(1)

M.Tech

1) CIVIL ENGINEERING GS-CY

Syllabus and Model Question paper

Syllabus

1. **Elements of Civil Engineering & Strength of Materials:**
   Force and its types, Concept of equilibrium, Building stones, Bricks, Cement and its properties, Timber and its properties, Columns and Struts, Stress and Mohr's circle, Types of Beams, Bending moments and Shear force, Bending stress and Shear stress, Cylinders, Torsion.
2. **Building Engineering Science:**
   Safe bearing capacity, Foundation, Types of Foundation, Footings and types, Reinforced Cement concrete, Mortars, Woods, Types of roofs, Cement and its types, Bricks Lintels, Chajja and Masonry, Staircase, Trusses.
3. **Surveying:**
   Chain surveying, Errors in surveying, Compass surveying, Omitted measurements, Plain table surveying, Leveling, Trigonometric surveying, Tachometric surveying, Contouring, Curves, Calculation of are and volume.
4. **Fluid Mechanics:**
   Different types of fluids and units, pressure, byoyant force, Different types of flows, Bernoulli's theorem, Discharge Measurements, Orifice, most economical section of the channel, Reynold's and Fraud's number, Similarities, Pressure measuring devices.
5. **Structures**:
   Beams – Singly, doubly, flanged beams Slabs – One-way, two way and flab slabs Strairs Columns and column footings (isolated and combined footings) Raft foundationSteel structures: Analysis and design of tension and compression members, beams and beam- column, column bases, connections – simple and eccentric, beams – column connections, plate girders and trusses, plastic analysis of beams and frames
6. **Geo-technical Engineering:**
   Physical properties of soils, Water in soils, Stress in soils, Consolidation and settlement, Shear strength of soils, Shallow foundations, Site investigation, Stability of slopes, Earth pressure.
7. **Water Supply and Sanitary Engineering:**
   Quantity of Water-water demand, Population forecast, Sources of Water, Quality of water, Types of pipes, Types of pumps, Water treatment units – sedimentation, aeration, flocculation, filtration, Screening, Pipe joints, Conveyance of Water, Quantity of Sewage, Characteristics of Sewage, pH, BOD, COD, DO and others, Sewers, Sewer Appurtenances, Biological treatment, Sewage treatment units-screening, Grit chamber, Skimming tanks, Detritus tank, Trickling filter, Contact beds, Septic tank, Imhoff tank, ASP, Sewage disposal units.
8. **Transportation Engineering:**
   Highway Geometric Design: Highway cross-section elements, Sight distance, Design of Horizontal alignment, Design of Vertical alignment.

Traffic Engineering: Traffic characteristics, Traffic operation, Pavement materials, Design and evaluation, Rail Gage, Train Resistance, Power of Locomotive, Rails, Sleepers, Curvature of Track, Tunneling of soft soil, Transition curve, Harbour and Dock.

9. **Hydrology:**
Hydrologic cycle, rainfall, unit hydrograph, flood estimation, reservoir design, well hydraulics.

10. **Irrigation:**
Duty, Delta, Crop water requirements, design of lined and unlined canals, head work, gravity dams and orgee spillways, Irrigation method.

Model Question Paper

PART – I

Each question carries One Mark50 x 1 50 Marks

1) The Translatory effect of couple is
   a) Product of Force & perpendicular distance b) Zero
   c) Unity d) None of the above

2) Froude number is defined as the ratio of
   a) Inertia force to viscous force b) Inertia force to gravity force
   c) Inertial force to elastic force d) Inertia force to pressure

3) Gravity dams are generally provided with
   a) Free fall spillway b) Ogee spillway
   c) Chute spillway d) Tunnel spillway

4) The permissible stresses for main structural steel members under dynamic loads should be increased by
   a) 20% b) 25%
   c) 33.33% d) 40%

5) Under Natural condition of flow, polluted river would contain
   a) More dissolved oxygen in summer than in winter
   b) less dissolved oxygen in summer than in winter
   c) more or less same dissolved oxygen in summer and winter
   d) less dissolved oxygen during floods

PART – II

Each question carries 2 marks **25 x 2 = 50 Marks**

1) If the poisson's ratio of a material is 0.4, then the ratio of the shear modulus and young's modulus is

a) 5/7 b) 7/5
c) 5/14 d) 5/12

2) A geometrically similar spillway model is constructed to a scale of 1:1 corresponding to a discharge of 1024 cumecs in the prototype. The discharge in the model (in cumecs) is

a) 1 b) 16
c) 22 d) 64

3) The main reinforcement of a RC slab is given as 10 mm dia bars at 100 mm spacing. If it is required to provide 12 mm bars instead of 10 mm bars, the spacing should be

a) 120 mm b) 140 mm c) 144 mm d) 160 mm

4) In a BG Curved track section with radius of curvature R=360 m and maximum permissible speed of train V=60 kmph, then equilibrium cant required will be

a) 10 cm b) 13.6 cm c) 6 cm d) 3.6 cm

5) A water treatment plant trets 5000m^3 of water every day. If it uses 20 kg of Chlorine per day, then chlorine dosage is

a) 0.25 mg/1 b) 4 mg/1 c) 0.4 mg/1 d) 10 mg/1