SCHEME AND SYLLABUS FOR THE POST OF RESEARCH ASSISTANTS IN ENGINEERING LABORATORIES

SCHEME:

PART-A WRITTEN (OBJECTIVE TYPE) EXAMINATION

<table>
<thead>
<tr>
<th>PAPER-1</th>
<th>General Studies</th>
<th>150 Marks</th>
<th>150 Qns</th>
<th>150 Minutes</th>
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<tbody>
<tr>
<td>PAPER-2</td>
<td>Civil Engineering</td>
<td>150 Marks</td>
<td>150 Qns</td>
<td>150 Minutes</td>
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<td>PAPER-3</td>
<td>Civil Engineering</td>
<td>150 Marks</td>
<td>150 Qns</td>
<td>150 Minutes</td>
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PART-B: INTERVIEW

SYLLABUS

PAPER-1 GENERAL STUDIES

1. SCIENCE AND TECHNOLOGY:
   a) General Science and Technology
   b) Role and impact of science and Technology on India's development.
   (Questions will cover general appreciation and understanding of matters of everyday
   observation and experience as may be expected of a well-educated person who has not
   made a special study of science and technology disciplines).

2. INDIAN HISTORY AND CULTURE:
   a) Modern Indian History from 19th century to the present
   b) Nationalist Movement and Constitutional development
   c) Indian culture and Heritage including architecture, Fine Arts, dance forms, music,
   paintings, Folk arts and performing arts.
   d) History of Andhradesa Society, Culture, Geography and Economic development.

3. INDIAN POLITCY:
   General and broad understanding of the structural (institutions) and functional
   (processes) aspects of Indian Political system.

4. INDIAN ECONOMY AND GEOGRAPHY OF INDIA:
   a) Structure of National economy
   b) Economic development (including planning) since independence
   c) Economic Reforms
   d) Physical, economic and social Geography of India.

5. CURRENT EVENTS:
   Current Events of Regional, National and International importance.

6. GENERAL MENTAL ABILITY: (Reasoning and analytical abilities)

PAPER-2 : CIVIL ENGINEERING

PART – A:

STRENGTH OF MATERIALS:-
Simple stresses and Strains: Types of stresses and strains - Hook's Law, Stress-strain
curve for mild steel working stress and factor of safety Posion ratio - State of simple shear,
complementary - Shear Elastic constants and their relations - Compound bars - Thermal stress.

Compound stresses Mohr’s circle of stress - Principal stresses and planes.

Shear force and bending moment diagrams: S.F.D. and B.M.D. for cantilevers,
simply supported beams and over hanging beams subjected to point loads and uniformly
distributed loads. Relations among load, shear force and bending moment.

Bending and shear stress: Basic equation; M/I = F/Y = E/R - Distribution of bending
and shear stresses across various cross sections such as rectangular, circular, I and T sections,
Torsion of Circular shafts - power transmission.

Columns and struts: Euler's theory and Rankine's Theory - Socant and Perry formulae
for eccentrically loaded columns.

Deflections and slopes: Slopes and deflections in cantilevers simply supported beams;
propped beams and fixed beams subjected to point loads and uniformly distributed loads.
PART - B:

FLUID MACHANICS AND HYDRAULIC MACHINERY:

Fluid statics: Hydrostatic force on a plane and curved area Centre of pressure and its applications to lockgates and dams Metacentric height.

Fluid Dynamics: Convective and local acceleration, Euler's equation of motion and its integration, Bernoulli's equation motion and its application, flow in curved path. Free and forced vortex.

Flow measurements: Notches and weirs, venturimeters, pitot tube, nozzle meter, current meter.

Compressible Flow: Velocity of pressure wave, wave velocity for adiabatic and isothermal compression, Basic equations of one-dimensional flow continuity, energy and momentum equations.

Laminar and turbulent flow through pipes: Reynolds experiment significance of Reynold's number, formulae for laminar flow through circular pipes, Turbulent flow-Darcy Weisbsch equation, friction factor and Mody's diagram.

Turbines: Classification, specific speed velocity triangles Principles of design of reaction and impulses Turbines, characteristic curves.

Pumps: Centrifugal pumps, velocity triangles, Work done and efficiency minimum starting speed, loss of head; specific speed and characteristic curves for centrifugal pumps.

PAPER – 3 : CIVIL ENGINEERING

1. BUILDING MATERIALS:
Timber: Different types and species of structural timber, density – moisture relationship, strength in different directions, defects, preservations, plywood.
Bricks: Types, Indian standard classification, absorption, saturation factor, strength in masonry, influence of mortar strength on masonry strength.
Cement: Compounds of different types, setting times, strength.
Cement mortar: Ingredients, proportions, water demand, mortars for plastering and masonry.
Concrete: Importance of w/c ratio, strength, ingredients including admixtures, workability, testing for strength, mix design methods, non-destructive testing.

2. STRUCTURAL ANALYSIS:

3. DESIGN OF STEEL STRUCTURES:

4. DESGIN OF CONCRETE AND MASONRY STRUCTURES:

5. CONSTRUCTION PLANNING AND MANAGEMENT:

6. HYDROLOGY AND WATER RESOURCE ENGINEERING:
7. ENVIRONMENTAL ENGINEERING:

8. SOIL MECHANICS AND FOUNDATION ENGINEERING:

9. SURVEYING AND TRANSPORT ENGINEERING:

Sd/- SECRETARY

//f.b.a//

ASSISTANT SECRETARY (SS)