



लोक सेवा आयोग

नेपाल इन्जिनियरिङ्ग सेवा, सिभिल समूह, विभिन्न (जनरल, हाइवे, स्यानिटरी, इरिगेशन, हाइड्रोपावर) उपसमूह, राजपत्रांकित तृतीय श्रेणी (प्राविधिक) पदको प्रतियोगितात्मक लिखित परीक्षा

मिति: २०८२/१२/१

समय: ३ घण्टा

पूर्णाङ्क: १००

पत्र: द्वितीय

विषय: Technical Subject

तलका प्रश्नहरूको उत्तर Section अनुसार छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ।

Section – A

30 Marks

1. Define total stress and effective stress at a point below the ground level with an example. Briefly mention about the implication of total stress and effective stress at a point below the ground level with regards to design and construction of retaining wall. 2+3=5
2. While designing a reinforced concrete section for bending, according to the area of reinforcement provided, there are three types of sections. How these sections are classified and explain which one is most preferable and why? 5
3. Define the normal stress, shear stress and principal stresses. Using a neat Mohr circle, show how normal and shear stress are obtained from the principal stresses for a plane stress state. 4+6=10
4. Discuss the reasons behind failure of roads bridges. What are the challenges in road bridge maintenance? Explain in brief the specific design considerations and construction methodologies and process to avoid bridge failures. 3+2+5=10

Section – B

25 Marks

5. In the context of open channel flow, define specific energy. Provide a freehand sketch that shows combined graphical variation of different components of specific energy and also label and explain different parameters and features. 5
6. Discuss the design considerations for a desanding basin in a hydropower project with sketch. Explain the importance of considering suspended sediment characteristics in the design. How are sediments flushed from a desanding basin? 4+3+3=10
7. What do you mean by "River Training Works"? Introduce the different methods of river training. 2+8=10

Section – C

25 Marks

8. Discuss the design considerations associated with horizontal and vertical curves in highways. 5
9. What are the factors affecting stopping sight distance? Derive an expression to calculate stopping sight distance. 5+5=10
10. What are the factors affecting the length of an airport's runway? Explain the need for holding bays and bypasses. 5+5=10

Contd...



Section - D

20 Marks

5+5=10

for the following:

- a) Imaging that a mayor of a sub-metropolitan city in Nepal ask you to provide a lumpsum cost required to construct a new water supply system to serve the city's population. Making reasonable assumptions of the per capita cost and other variables including transmission line, distribution line and treatment units suggest a tentative figure.
- b) If the above system uses river water for the water supply project, suggest a schematic flow diagram illustrating the possible treatment units involved in the water treatment process. Explain the reasoning behind the sequence of these units.
12. What are key components of a sanitary landfill site designed to dispose solid waste with minimal environmental and health risks? Elaborate with a neat sketch.

10

««The End»»

