

**SUKATAN PEPERIKSAAN KURSUS BAGI
JURUTEKNIK, GRED J17**

1. Tarikh Kuatkuasa : 01-01-2012
2. Matlamat sukatan : a) Untuk menilai kesesuaian seseorang pegawai itu untuk menjawat jawatan tersebut
b) Untuk menguji kemahiran seseorang pegawai yang tidak mempunyai kelayakan akademik yang sepatutnya bagi jawatan tersebut
3. Tujuan peperiksaan : Untuk memenuhi sebahagian daripada syarat-syarat untuk diserapkan kejawatan tetap
4. Pegawai yang layak menduduki peperiksaan ini : Juruteknik J17 yang masih dalam jawatan sementara tanpa kelayakan Sijil Kejuruteraan

5. Kandungan Sukatan Peperiksaan

5.1 Kertas I - Matematik

1. Metrication - Metric system and metric equivalent.
2. Fractions & Decimals.
3. Algebra Transposition of formulae, linear, quadratic and cubic equations.
4. Average, Percentages & Ratios.
5. Geometry- Geometry of plane shapes parallel lines, angles, circles and lines.
6. Areas & Perimeters - Triangles, quadrilaterals, curvilinear figures and irregular figures - Simpson's Rule, Trapezoidal Rule and Mid-ordinate Rule.
7. Volumes - Rectangular solids, Trapezoidal solids, right circular cylinder, prism cone and pyramid, and irregular volumes.
8. Trigonometry - Trigonometric functions including Sine Rule, Cosine Rule, Tangent Rule and Pythagoras' Theorem.
9. Scales & Graphs.

Soalan : Jawab Semua Soalan

Masa : 3 Jam

5.2 Kertas II - Jalanraya

1. Road Construction

- Basic Principles and Requirements.
- Road Elements.
- Road Engineering Terms.
- Elementary Study of Soil.
- Alignment and Soil Survey.
- Horizontal and Vertical Alignment.
- Junctions and Crossings.
- Roads Standards.
- Preparation of Scheme :- Preliminary survey, land acquisition, location survey, preparation of working drawings and cost estimates.
- Construction :- Construction survey and setting-out profile, clearing , earthwork operation, setting out road profile, pavement construction, laboratory and field controls.
- Road Bases and Surfacing:-
 - i) Lean concrete base, dense tar macadam, dense bitumen macadam, asphaltic concrete base course, wet mix macadam, dry bound macadam soil cement, cement bound granular materials, asphaltic concrete wearing course, SBST and DBST surface dressing, penetration macadam.
 - ii) Plant used for construction.
 - iii) Standard Tests for subgrade, sub-base, road base and bitumen mixes.

2. Drainage

- - Source of water.
- - hydrologic cycle.
- - Ground water.

- - Surface drainage & types of structures.
- - Subsoil drainage & types of structures.

3. Retaining Walls

- Functions and types, foundation types, common proportions of retaining walls, drainage & backfill, failure & repairs.

4. Culverts

Types & methods of construction of pipe culverts: -

- i) Concrete pipes covering, handling, trenching, foundation bedding, installing pipes, jointing , and backfilling.
- ii) Corrugated steel pipe covering, installation of nestable and multiplate pipes, trenching foundations, placing and backfilling.
- iii) Precast Box culverts, installation, bedding type and backfilling.
- iii) Methods of compaction.
- iv) Culvert elements and culvert faults.
- iiiv) Alignment and choosing locations for culvert.
- iiiiv) Factors controlling flow in culverts, head water level, gradient of flow, tail water levels and energy dissipaters.

5. Bridge

- Bridge definition:
 - i) Substructure.
 - ii) Superstructure.
- Types of Bridges:
 - i) Girder bridges.
 - ii) Arch bridges.
 - iii) Suspensionb ridges
- Timber Bridges
- Steel Bridges
 - i) Non-composite rolled beam or girder.
 - ii) Composite beam or girder.
 - multi-stringer type

- floor beam type
- rigid frame type
- rectangular or trapezoidal type
- truss bridge
- Concrete Bridges: -
 - i) Slab bridges
 - ii) Beam bridges
 - iii) Box girder bridges
- Prestress bridge members:-
 - i) Various types of Prestress beam & girders,

6. Road Maintenance

- Objectives of road maintenance
- Drainage maintenance of :
 - Bituminous and concrete pavement, gravel surface, unpaved surface, various types of drains.
- Culvert maintenance.
- Maintenance of bridges.
- Maintenance of verges.
- Maintenance of roadside furnitures.
- Maintenance work for Pavement.
 - I) Unpaved surface
 - ii) Graveled surface
 - iii) Bituminous pavement.
 - IV) Preventive maintenance.
 - v) Repair of bituminous Pavement.
- Cleaning of road reserve.
- Inspection reports.
- Preparation of works & Maintenance programme.
- Preparation of maintenance returns.
- Costing.

7. Traffic Signs & Controls

8. Traffic Survey

9. Traffic Engineering & Highway Safety

Soalan : Jawab Semua Soalan

Masa : 3 Jam

5.3 Kertas 3 - Binaan Bangunan

1. Concrete

Constituents, reinforcement, reinforced concrete & precast concrete; mixing concrete, proportions, sampling and testing, rectification of defective concrete; transporting & placing, compaction; construction joints, protection of concrete removal of formwork; finishes.

2. Brickwork

Bricks, mortar; bonding; junctions & quoins, piers, jambs, offsets, corbels, Oversailing course, buttress capping, lintels, arches copings, window sills, Thresholds damp proof course; jointing & pointing; tools for construction;

3. Timber

Structure of timber; seasoning, preservation & conversion; defects; Common timbers of Sabah veneers plywoods & boards.

4. Paints

Composition types; distempers varnishes tools for painting; preparation of surfaces & priming; decoration common uses in building works.

5. Iron & Steel

Cast iron" wrought iron & steel; properties & common uses in building works.

6. Miscellaneous Building Materials

Aluminium, copper, zinc, asbestos bitumer, earthenware & glass.

7. Foundations

Principles; investigations & methods of improving bearing of soils; Loading on foundation sand types of foundations; choice of foundations; construction.

8. Walling

Types-brickr, reinforced concrete panel& hollow block; damp roofing.

9. Floors

Types; floor materials& 'finishes; floor boarding.

10. Roofs

Types; construction; rmethods of insulation & waterproofing.

11. Wall Finishes

Plastering; wooden wall coverings, glazed wall tiles.

Soalan : Jawab Semua Soalan

Masa : 3 Jam

5.4 Kertas IV - Survey

1. Chain Surveying

Instruments used; fundamental survey operations; errors.

2. Compass Traversing

Closed & unclosed traverse; chain & compass traverse; plotting, mis-closure and adjustment.

3. Levelling

Levelling instruments & terms; setting up the level, its temporary & Permanent adjustments; levelling procedure; booking & computation; checking field work; errors; longitudinal & cross sections.

4. Theodolites

Types; setting up & use of theodolites; measurement of horizontal & Vertical angles; adjustment of theodolite.

5. Curve Ranging

- Method - one theodolite & steel tape; chain or steel tape only; two theodolites.
6. Setting out
Centre line of road; pegging, reference peg, traveller pegs, drainage works; building works; bridge works.
 7. Use of advance GPS equipments in ground survey and road engineering surveying

Soalan : Jawab Semua Soalan

Masa : 3 Jam

5.5 Kertas V – Lukisian

1. General Requirements
2. Drawing Instruments
Use and care.
3. Lines & Lettering
4. Dimensions & Scales
Suitable types & general rules; accuracy of drawings; fractions versus decimals.
5. Symbols & Abbreviations
6. Geometric Constructions
Lines; circles & arcs; angles; construction.
7. Sketching
Freehand sketches; dimensioned sketches.
8. Projections
Enlargement & reduction of plane figures; plans & elevations (orthogonal projection); axonometric, isometric & oblique projections.
9. Reinforced Concrete Structures Drawings

Soalan : Jawab Semua Soalan

Masa : 4 Jam

5.6 Kertas VI - Penganggaran

1. Main Principles

Origin & work of a Quantity Surveyor; bill of quantities; processes of quantity surveying; standard method of measurement.

2. Taking Off

General principles; traditional dimension paper; applications.

3. Working Up

Working up & billing direct; squaring dimension; abstracting, billing; cut & shuffle; use of computers.

4. Procedures of Taking Off and Measuring Works

Excavation & foundation; walling, brickwork & partitions; floor & roofs; drainage; roads & paths; a complete building; reinforced concrete structures.

Soalan : Jawab Semua Soalan

Masa : 3 Jam

5.7 Kertas VII - Perkhidmatan Bangunan

1. Water Supply Rules

Definitions of common terms; general rules.

2. Water Fittings

Mild steel pipes & fittings; asbestos cement & cast iron; taps & valves.

3. Internal Plumbing System

Water supply system; indirect & direct systems of cold water supply.

4. Meter

Fixing; siting; resiting; sealing; testing; failure of meter; unmetered supply; interference & damage of meter; sub meters.

5. Private Water Supplies

Supplies to multi-storey buildings, factories, housing estates & swimming pools.

6. Building Drainage

General principles; drainage definitions; layout of external drains (vent pipe, soil pipe, sewer ventilation & junction bends); By-law.

7. Sewer Materials & Appurtenances

Salt glazed ware, precast concrete pipes, pitch fibre pipes, cast iron pipes & fittings; sinks, basins, pans, cistern & traps.

8. Sewer Construction

Soil & waste pipes; two pipe system, one pipe system, single stack system; house drainage system.

9. Fundamentals of Sewage Treatment

Medical & social aspects; elements of the system.

Soalan : Jawab Semua Soalan

Masa : 3 Jam

5.8 Kertas VIII - Kertas

1. Human Relations

Leadership; management/staff relationship; leadership style; qualities of good leadership; basics of good management/staff relationship.

2. Chain of Command

Importance; organisation and command charts; application.

3. Duties of Technician

4. Accidents & Returns

5. Organisation & Planning

Workforce organisation & planning; material organisation; schedule of work & job planning.

6. Contracts

Types; administration; site organisation.

Soalan : Jawab Semua Soalan

Masa : 3 Jam

Calon -calon tidak dibenarkan untuk merujuk kepada mana-manabahan rujukan atau nota-nota.

6. Pengecualian : Calon-calon yang telah kukus mana-mana bahagian adalah dikecualikan daripada mengambil semula bahagian tersebut
7. Matlamat sukatan : Lulus/Kandas
Markah lulus 50% dan keatas bagi setiap bahagian
8. Penyelia atau Pemeriksa dilantik oleh : Institiut Latihan Jabatan Kerja Raya
9. Bahasa (soalan dan jawapan) : Bahasa Malaysia
10. Permohonan menduduki peperiksaan : Permohonan boleh dibuat melalui mengisi borang dan dihantar terus ke Institiut Latihan Jabatan Kerja Raya
11. Pusat peperiksaan : Institiut Latihan Jabatan Kerja Raya, Kepyayan
12. Kekerapan peperiksaan : Satu (1) kali setahun
13. Tarikh akhir mengemukakan permohonan : 1 bulan sebelum tarikh peperiksaan

BAHAN-BAHAN RUJUKAN

- (1) PUBLIC WORKS DEPARTMENT
Instructor Manual's For Civil Engineering
Technical Assistant's First Service Examination Course
Volume I & II

- (2) PUBLIC WORKS DEPARTMENT
Instructor Manual's For Civil Engineering
Technical Assistant's Second Service Examination Course
Volume I & II