

Departmental Examination विभागीय परीक्षा
(Against Departmental Selection Quota, 30%) 30 प्रतिशत कोटा
के विरुद्ध सहायक इंजीनियर (ग्रुप-बी) के पद हेतु चयन

For

Group 'B' AEN's posts in

CIVIL ENGINEERING DEPARTMENT (सिविल इंजीनियरिंग विभाग)

Question Paper-I (Civil Engineering General) प्रश्न पत्र-I सिविल इंजीनियरिंग सामान्य

Date दिनांक 24.06.2018

Time: 3 hours समय-तीन घंटा

Max. Marks: 150 अधिकतम अंक-150

Notes:

- i. Candidates should check the page numbers of the answer sheets before writing their roll number, name etc. on the fly leaf.
- ii. Question paper is being given both in English and Hindi languages. In case of any ambiguity in the two versions, English version will be considered as authentic. The candidates have the option to answer the questions in any of the two languages.
- iii. The paper is divided in three sections, viz A, B & C. Instructions for each section are indicated at the beginning of each section.
- iv. Section A contains objective type questions consisting of multiple choice types, fill in the blanks and True/False type questions. Correct choice/answer shall be written carefully in the answer book. Correction of any type for these answers like over writing, cutting and re-writing, erasing, scoring out a ticked answer and ticking another answer, is NOT permissible. In case any correction is made, that answer will not be evaluated.
- v. Candidates should not write their name, Roll No., Initials, designation, signature, address or any other identification mark any where on the answer paper, as this will disqualify them for the selection. They should not draw any symbol, sign or write such things as Shri Ganeshaya namah, Hari Om, Om, Shri Swami Samarth etc., etc, on their answer papers. They should not use coloured pens other than blue or black pens for writing the examination.
- vi. Candidates are allowed to use own calculator but no other device capable of receiving/ transmitting signals like mobile phone etc. will be allowed.

ध्यान:-

1. प्रश्न पत्र पर नाम/पदनाम/क्रमांक लिखने के पूर्व उत्तर पुस्तिका के पृष्ठों की संख्या को सुनिश्चित कर लिया जाये।
2. प्रश्न पत्र हिन्दी (अंग्रेजी एवं हिन्दी) में दिये गये हों दोनों भाषाओं के प्रश्न पत्रों में अगर विरोधाभास मिलता है तो अंग्रेजी भाषा का प्रश्न पत्र सही माना जाये। परीक्षार्थी को हिन्दी अथवा अंग्रेजी किसी एक भाषा में प्रश्नों के उत्तर देने हैं।
3. प्रश्न पत्र का तीन भागों में विभक्त किया गया है, अर्थात्-क, ख तथा ग। प्रत्येक भाग के प्रश्नों में उस भाग से संबंधित निर्देश अंकित किये गये हैं।
4. भाग क में दायुनिष्ठ प्रश्न दिये गये हैं जैसे सही विकल्पों वाले प्रश्न, खाली जगहों को भरने और सत्य/असत्य प्रश्न के प्रश्न। सही चयन/उत्तर का उत्तर पुस्तिका में सावधानी पूर्वक लिखा जाये। दिये गये उत्तर में किसी भी प्रकार का सुधार/परिवर्तन जैसे लिख के तुरंत फिर से लिखना (Over Writing) पहले लगाई गयी टिक को तुरंत पर तुरंत टिक करना, उत्तर काट कर फिर से लिखना आदि करने की अनुमति नहीं है। यदि कोई सुधार/परिवर्तन किया जाता है तो उस उत्तर का मूल्यांकन नहीं किया जायेगा।
5. उत्तर पुस्तिका में अपना नाम अथवा अन्य कोई पहचान लिख नाम/पदनाम/क्रमांक या अन्य कोई पहचान का चिह्न अंकित न करें। अन्यथा ऐसा प्रयास को आप अवश्य सजायित हो जायेंगे। परीक्षार्थियों को किसी प्रकार का पहचान चिह्न या कोई नाम जैसे - श्री गणेशाय नमः, हरिओम, ओम, श्री स्वामी समर्थ आदि, आदि भी नहीं बनाना है। काले अथवा नीले रंग के पेन के अतिरिक्त अन्य किसी रंग के पेन का प्रयोग भी वर्जित है।
6. परीक्षार्थियों को कैलकुलेटर का उपयोग करने की अनुमति है लेकिन सिंगल प्रोसेसर, प्रोग्राम करने में सक्षम साइडर और अन्य ऐसी कोई अन्य डिवाइस की अनुमति नहीं होगी।

PAPER-I

SECTION-A

(Max Marks = 30)

NOTE: All questions are compulsory in this Section.**Question 1 : Fill in the blanks with most suitable answer: (10x1 = 10 Marks)**

- i. Important ruling principle of Surveying is from to part.
- ii. Length of an arc of a circle of radius 100m subtending an angle of one Radian at the centre is Metre.
- iii. Sum of all natural numbers from 1 to 100 is
- iv. All Citrus Fruits are generally good source of Vitamin
- v. Longest platform of the world is at station of Indian Railways.
- vi. In an Isosceles triangle one of the angles is 110 degrees. Measure of any other angle will be Degrees.
- vii. Corresponding to temperature reading of 32 degree on Fahrenheit Thermometer, corresponding reading on Celsius Thermometer would be degree.
- viii. Granites are derived from types of rocks.
- ix. Gravels are soils with particle size more than mm as per IS code.
- x. Concrete needs to be strengthened with reinforcing steel bars since concrete is weak in

Question 2 : Write 'True' or 'False' for each of following statements:(10 x 1 = 10 marks)

- a. A straight line is a curve of Infinite radius.
- b. Lines parallel to horizon at two points of earth situated on the same Meridian 2000 km apart will be parallel to each other.
- c. In a fully saturated soil void ratio is zero.
- d. In Fe500 reinforcing steel, the term 500 means the stress in N/Sq mm corresponding to strain of 0.2% (proof stress)/yield stress.
- e. The bricks conforming to Class 10 have average compressive strength not less than 100 kg/sq cm.
- f. The Indian Standard Code for Plain & Reinforced concrete is IS-456.
- g. In Limit State design partial safety factor for Concrete is taken as 1.15.
- h. In case of pure bending, there is no strain developed in the longitudinal surface passing through the Neutral Axis.
- i. In case of drinking water drawn from a deep tube well, no treatment of water is required.
- j. Bearing capacity of Normally Consolidated clay soils increases with time.

Question 3 : Match the pairs appropriately: (10 x 1 = 10 marks)

- | | |
|----------------------|------------------|
| a. Bearing of a line | 1. Silty Sand |
| b. Latitude | 2. Rotation |
| c. Strain | 3. Reduced level |
| d. Bacteria | 4. Sands |

- | | |
|---------------------|---------------------------------|
| e. Moment | 5. Chlorination |
| f. Stirrups | 6. Aggregates |
| g. Contour | 7. Shear Reinforcement |
| h. Relative Density | 8. Meridian |
| i. SM | 9. Stress |
| j. IS - 383 | 10. Angle from Equatorial plane |

SECTION-B (Max. Marks = 40)

Note: All questions are compulsory. Each question carries 20 marks.

Question 4: Write short notes on any Four of the following: (5 x 4 = 20 marks)

- Void Ratio & Porosity in soils
- pH value of water
- Hooks law
- Modular Ratio in Reinforced Concrete
- Contour lines
- Influence Lines for Bending Moment in Beams

Question 5: Distinguish between the following for any Four (5 x 4 = 20 Marks)

- Temporary & Permanent Hardness of water
- Plane Surveying and Geodetic Surveying
- Silt and Clay
- Liquid Limit and Plastic Limit of soils
- Design by Working Stress Method and by Limit State Method
- Laminar Flow and Turbulent Flow

SECTION -C (Max. Marks = 80)

Note: Answer any Four of the following questions. Each question carries 20 marks.

Question 6 : a. Explain True Bearing & Magnetic Bearing. - 5 marks

b. In a closed traverse ABCD, the bearing of the line AB was measured as $60^{\circ} 00'$ with a prismatic Compass. The Interior Angles at apexes were measured with a theodolite as under:

Angle 'A' = $140^{\circ} 10'$; Angle 'B' = $99^{\circ} 08'$; Angle 'C' = $60^{\circ} 22'$ and Angle 'D' = $69^{\circ} 20'$.

Calculate Bearings of all other lines i.e. Lines AD, DC, CD, CB, BC & BA of the Traverse ABCD. (15 marks)

Question 7: a. Explain:

- i. Maximum Dry Density (MDD) of a soil. (5 marks)
- ii. Degree of Saturation of a soil. (3 marks)

b. In a compaction test on a soil , the mass of wet soil when compacted in a mould was 1.855 kg. The water content of the soil was 16%. If the volume of the mould was 0.945 litres, determine in respect of the soil sample the following:

i. Dry Density (6 Marks)

ii. Void Ratio.(6 Marks)

Take Specific Gravity of Solids as 2.68.

Question 8: A simply supported beam ABC with supports at A & B, 6 metres apart and with an overhang of BC 2 metres long carries a Uniformly distributed load of 15 KN/metre over the entire length. Draw the Shear Force and Bending Moment diagrams for above beam. Also find out the location of section between supports A & B where Bending Moment will be Zero.

Question 9 : The cross section of a simply supported RCC beam is 200mm wide and 300 mm deep to the centre of the reinforcement which consists of 3 bars of 16mm dia. Determine the depth of Neutral Axis and the maximum stress in concrete when the reinforcement steel is stressed to 120 N/ sq mm. Take Modular Ratio $m = 19$.

Question 10: a. List at least three types of methods for treatment for disinfection of potable water. (6 marks)

b. A town having population of 50000 is to be supplied water at rate of 150 litres per capita per day. The disinfection of water is to be carried out with bleaching powder containing 30 percent active chlorine. If dose required for disinfection is 0.3 ppm (0.3mg/litre), calculate the quantity of bleaching powder required per month (1 month = 30 days.)(14 marks)

Question 11: a. Explain any two of the following: - (2.5x2 = 5 marks)

- i. Liquefaction of Soil
- ii. Effective Stress in soil
- iii. Pore water pressure

OR

b. Explain a Unit Hydrograph. - 5 marks

- c. In context of The Official Languages (For Official Purposes of the Union) Rules 1976 & Extant directions for Rajbhasha , please answer the following:
- Broadly mention any four of the Schemes of Govt .of India for promoting use of Hindi. Describe any two the same. (4 + 2× 2 =8 marks)
 - What are the classified Regions under Official Language Rules -1976? In which Region NER Zone falls. (2 marks)
 - Broadly describe the provisions under Section 3/3 of the Official Languages Act-1963. (5 marks)
