.75 Arrange the constituents of a good brick earth in descending order of them contained in brick earth.
(a) Silica, Alumina, Lime
(b) Alumina, Lime, Silica
(c) Lime, Silica, Alumina
(d) Silica, Lime, Alumina

Q.76 The few chips or pieces of stones are taken and they are placed in a glass tube to find out the presence of soluble matter in a sample of stone. This is the process of
(a) Water absorption test
(b) Smith's test
(c) Acid test
(d) Attrition test

Q.77 The fire load of Domestic buildings should not exceed by an average of _____ of the net floor area of any compartment, nor an average of _____ on limited isolated areas.
(a) 550000 k cal/m^2, 11000000 k cal/m^2
(b) 275000 k cal/m^2, 550000 k cal/m^2
(3) 1100000 k cal/m^2, 2200000 k cal/m^2
(4) 550000 k cal/m^2, 22000000 k cal/m^2

Q.78 For providing fire resistance to timber by Sir Abel's process, the timber surface should be cleaned and coated with a dilute solution of
(a) boric acid
(b) calcium silicate
(c) sodium dichromate
(d) sodium silicate

Q.79 Which of the following statement is incorrect regarding to pit sand?
(a) When it is rub between fingers, fine pit sand should not leave any stain on the fingers.
(b) It consists of fine rounded grains.
(c) It is excavated from a depth of about 1 to 2 m from ground level.
(d) It is obtained by forming pits into soils.

Q.80 Which type of bricks are commonly used at places where brickwork is to be provided with a coat of plaster?
(a) Second class bricks
(b) First class bricks
(c) Third class bricks
(d) Fourth class bricks

■■■■

Answers **RPSC Assistant Engineer (DLB) Exam : 2023 (Exam held on 21-05-2023)**

1.	(d)	2.	(c)	3.	(a)	4.	(d)	5.	(b)	6.	(c)	7.	(b)	8.	(b)
9.	(*)	10.	(c)	11.	(d)	12.	(a)	13.	(b)	14.	(c)	15.	(a)	16.	(d)
17.	(d)	18.	(b)	19.	(c)	20.	(b)	21.	(c)	22.	(d)	23.	(c)	24.	(a)
25.	(c)	26.	(b)	27.	(b)	28.	(b)	29.	(a)	30.	(a)	31.	(c)	32.	(c)
33.	(c)	34.	(a)	35.	(b)	36.	(a)	37.	(d)	38.	(c)	39.	(a)	40.	(b)
41.	(d)	42.	(b)	43.	(d)	44.	(a)	45.	(d)	46.	(a)	47.	(a)	48.	(b)
49.	(d)	50.	(c)	51.	(a)	52.	(a)	53.	(c)	54.	(b)	55.	(d)	56.	(c)
57.	(a)	58.	(b)	59.	(d)	60.	(b)	61.	(d)	62.	(a)	63.	(b)	64.	(c)
65.	(c)	66.	(c)	67.	(a)	68.	(b)	69.	(c)	70.	(d)	71.	(c)	72.	(b)
73.	(b)	74.	(a)	75.	(a)	76.	(b)	77.	(b)	78.	(d)	79.	(b)	80.	(a)

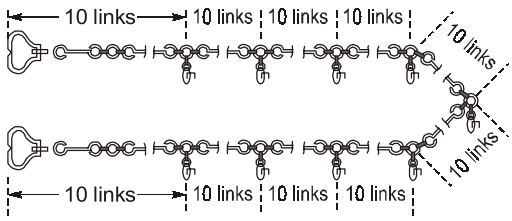
Explanations

1. (d)

- **Reconnaissance Survey:** This initial stage involves a general overview of the project area, studying existing maps, aerial photographs, and local conditions to identify potential routes and constraints.
- **Preliminary Survey:** Based on the reconnaissance survey, a more detailed study is conducted to determine the feasibility of the proposed route, including topographic surveys, soil investigations, and cost estimations.
- **Location Survey:** Finally, the exact alignment of the project is finalized, taking into account all the data gathered during the previous surveys. This stage involves precise measurements and staking out the project area.

2. (c)

- A Gunter's chain is a 66 foot measuring device used for land surveying, divided into 100 links, each 7.92 inches long.
- It's also known as a surveyor's chain and was designed by Edmund Gunter in 1620. Gunter's chain is a convenient tool for land measurement because 10 square chains equal an acre.



(a) 100 link chain

(Guntur's Chain)

Note:

- Revenue's chain: 33 feet (16 links)
- Engineer's chain: 100 feet (100 links)
- Metric chain: 20 m (100 links)
  30 m (150 links)

3. (a)

In triangulation surveying, 'first order' refers to the highest level of accuracy. It uses the longest baseline (8 to 12 km) to establish a network of control points.

4. (d)

Followings are the advantages of Tacheometric surveying :

1. It is one of the fastest methods of surveying.
2. The accuracy of tacheometric survey n uneven or difficult terrain is quite satisfactory.
3. Does not require tedious jobs with tapes and chains.
4. Cost of surveying is less.

5. Useful where chain survey or plane table survey cannot be conducted (hilly areas, hydrographic sites).
6. It can be used to provide a better check for previously done chain surveying results.

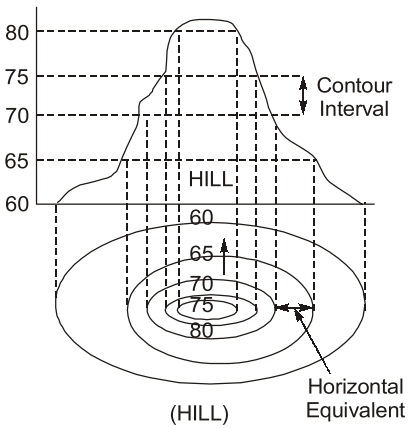
5. (b)

Horizontal Equivalent:

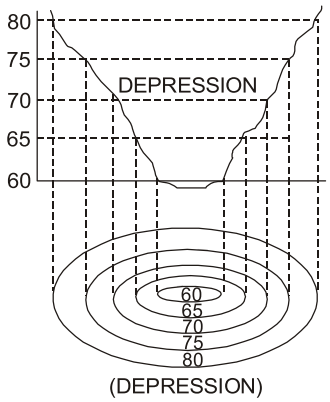
- The horizontal distance between any two adjacent contours is called the horizontal equivalent.
- It can be variable and depends upon the shape of the ground.

Contour Interval:

- The constant vertical distance between two consecutive contours is called the contour interval.
- It is constant between the consecutive contours.



(HILL)



(DEPRESSION)

6. (c)

The formula for calculating area of the map by using a planimeter is given by:

$$A = M(F - I \pm 10N + C)$$

where:

M : Multiplying constant

F : Final reading of planimeter

I : Initial reading

N : Number of times zero of dial pass (index mark per number of revolutions of wheel on one complete tracing)

C : Constant marked above scale division on tracing arm

7. (b)

Procedure for Setting the Curve

Field Procedure

1. Locate P.C. and P.T., i.e., T_1 and T_2.
2. Calculate the chainage of T_1 by subtracting the tangent length from the P.I. and calculate the length of the subchord so that the first peg is at a full station.
3. Calculate the length of the curve and find the length of the last subchord.
4. Calculate all the offsets from O_1 to O_n.
5. Put the zero mark of the chain (or tape) along the tangent T_1I, take a length T_1a' (length of first subchord), and swing the chain such that the arc $a'a = O_1$. The first point a on the curve is thus fixed.
6. Pull the chain along T_1 a produced to the point b', so that $ab' = C_2$ (normal chord). Put the zero end of the chain at a and swing the chain with radius $ab'(C_2)$. Cut off $b'b$ equal to the second offset O_2. The second point b is thus fixed.
7. Pull the chain along ab to the point c', till, as discussed in step 6, the point of tangency T_2 is reached. The last point fixed must coincide with T_2 (fixed earlier). If the error is more (> 2 m), the curve is reset. If the error is less, it should be distributed among all the points by shifting them parallel to the closing error by an amount proportional to the square of the distance from the P.C., T_1.