2017

CIVIL ENGINEERING PAPER - II

Time Allowed : 3 Hours

Full Marks : 200

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

Answers may be given either in English or in Bengali but all answers must be in one and the same language.

Group-A
Answer any four questions

1. (a) State the differences between magnetic bearing and true bearing of a line. Explain the term 'declination'. What are different types of variation in declination ?   4+2+4

   (b) The following bearings were observed while traversing with a compass :-

Line	F.B.	B.B.
AB	45°45′	226°10′
BC	96°55′	277°5′
CD	29°45′	209°10′
DE	324°48′	144°45′

   Determined the corrected bearings   12

   (c) What are meant by contour interval and horizontal equivalent. Describe the characteristies of contours.   4+6

2. (a) Name different types of precipitation and briefly explain them.   2+4

   (b) What is meant by 'Isohyet' ? Describe Thiessen's method to determine average rainfull in a catchment area.   3+8

   (c) Explain the differences between arithmetical increase and geometrical increase methods for forecasting of population of a city. For a city, following data have been collected from census department.

Year	Population
1980	80,000
1990	1,20,000
2000	1,70,000
2010	2,20,000

   Estimate the probable population of the city in the year 2020 by above two methods.   15

3. (a) What is meant by the term 'Contract'? Describe in detail the schedule of rate contract. Name the components of contract document.   2+10+4

P.T.O.

(b) Explain the following terms :

   (i) Dummy activity and purpose of such activity;

  (ii) Advantages of net work diagram ;

 (iii) Total float and free float.

4+4+8

4. (a) What is meant by compaction of concrete ? Describe method of machine compaction using different vibrators and state the choice of the type of vibrator for different cases. 5+12

(b) State the advantages of nondestructive tests on concrete. Name important methods of such test on concrete. Explain the properties of concrete, those could be found from such tests.

3+5+7

5. (a) Explain the merits of cement concrete pavement. Describe the cement concrete slab method of construction of such pavement indicating placement of different types of joints in such pavement.

3+8+5

(b) For stone aggregates to be used in construction of flexible road pavement, name the properties of such aggregates to be evaluated. Explain the method of test for aggregate crushing value. What are the limiting values of aggregate crushing value for surface and 'base coarse'.

5+8+3

6. (a) Explain the following terms :

   (i) Wholesome water

  (ii) Palatable water

 (iii) Potable water

  (iv) Poluted water

   (v) Contaminated water

5

(b) What are the needs of using coagulants in sedimentation process in treatment plants.

5

(c) Explain the possible sequential processes to be adopted in a treatment plant for water from the source to distribution zone.

15

(d) Classify air pollutants on the basis of origin, chemical composition and state of matter.

7

Group-B

answer any two questions

7. (a) From view point of irrigation, what is difference between arid region and semi-arid region ? Explain the term 'base period of a crop'.

2+4

(b) Design a concrete lined channel to carry discharge of 500 cumecs at a slope of 1 in 4000. The side slope of the channel may be taken as 1:1. The Manning's roughness coefficient for the lining is 0.014. Assume permissible velocity in the Section as 2.5 m/sec.

30

8. (a) A square area has side length of approximately 200 m. If the area is to be determined to the nearest $10m^2$, what will be maximum error permitted in the side length and to what accuracy should the side be measured ?   10

   (b) Explain method of time-cost optimization of a project stepwise.   12

   (c) Explain the terms : (i) Updating and frequency of updating, and (ii) Expected time for an activity in PERT analysis.   10+4

9. (a) With the help of neat sketches, explain the following terms :

           (i) Artesian Aquifer,

           (ii) Non-artesian Aquifer,

      and (iii) Perched aquifer.   6

   (b) For estimating the value of discharge from a well in an unconfined aquifers theoretically, state the general assumptions made.   6

   (c) A 50 cm diameter well penetrates 25m below the static water table. After 24 hours pumping at the rate of 5400 litre per minutes the water level in a test well at a distance of 90m from the centre of the well, is lowered by 53 cm and in another well at a distance of 30m away from the centre of the well, by 111 cm. Find the value of transmissibility (T) for the aquifer.   24

10. (a) What are the effects of oil contamination in mixing water, on the strength of concrete ? For curing concrete describe the type of of water to be used.   6+6

    (b) What are the difference between transit theodolite and Non-transit theodolite ? Name the temporary adjustments to be made at every instrument setting at a station.

           An observer standing on the deck of a ship. just sees the top of a lighthouse which is 42 m above the sea level. The hight of observer's eyes is 6m above the sea level. Find the distance of the observer form the light-house.   3+5+10

    (c) State the characteristics of first class bricks.   6