Total No. of Printed Pages:02

SUBJECT CODE NO:- H-314
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Engineering Geology
(OLD)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B
i) Q. No.1 is compulsory and solve any two from reaming questions of section 'A'.
ii) Q. No. 6 is compulsory and . solve any two from reaming questions of section 'B'
iii) Neat and Labelled diagrams must be drawn wherever necessary.

Section A

Q.1   Write a short notes on.(any five)   10

1) Vadose water.
2) Concordant bodies.
3) Chemical weathering.
4) Angular unconformity.
5) Indo-gangetic plain.
6) Plutonic metamorphism.
7) Block mountain.

Q.2   a) Enumerate the important igneous rocks and give their distinguishing characters.   08
        b) Describe Luster , cleavage, fracture , streak in detail.   07

Q.3   a) What is bauxite? Write about the origin of bauxite .   08

        b) What is Fault? Explain oblique fault , enechelon fault, Radial fault, peripheral fault. 07

Q.4   a) Describe in brief processes involved in metamorphism.   08

        b) Explain physiographic divisions of India.   07

Q.5   a) Write an essay on Deccan traps. Discuss their mode of eruption, stratigraphy , and age. 08

        b) What are joints? Explain in brief secondary joints.   07

1

H-314

Section B

Q.6　Write short note on(any five)　　　　　　　　　　　　　　　　　　　10
- i)　　Cone of depression.
- ii)　　Water Loss
- iii)　　Forces acting on dam.
- iv)　　Perched water table.
- v)　　Factors promoting Landslides.
- vi)　　Damson on folded rock.
- vii)　　Previous Literature.

Q.7　a)　Describe the factors that help in selecting the rocks for building purpose.　　08

　　　b)　Give a brief outline of the geological survey of tunnels.　　07

Q.8　a)　Explain in detail vertical distribution of groundwater.　　08

　　　b)　Write a note on advantages of drilling.　　07

Q.9　a)　Explain the importance of the geological investigation of Dams.　　08

　　　b)　Explain various types of earthflows in Landslides.　　07

Q.10　a)　Describe the various factors which affect the stability of bridge.　　08

　　　b)　Discuss the significance of rainwater harvesting in Marathwada region.　　07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-193
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Water Resource Engineering - I
[OLD]

[Time: Three Hours]   [Max. Marks:80]

Please check whether you have got the right question paper.
N.B   i) Question 1 & 6 is compulsory.
                ii) Answer any 2 questions of remaining of each section.
                iii) Assume suitable data if necessary and state it clearly.

SECTION A

Q.1	a)	Enlist various practical applications of hydrology.	02
	b)	What do you understand by the term infiltration? How can we measure it in the field?	04
	c)	Explain the factors affecting the evapotranspiration process.	04

Q.2   a) List different types of self-recording rain gages. Explain the working of any one of them with   07
         the help of neat sketches.
      b) How will you determine the areal mean rainfall over a basin by: 08
         i)   Arthmetic mean method   ii) Thiessen polygon method   iii) Isohyetal method

Q.3   a) Explain advanced techniques equipment's used in gauge discharge measurement.   08
      b) Explain the streamflow measurement by area – velocity method.   07

Q.4   a) What is Unit Hydrograph? Explain clearly the basic postulates of Unit Hydrograph theory.   07
         Describe how can you obtain the Unit Hydrograph from flood hydrograph resulting from a
         storm of certain duration.
      b) In a typical 6-hr storm, 5 cm excess rainfall is occurring.the flow recorded in the catchment as shown   08
         below. Derive a unit hydrograph for 6-hr storm. Assume Base flow is 150 cu.meter/sec.

Time in Hrs.	0	6	12	18	24	30	36	42	48	54	60	66
Observed Hydrograph(m3/s)	100	100	300	700	1000	800	600	400	300	200	100	100

Q.5   Write short note on (any three)   15
      a) Base flow separation
      b) Log Pearson type III distribution
      c) Factors affecting flood
      d) Gumbel's distribution
      e) S-curve hydrograph

1

H-193

SECTION B

Q.6   Attempt any FIVE   10
a) Define ground water hydrology
b) What do you mean by micro irrigation
c) Give various advantages of irrigation
d) State Darcy's law.
e) What is water logging?
f) Give relation between duty and delta
g) What do you understand by crop rotation
h) Define permanent wilting point

Q.7   a) Derive the basic differential equation of steady groundwater flow in a confined aquifer. State   08
Clearly the assumptions involved
b) Explain with neat sketch different watershed structure in drainage line treatment   07

Q.8   a) Explain different methods of improving duty.   07
b) Find the field capacity of a soil for the following data: 08
Root zone depth=2m
Existing water content=5%
Dry density of soil = 15 KN/m^3
Water applied to the soil = 500m^3.
Water loss due to evaporation and deep percolation = 10%
Area of plot = 1000 sq. meters.

Q.9   a) Obtain an expression for a discharge through open well by recuperation test.   07
b) A tube well fully penetrates a confined aquifer of thickness 30m and coefficient of   08
permeability 38m/day. Determine the radius of the well if the yield required is 40lit/sec under
a drawdown of 4.0m, the radius of influence is 250m.

Q.10   Write short note on: (any three)   15
a) Effects of water logging
b) Methods of applying water to crops
c) Consumptive use of water
d) Important crops in India and their seasons

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-383
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Transportation Engg.-I
(Old)

[Time: Three Hours]   [Max. Marks:80]

Please check whether you have got the right question paper.

N.B
1) Question No.01 and 06 are compulsory.
2) Solve any two questions from remaining questions from each section.
3) Figure to right indicates full marks.

Section – A

Q.1   Attempt (any Five)   10

    a) What is mean by linear waterway?

    b) Explain the term wing wall.

    c) What is cause way?

    d) What is mean by free board?

    e) What is diamond crossing?

    f) What is scour depth? How it is measured?

Q.2   a) Indicate the basic principle of design and construction features for a submersible bridge.   08

    b) What is economic span? Derive the relation for the same.   07

Q.3   a) Explain IRC loading on bridges.   07

    b) Discuss the various considerations important for selection of suitable site for a bridge.   08

Q.4   a) What are the characteristics of an ideal airport layout?   07

    b) Explain Geometric design of airfields?   08

Q.5   Write a short note (any three)   15

    a) Runway orientation

    b) Bridge approaches

    c) Coffer dams

    d) Site Selection for airport

    e) River training works

1

Section B

Q.6 Attempt the following (any five)   10

    a) What are the types of crossing?

    b) Enlist different types of sleepers.

    c) What is requirement of railway station?

    d) What is function of ballast?

    e) State fixtures and fastening.

    f) Enlist types of rail joints.

Q.7 a) Classify the signal in accordance to the location and explain any one with neat sketch.   07

    b) Explain in detail Equilibrium super elevation.   08

Q.8 a) What is tilting of rail? Why it is being adopted.   07

    b) Discuss the factors on which sleeper density depends and how the sleeper density is   08
    expressed?

Q.9 a) State the site selection requirements of docks and harbor.   07

    b) What is mean by wear of rails? Mention the precautions to be taken to reduce wear of   08
    rails. How wears of rails are measured?

Q.10 Write a short note on (any three)   15

    a) Marshaling yards

    b) Cant deficiency

    c) Creep of rails

    d) Fish plates and fish bolts

    e) Modern trends in Railway

Total No. of Printed Pages:04

SUBJECT CODE NO:- H-418
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Theory of Structure-II
(Old)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B   1) Question No. 1 & 6 are compulsory.
              2) Attempt any two questions from remaining each Section.
              3) Assume suitable data, if necessary and state it clearly.

Section A

Q.1   Answer the following (Any Two)   10

  a) What are the assumptions made in plastic analysis?
  b) Define shape factor & find shape factor of I section.
  c) Differentiate between static & kinematic indeterminacy.

Q.2   Analyze the continuous beam as shown in fig. 1 by slope deflection method, if support C sinks   15
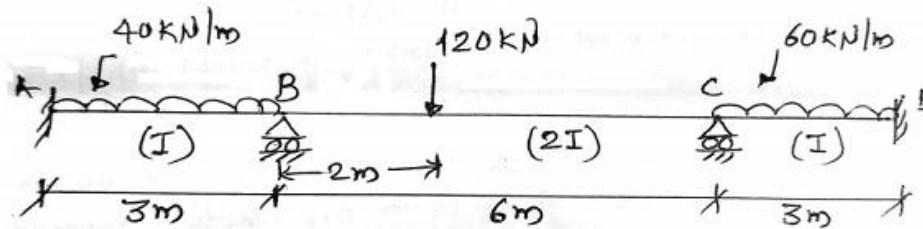   by 10 mm. Take $E = 2 \times 10^5 N/mm^2$ & $I = 4 \times 10^7 mm^4$.

Fig. 1

Q.3   Find the forces in the members of frame shown in fig.2 . All members have same cross-sectional   15
          area & are of the same material.
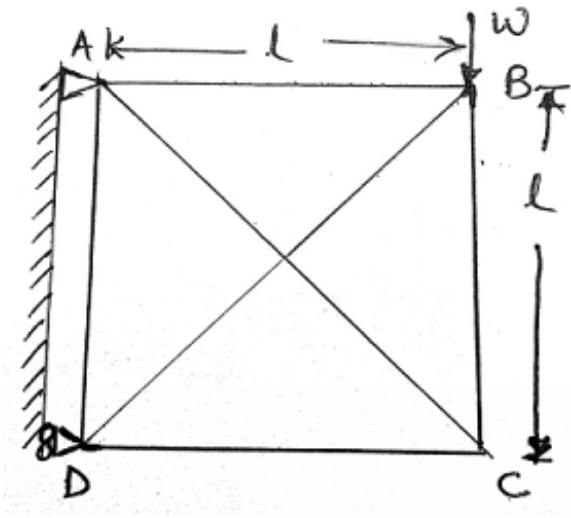
1

Fig.2

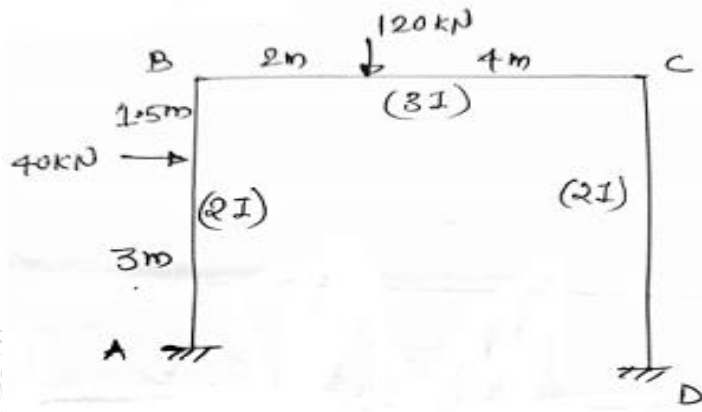Q.4   Analyze the frame shown in fig.3 by column analogy method.   15

Fig. 3

Q.5   Answer the following:-   15

   a) Differentiate between pin jointed & Rigid jointed frames.
   b) Explain static indeterminacy.
   c) Explain effect of lack of fit & temperature changes in pinjointed frames.

Section B

Q.6   a) Write a short note on normal thrust & radial shear of two hinged arch.   04
       b) Answer the following:-   06
          1) Explain distribution factor & Rotation factor
          2) Explain effect of temperature changes in two hinged arch.

Q.7   Analyze the beam shown in fig.4 by using moment distribution method if support B sinks by   15
       2mm & support C sinks by 7 mm. Take $E = 200 \, KN/mm^2$ $I_{ab} = I_{cd} = 2 \times 10^7 mm^4$ &

       $I_{bc} = 4 \times 10^7 mm^4$.
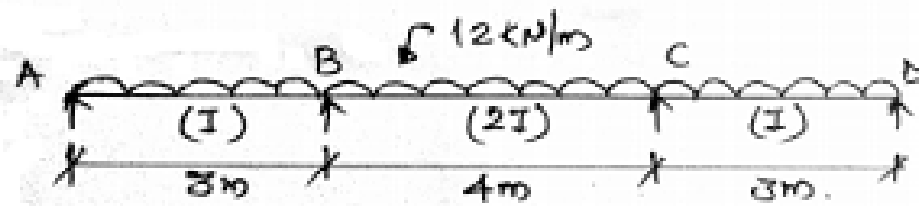

Fig.4

Q.8   Analyze the continuous beam shown in fig.5 by using Kani's method.   15
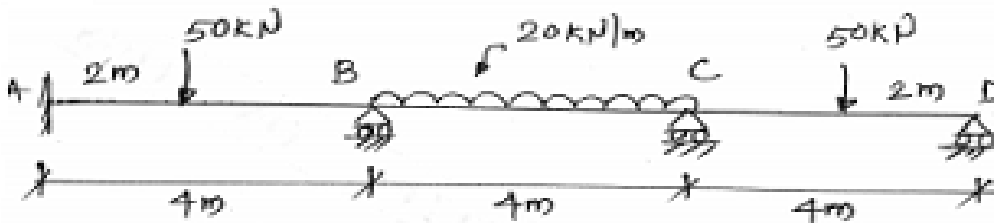

Fig. 5

3

Q.9   Analyze the frame shown in fig. 6 by moment distribution method & Draw BMD.   15
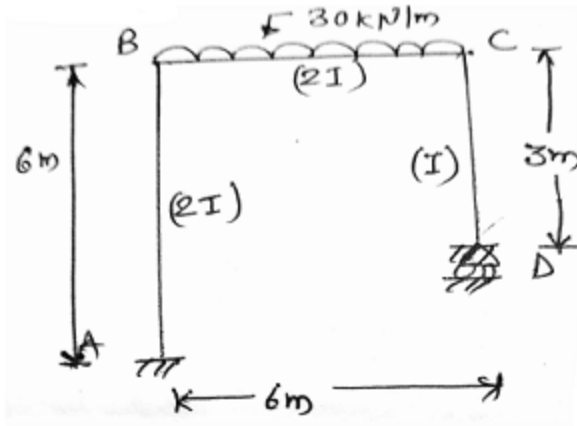

Fig. 6

Q.10   A two hinged parabolic arch of span 30 m & rise 6 m carries two point loads, each 60 KN acting   15
at 7.5 m & 15 m from left end respectively. Determine the horizontal thrust & maximum positive
& negative moments in the arch rib.

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-520
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CIVIL)
Theory Of Structures-II
(Revised)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B.   1) Question no.1 & 6 are compulsory.
                       2) Attempt any two questions from remaining from each section.
                       3) Assume suitable data if necessary and state it clearly.
SECTION – A

Q.1   Answer the following (Any Two)   10
      a) State & explain Castigliano's second theorem and its applications.
      b) Differentiate between statically determinate and indeterminate structures.
      c) What are the assumptions made in plastic theory?

Q.2   Find forces in all the members of frame shown in fig 1. Cross sectional areas are given in brackets.   15
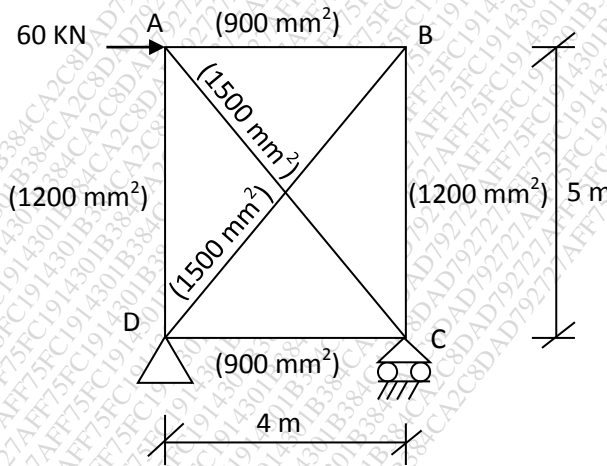

Fig. 1

Q.3   A continuous beam ABCD is loaded as shown in fig. 2 During loading support B sinks by 1 Cm. Find   15
      support moments using slope deflection equation method. Take $I = 800 \ cm^4 \ E = 2 \times 10^5 \ N/mm^2$
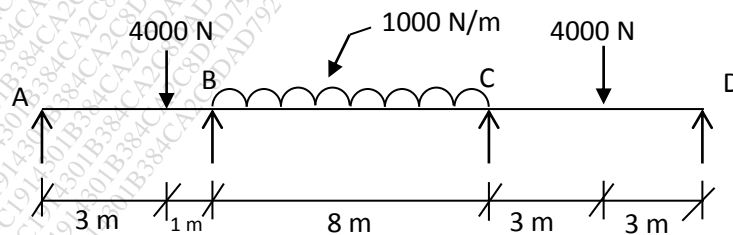   & Draw BMD.

Fig. 2

1

H-520

Q.4   Analyze the portal frame shown in fig. 3 by using column analogy method. and draw BMD.   15
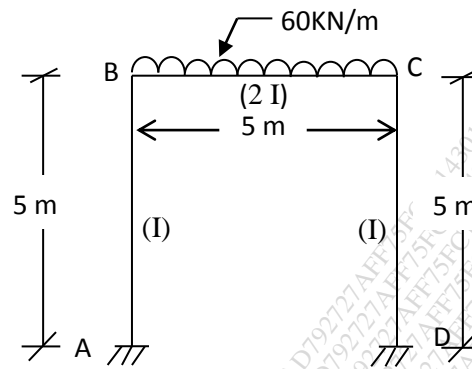

Fig:- 3

Q.5   Answer the following: 15
    a.   Explain the effect of lack of fit & temperature changes in pin jointed frames.
    b.   Define shape factor and collapse load.
    c.   Explain Kinematic indeterminacy.

SECTION – B

Q.6   a) Write a short note on sway analysis of frames using moment distribution method.   04
    b) Explain following (Any Two)   06
      1.   Distribution theorem
      2.   Effect of temperature changes in two hinged arches.
      3.   Explain effect of shortening of rib in two hinged Arch.

Q.7   Analyze the frame by kani's method as shown in fig. 4 & draw BMD.   15
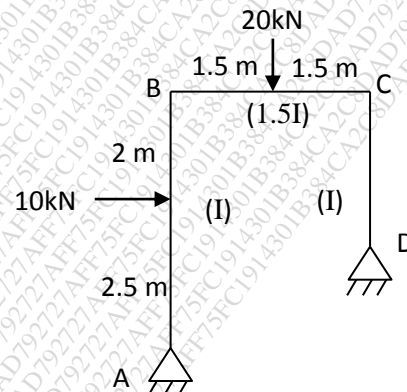
Fig:- 4

Q.8   Determine the support moments for the continuous beam shown in fig 5 by using moment distribution 15
method, if support B sinks by 2.5 mm.
For all members $I = 3.5 \times 10^7 \ mm^4, E = 200 \ kN/mm^2$ and draw BMD.

2

Fig:- 5

Q.9 Analyze the portal frame shown in fig. 6 by using moment distribution method and draw BMD. 15

Fig:- 6

Q.10 A two hinged parabolic arch of span 20 m and rise 4m carries a uniformly distributed load of 15
50 KN/m on left half span of arch. Find the reactions at the support and position and amount of
maximum bending moment.

3

Total No. of Printed Pages: 02

SUBJECT CODE NO:- H-541
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL)
Engineering Geology
(Revised)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.
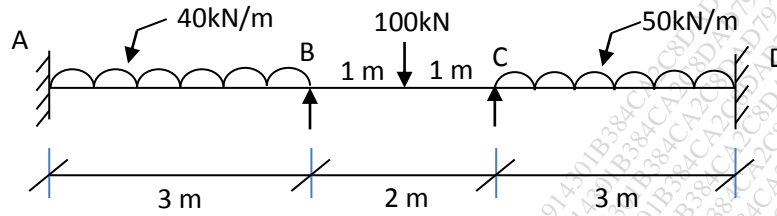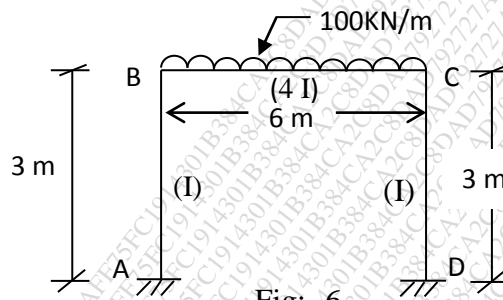
N. B
1. Q. No. 1 is compulsory and solve any two from remaining questions from section A.
2. Q. No. 6 is compulsory and solve any two from remaining questions from section B.
3. Neat and labeled diagrams must be drawn wherever necessary.

Section A

Q. 1   Write short notes on (any five)   10
      i)   Streak
      ii)   Aphanitic Texture
      iii)   Chemical Deposits
      iv)   Relict Mountains
      v)   Focus and Epicenter
      vi)   Peasolitic texture

Q. 2   a) What is fault? Explain various types of faults.   08
      b) Define minerals and explain physical properties of minerals.   07

Q. 3   a) Explain various kinds of metamorphism.   08
      b) Define River and explain various land forms formed by River.   07

Q. 4   a) What is an unconformity? Explain various types of unconformities.   08
      b) What is an earthquake? Distinguish between P-waves, S-waves and surface waves. 07

Q. 5   a) What are mountains? Describe folded and faulted mountains.   08
      b) Describe origin, distribution, classification and economic importance of vindhyan system. 07

Section B

Q. 6   Write short notes on (any five)   10
      i)   Over break
      ii)   Confined Aquifer
      iii)   Porosity
      iv)   Juvenile water
      v)   Silting of Reservoirs
      vi)   Dykes of Deccan trap

Q. 7   a) What is exploratory drilling? Describe the advantages of drilling.   08
      b) What is Rain Water Harvesting? Explain artificial and natural recharge of ground water. 07

1

Q. 8	a)	What is the significance of structural Geology in civil engineering?	08
	b)	Explain various types of Basalts and describe field characteristics of each type.	07

Q. 9   a) What difficulties will have to face if: 08
   a. Dams constructed on soluble rocks
   b. Dams constructed on downstream dipping strata.

        b) What is landslide? Describe various measures to be taken for prevention of landslides.   07

Q. 10   a) Define Ground water and explain in detail, perched. Aquifer and confined Aquifer.   08
        b) Describe in detail about common building stones of India.   07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-548
FACULTY OF SCIENCE AND TECHNOLOGY
T.E (Civil)
Highway Engineering
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. Solve any three from each section.
2. Question no. 05 and 07 are compulsory.
3. Non-Programmable calculator is allowed.
4. Figure to right indicates full marks.

Section A

Q.1   a) Discuss the requirements of an ideal alignment for road and highway.   05
       b) Discuss factors controlling alignment for road and highway.   05
       c) What are the various methods of classifying roads?   05

Q.2   Explain CBR and test procedure for laboratory and field tests. How are the results of the test   15
       obtained and interrupted?

Q.3   Explain Marshall mix design procedure for bituminous mix design in detail.   15

Q.4   Overtaking and overtaken vehicles are at 70 and 40 kmph respectively. The posted speed of this   15
       undivided highway is 70 kmph find
       i)   Overtaking sight distance
       ii)   min. and desirable length of overtaking zone
       iii)   Show the sketch of overtaking zone with location of sign post
       (hint: acceleration $=1$ m/sec^2)

Q.5   The design speed of a highway is 85 kmph. There is a horizontal curve of radius 230 m on a certain   10
       locality. Calculate the super elevation needed to maintain this speed. If the maximum super
       elevation of 0.07 is not to be exceeded, calculate the maximum allowable speed on this horizontal
       curve as it is not possible to increase the radius. Safe limit of transverse coefficient of friction is
       0.15.

Section B

Q.6   Explain flexible and rigid pavements and being out the points of difference.   15

Q.7   Explain spot speed, running speed, space mean speed, time mean speed and average speed of   10
       vehicle.

1

D379A4D16A561B3CB0E26F01D21EF216

Q.8   a) Explain how the maintenance of the following pavement are carried out   07
            i.   Bituminous surface
            ii.   Cement concrete pavement
        b) Discuss the uses and limitations of R.C.C and pre-stressed concrete pavement for highways.   08

Q.9   a) Explain different road user characteristics and vehicular characteristics which affect the road   08
            design.
        b) State the functional classes of traffic signs with example.   07

Q.10   Discuss various factors to be considered for the design of pavements in detail.   15

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-103
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Environmental Engineering -I
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B   1.   Q.No.1 and Q.No.6 are compulsory
                          2.   Solve any two questions from remaining in each section
                          3.   Assume suitable data if necessary
                                        Section -A

Q.1   Attempt the following   10
        a)   Write down the principle, working and construction of settling chamber? Give their
             application?

        b)   Write down working principle of Pipe type Electrostatic Precipitator with neat sketch?

Q.2   a)   What are the sources of Air pollution? Describe in detail?   05

        b)   Enlist primary and secondary air pollutant and write its impact on environment?   05

        c)   What is Atmospheric stability and explain influencing factor on atmospheric stability? 05

Q.3   a)   What are the types of inversion and explain it detail.   07

        b)   Determine the effective height of stack, with the following given data   08
             1)   Physical stack is 210 m tall with 0.85m inside diameter
             2)   Wind velocity is 2.80m/sec
             3)   Air temperature is $20^{o}C$
             4)   Barometric Pressure is 1000 millibars
             5)   Stack gas velocity is 12.12m/sec
             6)   Stack gas temperature is $180^{o}C$

Q.4   a)   Enlist types of particulate matter and explain any one of them with its impact on human. 07
        b)   Describe in detail various layer of atmosphere and their importance   08

Q.5   Write short note on   15
        1)   Gaussian dispersion model
        2)   Photochemical smog
        3)   Green house effect
        4)   Control of air pollution
        5)   Function of CPCB and MPCB

1

Section – B

| Q.6 | a) | What Is "Solute Stabilization"? | 05 |
| | b) | What are the various types of filter material in WTP? Explain in detail sand filter in SSGF. | 05 |

Q.7 a) Explain in detail different component of RSF with neat and clean diagram. 07

b) The maximum daily demand at a water purification plant has been estimated as 8 million 08 liters per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangement) for the raw supplies, assuming a detention period of 8 hours and the velocity of flow as 25 cm per minute.

Q.8 a) Define Disinfection write different physical and chemical disinfecting agents? 05

b) Enlist types of chlorination and explain any one of them. 05

c) What is a river intake? What are the factors which govern the location of intake structure? 05

Q.9 a) The population of 5 decades from 1970 to 2010 are given below in table, find out the 05 population after one, two and three decades beyond the last known decade, by using arithmetic increase method and Geometric increase method .

Year	1970	1980	1990	2000	2010
Population	35000	38000	44000	52000	57000

b) Discuss Physical, Chemical and biological properties of water with IS-10500-2012. 05

c) What do you understand by Unit Operation and Unit Process used in Purification system? 05

Q.10 Write short notes on following (any three) 15
   a) Methods of aeration
   b) Stoke' slaw
   c) Design period
   d) Population forecasting methods.

Total No. of Printed Pages:2

<div align="center">

SUBJECT CODE NO:- H-157
FACULTY OF SCIENCE AND TECHNOLOGY
T.E (Civil)
Geotechnical Engineering
(OLD)

</div>

[Time: Three Hours]   **[Max.Marks:80]**

<div align="center">Please check whether you have got the right question paper.</div>

N.B
1. Q.No.1 from section A and Q.No.6 from section B are compulsory. Attempt any two questions of each section from the remaining.
2. Figures to the right indicate full marks.
3. Assume any additional data, if necessary and state it clearly

<div align="center">Section A</div>

Q.1   Answer the following.
  - a) What is geologic cycle? Explain the phenomena of formation and transportation of soils.   07
  - b) Explain sieve analysis with graph.   07

Q.2   Answer the following.
  - a) Write a brief note on the textural classification?   05
  - b) The porosity of a soil sample is 35% and the specific gravity of its particles is 2.7. Calculate its void ratio, dry density, saturated density and submerged density?   08

Q.3   Answer the following.
  - a) Laplace equation for two-dimensional flows through porous soil media.   07
  - b) Define the terms 'capillary water', 'discharge velocity' and 'critical hydraulic gradient'.   06

Q.4   Answer the following.
  - a) Describe the laboratory consolidation test with neat sketch.   07
  - b) Write a note on square root of time fitting method.   06

Q.5   Answer the following.
  - a) Define the term 'permeability'? How would you determine coefficient of permeability in the field?   07
  - b) Discuss the effect of compaction on soil properties.   06

<div align="center">Section B</div>

Q.6   Answer the following.
  - a) A raft of size 4 m × 4 m carries a uniform load of 200 kN/m². Using the point load approximation with four equivalent point loads, calculate the stress increment at a point in the soil which is 4 m below the centre of the loaded area.   08

  - b) Explain the concept of 'Pressure Bulb' in soils.   06

<div align="center">1</div>

Q.7   Answer the following.
       a) What are the advantages and disadvantages of a triaxial compression test? Briefly explain   07
          how you conduct the test and compute the shear parameters for the soil from the test data.

       b) Explain the shear characteristics of sand.   06

Q.8   Answer the following.
       a) Describe the friction circle method of analyzing the stability of slopes.   07

       b) Explain   06
          i)   Active
          ii)   Passive and
          iii) At rest conditions in earth pressure against retaining wall.

Q.9   Answer the following.
       a) Describe Culmann's graphical method of finding earth pressure. What are the advantages   07
          and disadvantages of Culmann's graphical method?

       b) Differentiate between finite slope and infinite slope.   06

Q.10   Answer the following.
       a) Derive as per Boussinesq's theory, expressions for vertical stress at any point in a soil mass   07
          due to line load on the surface. State the assumptions.

       b) Write brief critical notes on unconfined compression test.   06

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-129
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Chemical)
Chemical Reaction Engineering -II
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. Questions No.1 and 6 are compulsory
2. Answer any two question from remaining sections
3. Assume relevant data where necessary.

Section -A

Q.1   a) Discuss the necessity of RTD studies.   05

       b) Explain Earliness and Lateness of mixing.   05

Q.2   a) From time Vs. tracer concentration data in the reactor effluent stream, calculate fractional 10
          conversion for a first order chemical reaction whose rate constant is 5×10^{-2} sec^{-1}--- Also
          compare it with conversion in ideal plug flow reactor of the same size.

Time (sec)	0	20	40	60	80	100	120
Conc (gm/lit)	0	0.3	0.7	0.6	0.1	0.04	0

       b) Product distribution in multiple reactions.   05

Q.3   For diffusion through ash layer is rate controlling step derive expression for relation, for time   15
       required and conversion, assuming un-reacted core model for spherical particles of unchanging
       size. Also find time required for complete conversion.

Q.4   a) Determination of rate controlling step in fluid particle reaction.   08

       b) Draw neat sketches for contacting pattern for fluid particle reaction.   07

Q.5   Write a note   15
       i)   Tank series model
       ii)   Optimum temperature progression
       iii) Early and lateness of mixing

1

Section – B

Q.6 Explain 10
    i)   Global rate of reaction
    ii)   Catalyst poisoning

Q.7   a) Compare physical adsorption and Chemisorptions. 05

        b) Derive performance equation for plug plow reactor containing porous catalyst. 10

Q.8 The concentration of undesirable impurity in air (at 1 bar = 105 Pa) is to be reduced from 0.1% 15
    (or 100 Pa) to 0.02% (or 20Pa) by absorption in pure water, find the height of tower required
    for countercurrent operations. Data for consistency let us SI units throughout. For the
    packing, $K_{Ag.a}= 0.32$ mol/(hr.m^3.Pa), $K_{Ai.a}=0.1$/hr. solubility is given by Henry's law
    constant, $H_A=p_{Ai}/C_{Ai}==12.5$ Pa.m^3/mol. Flow rate per unit meter squared cross section of
    tower, $Fg/Acs=1$x10^5 mol/hr.m^2 and $F_l/Acs=7$ x10^5 mol/hr.m^2. Molar density of liquid
    remains constant throughout the column, $C_T=56000$mol/m^3.

Q.9   a) Explain in detail Thiele Modulus and effectiveness factor for porous catalyst. 05

        b) Describe working and construction of Trickle Bed reactor. 10

Q.10 Write a note 15
    i)   Contacting pattern for fluid –fluid reaction
    ii)   BET method
    iii)   Slurry reactor

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-293
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Design of Structure - I (Steel)
(Old)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
i. Question No. 1 from section A and Q. No. 6 from section B are compulsory. Attempt any two questions of each Section from the remaining.
ii. Assume suitable data it required & mention it clearly.
iii. Use of nonprogrammable calculators, IS 800-2007 is permitted

Section A

Q.1 Attempt any five. 10
 a) What is mean by builtup members?
 b) What is mean by plastic and compact section?
 c) What are advantages of welded connection?
 d) What is single lacing and double lacing?
 e) What design strength of tension member?
 f) What is lug angle?

Q.2 Design a joint B of a roof truss as shown in figure. The member are connected with 20 mm 15
 diameter bolts of grade 4.6 to the gusset plate 12 mm thick.
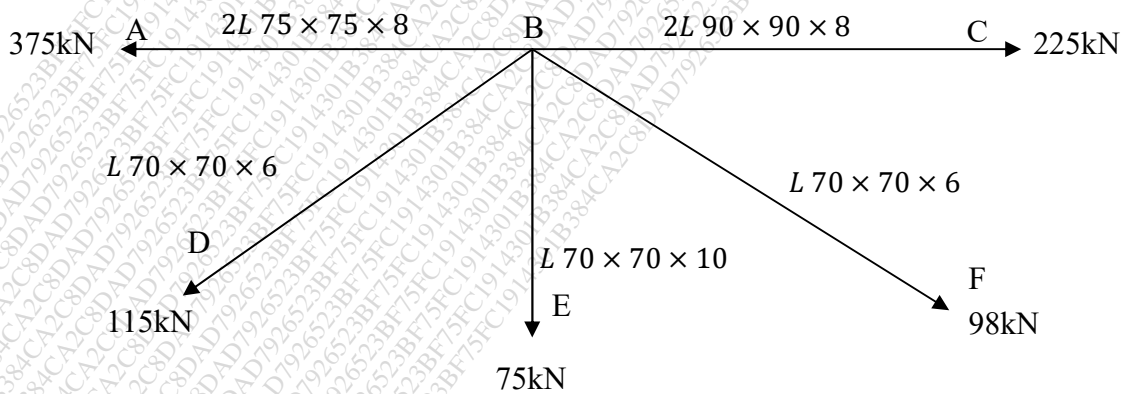
Q.3 An unequal angle of a truss is connected to the gusset plate, it carries ultimate tensile of 250 15
 KN. Design the section using bolt connection, Dia of bolt is 16 mm and $f_y=250$ N/ mm^2 and fe
 410 for plate.

1

H-293

Q.4   Design laced column 7.5 m long to carry a factor load of 1500 KN. The column is effectively   15
held in position at both ends and restrained against rotation at one end. Providing double lacing
system and used two channels back to back.
Used Fy250 N/mm².

Q.5   Write short notes on (Any three)   15
    a) Explain shear strength for bolted and welded connections.
    b) Explain types of welds with neat sketches and advantages of weld.
    c) Write steps for designof axially loaded compression member.
    d) Explain slab base.

Section B

Q.6   Attempt any five.   10
    a) What is plate girder?
    b) What is means by web crippling?
    c) What are different types of beam to column connection?
    d) Enlist different parts of a roof truss.
    e) Where plate girder is used?
    f) Explain post critical method to calculate the nominal shear strength of girder.

Q.7   A simply supported beam of 4.5 m effective span it carries a total udlof 35 kN/m (Inclusiveof   15
self-weight)in addition the beam carries a central point load of 30 kN (Inclusive of self-
weight). The beam is laterally supported throughout. Using steel grade of Fe 410.

Q.8   Design a simply supported gantry girder carrying manually operating travelling crane for the   15
following data:
    i.   Crane capacity =200kN
    ii.   Self-wt. of the crane girder excluding trolley =250kN
    iii.   Self-wt. of trolley = 50kN
    iv.   Minimum hook approach = 1.2m
    v.   Wheel base (distance between wheels) =3.5m
    vi.   Centre to Centre distance between gantry girder rails (span of crane girder) = 16m
    vii.   Centre to Centre distance between columns = 6.5m
    viii.   Diameter of crane wheels= 150mm
    ix.   Self-wt. of rails =0.3kN/m

Q.9   Design the plate girder for an effective span of 35 m and carrying audl of 30 KN/m and two   15
concentrated load of 130 KN each acting at 10 m from both ends. The girder is simply
supported at ends against lateral buckling throughout span.
Take Fy=250 N/mm²

2

Q.10 Write short notes on.
    a) Explain the concept of gantry girder   05
    b) Explain different types of stiffeners   05
    c) Explain different types of trusses and different types of load acting on trusses   05

F75FC1914301B384CA2C8DAD7926523B

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-265
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Transportation Engg.- II
(Old)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B   i) Q. No.1 and Q. No.6 are compulsory and attempt any two questions from remaining questions of Section –A and B each.
ii) Figures to the right indicates full marks.
iii) Assume suitable data where required and mention it clearly in the answer sheet.

SECTION – A

Q.1   Explain the necessity and objects of highway planning.   10

Q.2   a) Explain total reaction time of driver and factors on which it depends.   08
b) Discuss briefly the desirable properties of subgrade soil.   07

Q.3   a) Explain the bituminous mix design procedure as per IRC?   08
b) Discuss the first twenty – year road development plan and its salient features.   07

Q.4   a) Design the rate of super elevation for a horizontal highway curve of radius 450 m and speed   12
90 kmph.
b) What is star and grid pattern.   03

Q.5   Write short note on any three.   15
a) Vision 2021
b) Extra widening
c) CBR test.
d) PIEV theory

SECTION – B

Q.6   What are the factors considered for design of flexible pavement? Discuss significance of Each.   10

Q.7   a) Lit out the design elements of highway embankment and mention the function of each.   08
b) Briefly outline the advantages and disadvantages of flexible pavement.   07

Q.8   a) What are objects and scope of traffic engineering? Explain briefly.   08
b) Explain briefly the maintenance requirements of road drainage system.   07

Q.9   a) What are the objects of providing contraction joints in rigid pavements?   08
b) Explain how the speed and delay studies are carried out and what are their uses.   07

1

H-265

Q.10 Write short note on any three. 15
   a) Spot speed studies
   b) Traffic islands
   c) PQC pavement slab
   d) Deterioration of pavements.

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-488
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(Civil)
Advanced Surveying
(Old)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.5 are compulsory
2. Answer any two questions from section A and section B.
3. Assume suitable data if necessary.

Section A

Q.1	Attempt any three:	06

1) What is hydrographic surveying
2) Define camera axis
3) Define Aerial photography
4) Define principal plane.
5) Define sounding.

Q.2 Explain the methods of locating soundings. 07

Q.3 Derive an expression for scale of a vertical photograph. 07

Q.4 A camera having focal length of 15 cm is used to take a vertical photograph to a terrain having an average elevation of 1300m. what is the height above sea level at which an aircraft must fly in order to get a scale of 1:5000 07

Section B

Q.5 Attempt any three: 06
1) Classify remote sensing
2) Name the types of observation platforms
3) What do you understand by geographical information system?
4) Write down five main components of GIS.
5) Write the main components of GIS.

Q.6 Write a detailed note on applications of remote sensing. 07

Q.7 Explain the component of GIS. 07

Q.8 Write a brief note on electromagnetic spectrum. 07

1

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-527
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL)
Design Of Structure-I (Steel)
(Revised)

[Time: Three Hours]   [Max.Marks:80]

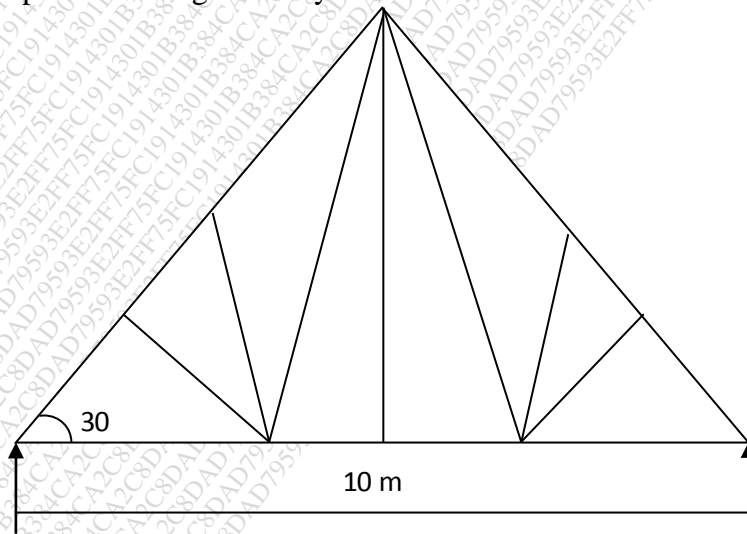Please check whether you have got the right question paper.

N.B
1. Q.No.1 from section A and Q.No.6 from section B are compulsory. Attempt any two questions of each section from the remaining.
2. Assume suitable data it required & mention it clearly.
3. Use of nonprogrammable calculators, IS 800-2007 is permitted.

Section A

Q.1   Attempt any five: 10
a) What are the disadvantages of steel structure
b) What is mean by plastic and compact section
c) What are the different load acting the steel structure
d) What is lap joint and Butt joint
e) What is throat thickness
f) What is design strength due to block shear
g) What is tack bolting

Q.2   a) Determine bolt values of 20 mm diameter bolt connecting 10 mm plate in single shear and   10
double shear, bolts used are 4.6 grade plate of 410.

b) What are the advantages of welded connection?   05

Q.3   An equal angle of a truss is connected to the gusset plate, it carries ultimate tensile of 100 KN.   15
Design the section using bolt connection, Dia of bolt is 20 mm and $f_y = 250$ N/mm^2 and fe 410 for plate.

Q.4   Design a laced column 8 m long to carry a factored load of 2000 kN. The column effectively held   15
in position at both end and restrained against rotation at one end. Design the column by using two channels back to back and single lacing with bolted connection. Use $F_y = 250$ MPa.

Q.5   A column ISHB 350@ 661.2N/m carries an axial compression factored load of 1700 kN. Design a   15
suitable bolted gusset base. The base rest on M15 grade concrete pedestal. Use 24mm diameter bolts of grade 4.6 for making the connection.

Section B

Q.6 Attempt any five: 10
- a) What are the assumption in lateral tensional buckling of I-section.
- b) What is joist
- c) What is web buckling
- d) What is spacing of roof truss
- e) Enlist the design steps for purlin
- f) What is pitch and principle rafter
- g) What is philosophy of limit state design for strength

Q.7 Design of laterally unrestrained beam simply supported over a span of 2m over a udl of 56KN/m   15
inclusive of self-weight.

Q.8 Design the plate girder for an effective span of 35m and carrying a udl of 30KN/m and two   15
concentrated load of 130 KN each acting at 10 m from both ends. The girder is simply supported
at ends against lateral buckling throughout span.
Take Fy= 250 N/mm^2.

Q.9 Design the roof truss for following data   15
- a) Span of truss = 10 m
- b) Eaves Height = 5.8 m
- c) Inclination of the roof with horizontal = 30^0
- d) Centre to centre spacing = 2.5 m
- e) Roofing shall be of GI Sheet.

- f) Wind pressure acting normally on the wind ward side = 1200 N/m^2.

30

10 m

Q.10 Write short notes on
- a) Explain combine bending and shear in beam   05
- b) Explain slab base and gusseted base   05
- c) Write short note on beam connection.   05

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-534
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Building Planning and Design
(Revised)

[Time: Three Hours]   [Max. Marks:80]

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Attempt any Two questions remaining from section-A.
3. Attempt any One questions remaining from section-B.
4. Assume suitable data if necessary.
5. Use drawing sheet for Q.No.6 of Section-B.
6. Figures to the right indicate full marks.

Section: A

Q.1   Attempt any five questions from the following   10

     i.   What is the Building Line?

     ii.   What is the Septic tank & Soak pit?

     iii.   Differentiate Hotel & Motels.

     iv.   What are the thumb rules for selection of rise and tread?

     v.   What is the Control Line?

     vi.   What is mean by Soil Pipe and Waste Pipe?

     vii.   What is the selection criterion for Flooring?

Q.2   a) Differentiate between the following: 08

     i.   Wind & breeze

     ii.   Lighting and Ventilation

    b) What are the various Climatic zones of India? Explain in detail.   07

Q.3   a) What is mean by Low cost Housing? Discuss with different Materials & Methods.   08

    b) Define insulation. Discuss different Methods of heat insulation in building.   07

Q.4   a) Design a septic tank for the hostels of the Engineering college: 08

     i.   Number of Hostels=3

     ii.   Students / Hostel=200

     iii.   Water supply = 120 lpcd

     iv.   Assume Detention period 24 hours and

     v.   Sludge volume=301/cap/year

1

H-534

	b)	Explain the system of plumbing and sanitary units used in building services.	07
Q.5	a)	What are the different types testing of drains and pipes? Explain any Two each of them.	08
	b)	Write down the Concept of earthing. Explain in detail Electrification and its type.	07

Section: B

Q.6 Plan and design a residential bungalow for a family in new Aurangabad using the following data. (Draw with suitable Scale)

a) Plot Size 15 m X 20m.

b) Requirement Ent.varandha, Living room, Kitchen cum dinning, Store room, Bed room, Master Bed Room, Separate W.C. Bath and Stair Case.

c) Front, Back & Side margin as per NBC-2005.

i.	Working Drawing plan	08
ii.	Elevation	03
iii.	Locate Position of Column in plan	03
iv.	Section through Stair.	06
v.	Area Statement (Block plan calculation)	05

Q.7	a)	List out the requirement with minimum standards specified by building Bye-law of Hotel building and Draw Line plan Layout.	08
	b)	Explain the building Bye-Laws with reference to the minimum plot sizes and building frontage.	07
Q.8	a)	Write down Necessity of perspective drawing. Explain One point and Two point Perspective with neat sketch.	08
	b)	Explain with neat sketch hard landscape and soft landscape.	07

2

Examination March/April 2019

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-348
FACULTY OF SCIENCE AND TECHNOLOGY
TE (Civil)
Building Planning & Design
(OLD)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B
    1) Question no 1 and 6 are compulsory.
    2) Solve any two questions from no 2 to 5 and any one from question no. 7 and 8.
    3) Figure to indicate the maximum marks.

Section A

Q.1   Answer the following (any five)   10

    a) Define F.A.R.
    b) What is building line?
    c) Define Unity?
    d) Define Balance and Rhythm.
    e) Explain the term Humidity.
    f) Explain the term precipitation.
    g) What are the guidelines for orientation of different units of a residential?

Q.2   a) Define climate. What factors of nature do influence climate?   08
    b) Explain the C.B.R.I. Suggestion for obtaining optimum orientation.   07

Q.3   a) Explain the building bye-laws with reference to   08
    1) Open space requirement   2) Height limitations   3) Plinth are regulations.
    b) Explain the importance of lighting and ventilation as per building bye-laws.   07

Q.4   a) Explain the factors affecting the selection of site.   08
    b) Explain in detail testing of drains and maintenance of drains.   07

Q.5   a) Explain the term Contrast, Proportion and Scale?   08
    b) Explain the importance of principle of planning in planning of Residential Bungalow   07
    Plan.

Section B

Q.6   Plan and design a residential building for a family in a town using the following data.   25

    1) Plot size $13m \times 18m$ 2) Scale 1:50   3) Plinth Height – 0.9m

    4) Required Components – Entrance Veranda, Living Room, Bed Room, Master Bed Room, Separate W.C. And Bath , Kitchen, and Staircase.

Draw the following components

1) Working Plan 05
2) Location and position of Column in Plan 03
3) Elevation 04
4) Section through staircase and W.C. + Bath 07
5) Schedule of opening 02
6) Area statement and Block plan calculation 04

Q.7 By assuming suitable data and norms list out the requirements and draw a line plan of Indian Post office Building. 15

Q.8   a) How are the perspective projections classified? Mention the practical application of each type of perspective projection. 08

   b) What is meant by Landscaping? Explain the necessity of it and Enlist the type of Landscaping. 07

Total No. of Printed Pages:02
SUBJECT CODE NO:- H-563
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(Civil)
Design of Structure-II
(Revised)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.
N.B   1) Q. No. 1 and Q. No. 6 are compulsory. Answer any two from each Section.
2) Use I.S. 456-2000 is permitted.
3) Assume suitable data, if required.

Section A

Q.1   a) Explain the factor of safety with respect to limit state design.   04
b) Write minimum percentage of reinforcement requirements in beams and slabs for   03
crack control.
c) Why is it undesirable to design over reinforced sections?   03

Q.2   Calculate the area of reinforcement required for an L-beam of flange width 1100mm, flange   15
thickness 120 mm, web width 250mm, total depth 760mm and effective cover 60mm to resist
an ultimate moments of
i)   820 KN-m
ii)   890 KN-m

Q.3   a) Explain the necessity of torsion reinforcement in a slab.   03
b) Design the doubly reinforced rectangular beam having width is 300mm and overall   12
depth is 480mm an ultimate bending moment of 160KN-m is applied on the beam. Use
M20 & Fe415 grades of concrete & steel respectively.

Q.4   A simply supported R.C. beam, 400 mm×760 mm carrying a u.d.l. of 100 KN/m (inclusive of   15
self weight) over a span of 5.6m the beam is reinforced with 6 bars of 20mm & on tension
side. Use M20 and Fe415 grades.
Design the shear reinforcement.
i)   Using vertical stirrups only and no bent up bar.
ii)   Using one bent up bar.

Q.5   a) What is cracking? How are the cracks classified? Explain the bar detailing rules with   05
reference to cracking.
b) What is minimum eccentricity is considered in column design? Explain with reference   05
to IS code.
c) What are the advantages and disadvantages of providing large clear cover to   05
reinforcement in flexural members?

1

Section B

Q.6   a) Differentiate between one-way slab and two-way slab.   04
      b) Differentiate between long column and short column.   03
      c) Explain development length & necessity of the check.   03

Q.7   a) What are the different cases encountered in the analysis of a flanged section?   03
      b) Design the reinforcement in column of 450mm×600mm subjected to an axial load of   12
        1800KN under service load. The column has an unsupported length of 3.0m and is
        braced against side way in both direction. Use M20 and Fe415 grades of concrete &
        steel respectively.

Q.8   Design a R.C.C. slab for a room 6m×5m. The slab is to be cast monolithically, over the beams 15
      with corners held down. The width of the supporting beam is 230mm. The slab carries a live
      load of 2.5 KN/m^2 & floor finish is 1 KN/m$^{2.}$ Use M20 & Fe415 grades.

Q.9   Design dog legged stair having 3.5m by 5.5m. The vertical distance between the floors is   15
      3.75m. Take live load is 3 KN/m^2 & floor finish is 0.8 KN/m$^{2.}$ Use M20 & Fe415 grades.

Q.10   Design isolated footing for a column 300mm×300mm carrying a total ultimate load of 1600   15
      KN. S.B.C. of soil is 120 KN/m$^{2.}$ Use M20 and Fe415 grade of concrete and steel
      respectively.

Total No. of Printed Pages:04

SUBJECT CODE NO:- H-570
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (Civil)
Professional Practices
(Revised)

[Time: Three Hours]   **[Max. Marks:80]**

Please check whether you have got the right question paper.
N.B   1. Question no. 1 and 5 is compulsory
2. Solve any one question from section A & solve any two question from section B.
3. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
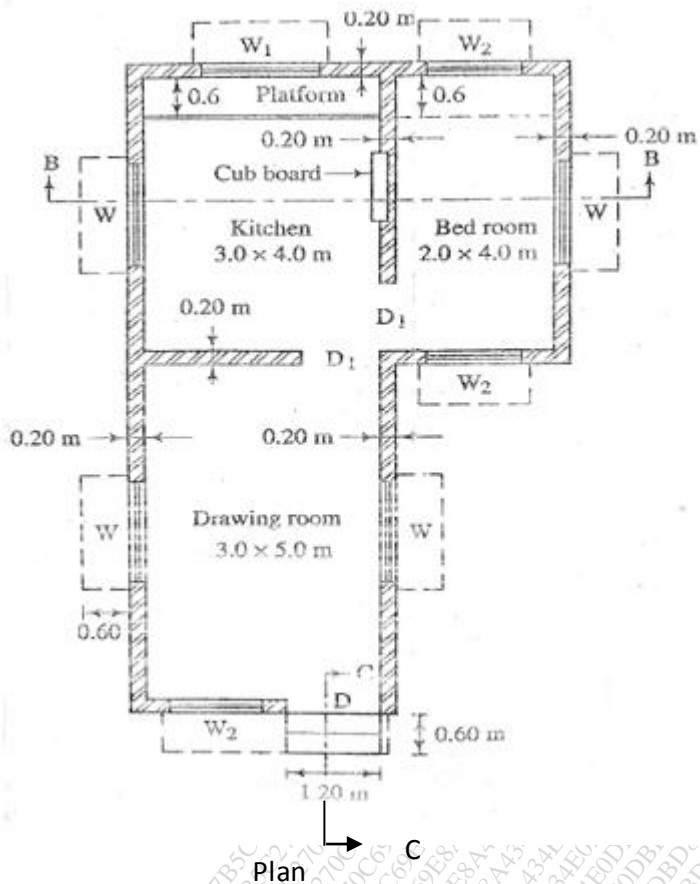
SECTION – A

Q.1   Workout the quantities of the following items from the given drawing from figure 1.
a) Earthwork in excavation in foundation.   05
b) Lime concrete in foundation   05
c) First class brickwork in 1:6 cement sand mortar in foundation and plinth   05
d) 2.5 cm Damp proof course   05

Q.2   a) Write detailed specification for
i)   Reinforced cement contract   05
ii)   Brickwork Ist Class   05

b) Carry out rate analysis for following
i)   2 cm thick DPC with cement mortar 1:2   05
ii)   12 mm plastering 1:6   05

Q.3   a) Explain the rules for measurement in detail.   05
b) What is specification? Explain the principles of writing specification in detail.   05
c) What is IS: 1200? List out its parts along with nature of work involved.   05
d) What is rate analysis? Explain factors affecting on the rate analysis.   05

Q.4   a) Explain DSR and other schedule in details.   05
b) What are the requirement of estimator and write uses of estimates?   05
c) Explain following terms
i)   Approximate estimates   05
ii)   Volume reduction theory of concrete mortar   05

Section-B

Q.5   Explain the following in detail.   16
a) Sinking fund
b) Mobilization fund
c) Contract documents
d) M.R. and N.M.R.

1

H-570

Q.6	a)	What is contract? Explain various types of contract in detail with advantage and disadvantage.	06
	b)	What are the responsibilities of contractor and Engineer?	06
Q.7	a)	Explain procedure for selection of tender in government works.	06
	b)	What are the objectives of valuation of property?	06
Q.8	a)	What is muster rule? What are the rules to be observed in its preparations?	06
	b)	What are the essential requirement of valid contract?	06
Q.9	a)	What is tender and how to draft tender notice explain with example.	06
	b)	What is depreciation? Describe various methods for determining depreciation.	06

Figure 1

Plan

Reference

D   – 1.2 m × 2.1m
D_1 - 1.0 m × 2.1m
W   - 1.5m × 1.2 m
W_1 - 1.5 m × 1.0 m
W_2 – 1.2 m × 1.2m
C.B. – 1.0 m × 1.8 m

E3747B5C270C69E8A434E0DBD80144E7

1.0 m

0.10 m

10 cm

10 cm thick R.C.C. slab

0.20 m

R.C.C. lintel 15 cm thick

0.20 m

3.0 m

W

15 cm

W_1

W_2

0.60 m

W

0.75

5 cm tile bedding

50 mm D

0.60 m

G.

0.30 m

L. C.C. (1:2

0.20 m

0.40 m

0.40 m

0.40 m

0.40 m

0.50 m

B.B.C.C. (1:3:6)

10 cm

B.B.C.C. (1:3:6)

0.80 m

45 cm sand filling

Section BB

(Scale : 1 cm : 1 m)

0.3 0.3 0.3

0.2 m
0.2 m
0.2 m
0.2 m

G.L.

0.90 m

B.B.C.C. (1:4:8)

Section CC

4
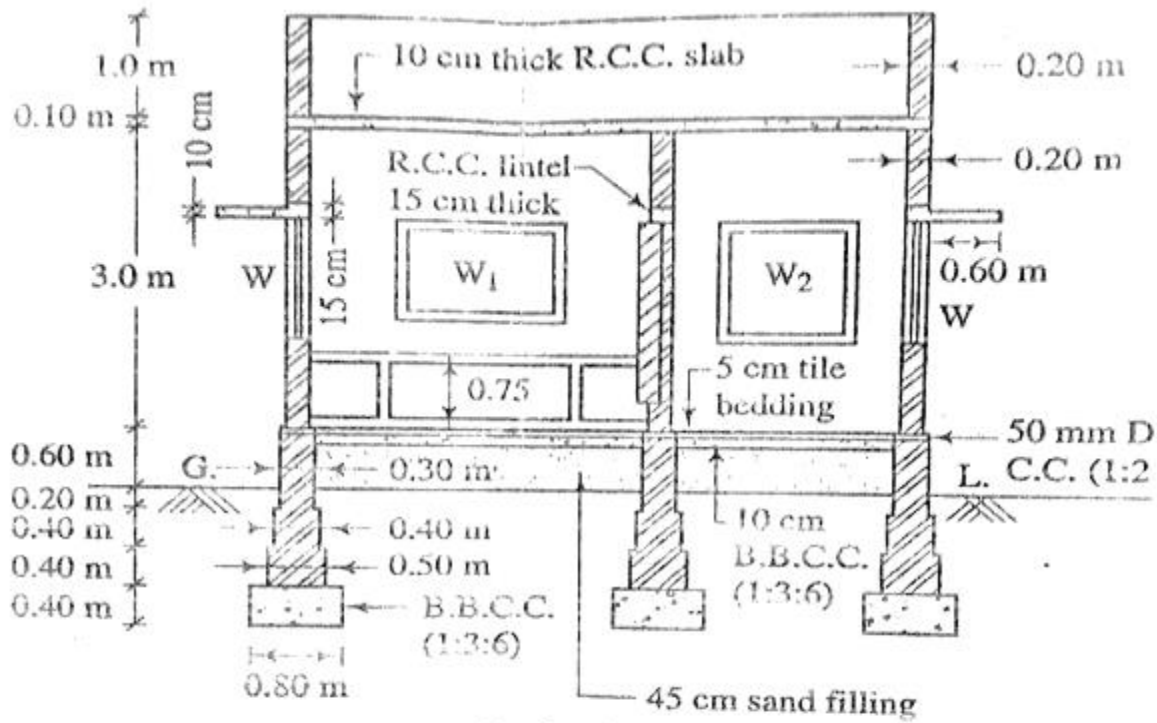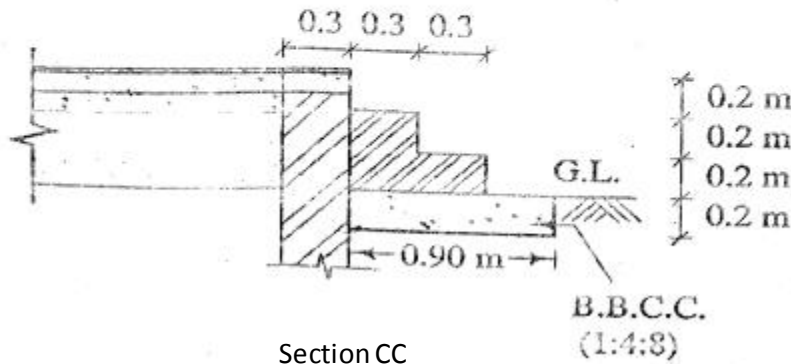
Total No. of Printed Pages: 02

SUBJECT CODE NO:- H-577
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil))
Geotechnical Engineering
(Revised)

[Time: Three Hours]   **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N. B
1. Q. 1 & Q. 6 are made compulsory. Solve any two questions from remaining questions of each section.
2. Assume suitable data if necessary & mention it clearly.
3. Figures to right indicates full marks.

Section A

Q. 1	Write short notes on:	
	a) Sedimentation analysis	06
	b) Index properties of soil	06
	c) Flow net.	04

Q. 2	a) Explain highway research board classification of soil.	06
	b) State and explain the factors affecting permeability of the soil.	06

Q. 3 a) Prove that, $\gamma_d = \frac{(1-n_a)\gamma w}{W+1/G}$ where,   06

$\gamma_d, \gamma_w, n_a, w \& G$ and $dry\ unit\ wt., dry\ wt.$ Water, % air void, water content and specific gravity of soil.

b) Explain oven drying method for determination of moisture content of the soil.   06

Q. 4	a) Explain consistency of soil with diagram.	06
	b) What is bulking of sand? Explain with proper graph showing water content V_s Bulking.	06

Q. 5 a) Explain pycnometer method for the determination of specific gravity of soil sample with   06
diagram.

b) The total unit weight of the glacial outwash soil is 16kN/m^2. The specific gravity of soil   06
particles of the soil is 2.67. The water Content of the soil is 17% calculate.
    i)   Dry unit weight
    ii)   Porosity
    iii)   Void ratio
    iv)   Degree of saturation.

1

Section B

Q. 6   Write short notes on:
    a. Direct shear test.   04
    b. Rankine active earth pressure theory.   06
    c. Unconfined compression test.   06

Q. 7   a) Explain Newmark's Influence chart.   06
    b) Find the intensity of vertical pressure and horizontal shear stress at a point 4m directly   06
        below 20 kN point load acting at a horizontal ground surface, use Boussinesq's equation.

Q. 8   a) Differentiate between consolidation and compaction   06
    b) Compute the intensities of active and passive earth pressure at a depth of 8 m in dry   06
        cohesionless sand with an angle of internal friction of 30° and unit weight of 18 kN/m^3.
        Take saturated unit wt. of sand as 22 kN/m^3.

Q. 9   a) Explain active earth pressure on a retaining wall with dry backfill with no surcharge.   06
    b) Explain Mohr-Coulomb failure theory.   06

Q. 10   a. Explain friction circle method and Swedish slip circle method.   06
    b. In a drained tri-axial compression test conducted on dry sand, failure occurred when the   06
        deviator stress was 218kN/m^2 ata confining pressure of 61kN/m^2 . What are the effective
        angle of shearing resistance and the inclination of failure plane to major principal plane?

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-591
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (CIVIL)
Elective-II: Advanced Concrete Technology
(Revised)

[Time: Three Hours]   [Max. Marks:80]

Please check whether you have got the right question paper.

N.B   (i) Solve any three question from Section A and B.
           (ii) Question No. 1 and 6 are compulsory.
           (iii) Assume Suitable data if necessary.

SECTION – A

Q.1   Solve any Five (2 x 5 =10)   10
        i)   High is mean by high strength fibre reinforced concrete?
        ii)   Enlist in detail of types of advanced curing
        iii) What is mean by Nanometer Scale for concrete?
        iv)   Define rheological for concrete.
        v)   Enlist in detail of different types of fibres
        vi)   What is mean by polymers for concrete?
        vii) Enlist in details types of shrinkage.

Q.2   A) Explain in details about Structural Levels of concrete.   08
        B) Explain about Transition Zone in Concrete.   07

Q.3   A) Explain design steps for high Density concrete.   08
        B) Explain design steps for ultra high strength concrete.   07

Q.4   A) Explain in details about Heavyweight Concrete.   08
        B) Explain in details about Shrinkage-Compensating Concrete.   07

Q.5   Write shorts notes on any three   15
        A) Fiber-Reinforced Cementitious Composites,
        B) Shotcrete concrete,
        C) Microstructure of concrete,
        D) Advanced curing.

SECTION – B

Q.6   Solve any Five (2 X5 =10)   10
        i)   What is mean by linear Elastic Fracture Mechanics?
        ii)   What is mean by Stress concentration factor?
        iii) What is the Dugdale model?
        iv)   Why is NDT needed?
        v)   Which wave will travel faster, as P wave or an S-wave?
        vi)   What is the use of Ultrasonic Pulse velocity meter?
        vii) What is mean by reflected waves?

H-**591**

Q.7   A) What is the two-parameters model?   08
       B) Describe the special characteristics of a concrete fracture process?   07

Q.8   A) Why is acoustic impedance an important index?   08
       B) What are the differences among A-scan, B-scan, and C-scan?   07

Q.9   A) Differentiate in between Reflected and Transmitted Waves   08
       B) Explain in details of NDT-CE Techniques.   07

Q.10   Write shorts notes on any three   15
       A) Two-Parameter Fracture Model,
       B) Sulphur-infiltrated concrete
       C) Attenuation and Scattering
       D) Theory of High Toughness and Ductile Concrete

E3747B5C270C69E8A434E0DBD8E16C4A