H-113

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-113
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Structural Mechanics
[REV]

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

Please check whether you have got the right question paper.

N.B
1. Solve ANY THREE questions from SECTION A & SECTION B each.
2. Use of non programmable calculator is permitted.
3. Make any suitable assumption if required & State it Clearly.

SECTION – A

Q.1 A. The stress at a point in a body is given by $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ N/mm^2. If E=2.1 x 10^5 N/mm^2 and $\mu = 0.3$. Find the Strain at point. 07

B Derive Equilibrium Equations for Three Dimensional element in Elastic Body. 07

Q.2 State the assumptions made in the theory of bending analysis of plates. Compute the deflection of a simply supported rectangle plate of size $a \times b$ subjected to uniformly distributed load. 13

Q.3 Derive the governing differential equation of circular plate subjected to lateral load in polar co – ordinates. 13

Q.4 Drive the equation of a circular plate for deflection carrying point load at its centre. 13

Q.5 A. Write strain displacement relations for a three dimensional state of strain and hence derive strain compatibility conditions. 07

B. Explain Plane Stress and Plane Strain condition of the body. Write constitutive laws for the same. 06

SECTION – B

Q.6 Analyse the frame ABC shown in figure 1 by using stiffness method. EI= Constant. Support A is fixed and Support C is hinged. 14

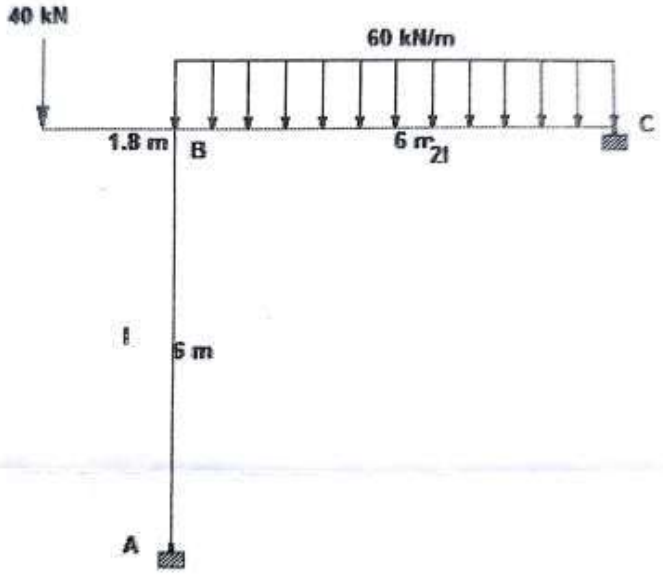


Figure No.1

Q.7 Derive and Explain functions for one dimensional two noded and three noded elements. 13

Q.8 Derive equilibrium equations for spherical shell as membrane theory. Determine the stresses in the shell under its own weight. 13

Q.9 State and explain step wise procedure adopted in finite element method of structural analysis. Explain what do you understand by one dimensional and two dimensional elements stating that in analysis of which type of structures these elements can be used? 13

Q.10 A Differentiate between static and kinematic in determinacy of a structure with example of beam and frame each. 06

B Differentiate between stiffness matrix method and flexibility matrix method in detail, starting procedure of both. State advantages of stiffness matrix method over flexibility matrix method. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-146
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Construction Management
[Revised]

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

Please check whether you have got the right question paper.

N.B i) Solve any three questions from each section.
ii) Assume suitable data where necessary and mention it clearly in the answer sheet.

SECTION – A

Q.1 a) What are the roles and responsibilities of construction project manager. 07
b) Discuss work break down structure in detail. 06

Q.2 a) Enlist and explain different types of concreting equipment's. 07
b) Differentiate between bar chart and mile stone chart. 06

Q.3 a) Following activity relationships are given in table below, draw the network and number the events as per Fulkerson's rule. 08

Activity	A	B	C	D	E	F	G	H	I	J
Immediate Predecessor	--	A	A	B	C	B	C	F	D,E	G

b) Write short note on project appraisal. 05

Q.4 a) Explain the features of construction project which makes it unique compared to other project types. 07
b) What do you understand by concept of management information system? 06

Q.5 a) Draw the following network and compute earliest start time, earliest finish time, latest start time, latest finish time and total float, also determine total project duration and locate critical path. 14

Activity	1-2	2-3	2-4	2-5	4-5	3-6	5-6	4-7	6-7	7-8
Duration (Weeks)	1	2	2	2	4	3	3	2	2	3

SECTION – B

Q.6 a) What are safety audits? Why is safety audit necessary? 07
b) Discuss some popular project management software's. 06

Q.7 a) Explain fixed capital and working capital in detail. 07
b) Discuss the role of vendor management in material management. 06

Q.8	a)	Why is the importance given to grapevine communication in any organization.	06
	b)	A construction company purchases 20,000 bags of cement annually. Each bag of cement costs. Rs. 300 and the cost incurred in procuring each lot is Rs. 200. The cost of carrying is 25 percent. What is the most economic order quantity? What is average inventory level?	08
Q.9	a)	What is job evolution? What are various methods of job evolution?	07
	b)	Explain the concept of cost of project.	06
Q.10	a)	Explain upward, downward and horizontal communication in detail.	07
	b)	Explain the importance of material management in construction projects.	06

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-181
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Professional Practice
[Revised]

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

Please check whether you have got the right question paper.

N.B
i) Q.No.1 is compulsory. Solve any two questions from remaining in section A.
ii) Attempt any three questions from section B.
iii) Figures to the right indicate full marks.
iv) Assume suitable data if required.

Section A

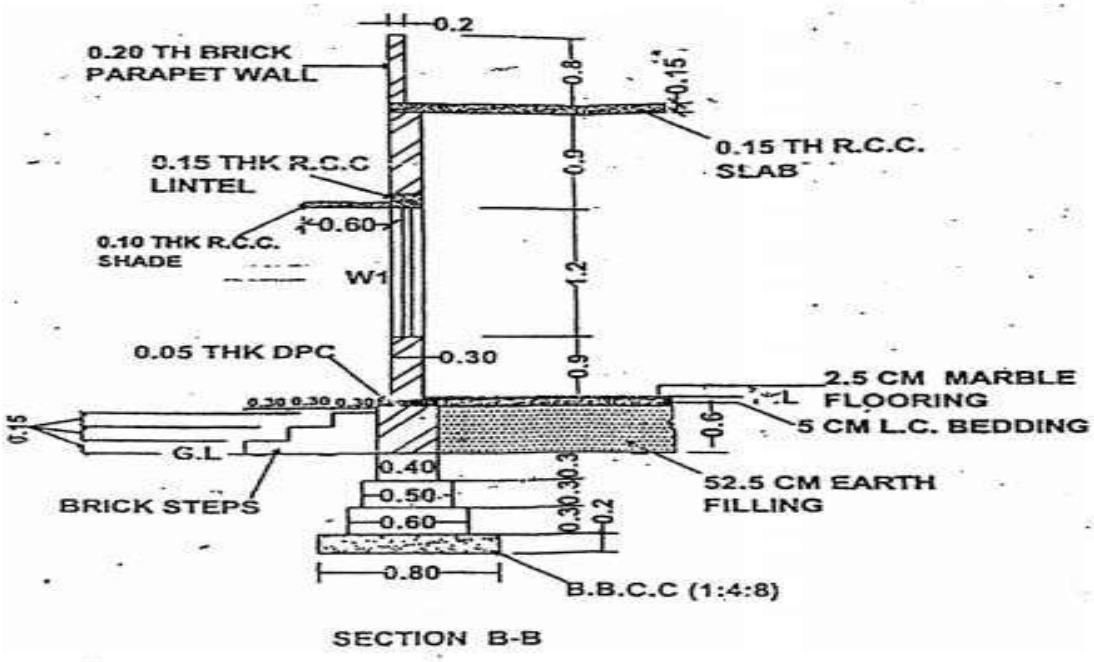
Q.1 The plan of a residential building is shown in Figure-1. Calculate quantity of following items in a measurement sheet. Adopt suitable brief specifications. 20

1. Excavation in foundation
2. B.B.C.C (1:4:8) in foundation
3. First class brick work in foundation and plinth in cement mortar 1:6
4. 2.5cm thick Damp proof course
5. Earth filling in Plinth

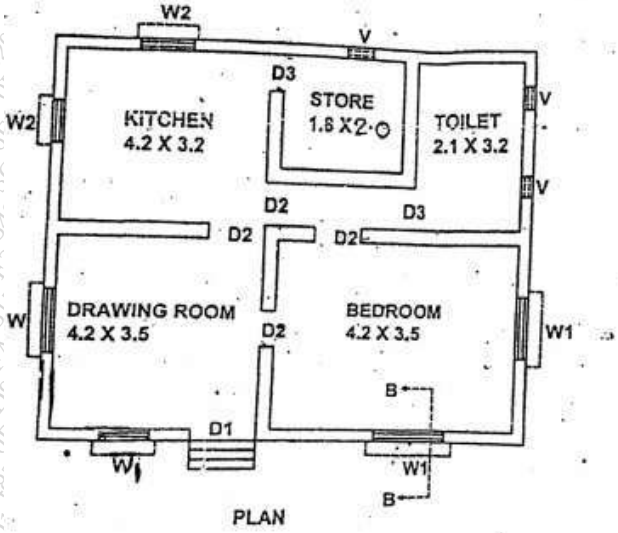
Q.2
a) Describe the factors affecting the rate analysis. 05
b) Find the rate of first class brickwork in super structure in C.M (1:6) for 10 m^3. 05
Assume suitable rates of material and labour.

Q.3
a) Discuss principles of writing good specification. 05
b) Write detail specification of cement concrete (1:4:8) for foundation. 05

Q.4
a) Write a note on methods of taking out quantities. 05
b) What factors are to be considered during preparation of detailed estimate? 05



SECTION B-B



PLAN

SCHEDULE OF OPENINGS

D1 = 1.1 X 2.1
D2 = 0.9 X 2.1
D3 = 0.4 X 2.1
W = 1.8 X 1.2
W1 = 1.5 X 1.2
W2 = 1.2 X 1.2
V = 0.6 X 0.6
BEARING OF LINTEL = 0.1

NOTE: -ALL DIMENSIONS ARE IN M

FIGURE: - 1

ASSUME DATA REQUIRED

Section B

Q.5	a)	Explain different methods of finding out sinking fund of a building.	07
	b)	What is a contract? What are the contract documents? Elaborate.	06
Q.6	a)	What do you understand by breach and termination of contracts?	07
	b)	What is tender notice? Explain with suitable examples.	06
Q.7	a)	Explain scrap value, market value, book value and prospective value.	07
	b)	Explain the details of labour, transportation and material supply contract.	06
Q.8	a)	Write a note on Informal and balance tender.	07
	b)	What is MB? How measurement of work and bills are prepared in PWD.	06
Q.9	a)	What is N.A.? Discuss its importance in land development.	07
	b)	What is G.P.A? when it is used, explain with suitable examples.	07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-216
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Elective-II: Advanced Structures
(Revised)

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

Please check whether you have got the right question paper.

N.B
1) Answer any Two from Section A & Section B.
2) Assume suitable data if necessary.
3) Figures to the right indicate the maximum marks.
4) Use of non-programmable calculator is allowed.
5) Use of IS:456-2000, is permitted.

Section A

Q.1 A building rests on six columns 400mm×400 mm arranged as shown in fig.01. Each central column carried a load of 1000KN & the end column carry 600KN each. Design main beam ABC &secondary beam BE of the raft foundation. Consider total wind load moment of 1200KN-M.SBC of soil 75 KN/M^2. Use M-20& Fe-415. 20

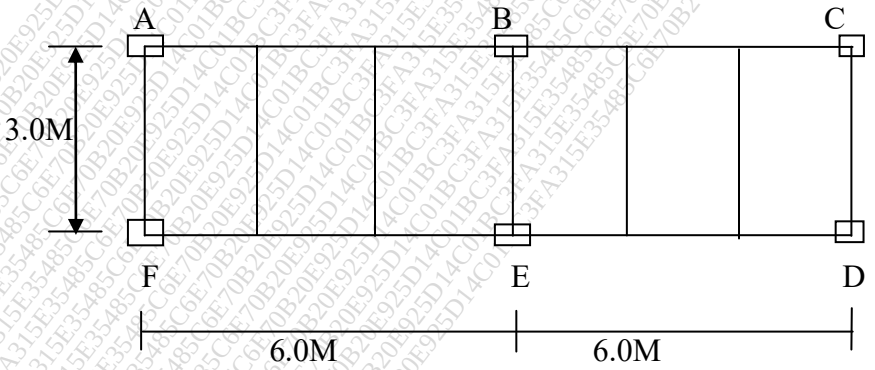


Fig.1

Q.2 a) Design a pile under a column transmitting an axial load of 1000KN. The pile is to be driven to a hard stratum available at depth of 8.0M. Use M-20concrete & Fe-415steel. 10

b) ARC column 450mm×450mm carrying a load of 900KN is supported on three piles 300mm×300mm in section. The Centre to Centre distance between the piles is 1050mm. Design a suitable pile cap. Use M-20concrete & Fe-415 steel. 10

Q.3 A cylindrical water tank is 8m in diameter. contains water up to a height of 2.8M excluding free board. Tank rests on a ring beam at a bottom 8.0M diameter. Dead weight of various components of water tank excluding water load transferred to ring beam is 75 KN/M. Design the ring beam. Use free board 0.2M. Use M-20 & Fe-415. The ring beam is supported by eight beam is supported by eight symmetrically placed columns. Show the reinforcement details. 20

No.of columns	2∅	β_s	β_m	β_T	∅
08	45	0.066	0.033	0.005	9.5°

Section B

Q.4 a) Explain the following terms with reference to bridges. 10
i) Distribution of wheel load on slab
ii) Dispersion of load along span.
iii) Ground contact area
iv) IRC loading

b) What are the bolded plates? Discuss the merits & demerits of it. 10

Q.5 a) Explain various types of transmission towers & their utility in load resistance 10
b) Explain following terms 10
1) Solidity ratio
2) Guyed towers
3) Lattice towers

Q.6 c) A reinforced concrete deep girder is continuous over span of 9.0M apart from Centre to Centre. It is 4.5M deep & 300MM thick &the column are 900MM width, If the girder support's a uniformly distributed load of 250KN/M including its own weight Design the beam.usingUse M-20concrete & Fe-415 steel.Show reinforcement in detailed. 12

a) Compare the design of deep beam by British code & American code. 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-217
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Elective-II: Pavement Design
(Revised)

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

Please check whether you have got the right question paper.

N.B
i) Question 1 and 6 are compulsory and solve any 2 of remaining of each section.
ii) Assume suitable data if necessary.

Section A

Q.1 Explain the following terms (any five) 10
a) Modulus of sub-grade reaction
b) Explain 'Prim Coat'
c) Radius of relative stiffness
d) Enlist types of rigid pavement
e) Contact pressure
f) Serviceability & reliability

Q.2 a) Explain marshal method of bitumen mix design. 07
b) Discuss factors affecting pavement design. 08

Q.3 a) Explain different types of pavement with advantages and disadvantages. 08
b) Draw cross-sectional diagram of each pavement type. 07

Q.4 Calculate the stresses at the corner, edge and interior regions of a rigid pavement by applying Westergaard's equation with the following particulars. 15
Wheel load = 4100 kg
Slab thickness = 15 cm
Radius of wheel load distribution = 15 cm
Modulus of elasticity of concrete = 2.1×10^5 kg/cm^2
Poisson's ratio for concrete = 0.15
Modulus od subgrade reaction = 3kg/cm^3

Q.5 Write a note on following (any three) 15
a) CBR test on soil
b) Abrasion test on aggregate
c) Equivalent single wheel load
d) Discuss Bossinique's theory

Section B

Q.6	a)	Discuss in detail Pavement Management System(PMS)	05
	b)	Explain Marshall Stability test with neat sketch.	05
Q.7	a)	Discuss different joints in rigid pavement with neat diagrams.	08
	b)	Provide a detailed discuss on 'Economic analysis of highway'.	07
Q.8	a)	Explain South African method of designing of composite pavement.	08
	b)	What is composite pavement? List itsadvantages andlimitations.	07
Q.9	a)	Discuss design parameters for rigid pavement.	08
	b)	Differentiate between corner loading and edge loading in rigid pavement.	07
Q.10	Write a note on following(any three)		15
	a)	Explain 'Cost-Benefit Ratio'	
	b)	Repetition of load	
	c)	Discuss design factors	
	d)	Pavement design submittal	

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-218
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Elective-II: Earthquake Engineering
[Revised]

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

Please check whether you have got the right question paper.

N.B
1) Q. No.1 & 6 are compulsory.
2) Attempt any two questions from each section.
3) Assume suitable data if necessary.
4) Use of IS 1893 (Part-I): 2002, IS 4327, IS 4328, IS 13920-1993 are permitted.

Section – A

Q.1 a) Explain with figure the movement of earth plates 06
i) Constructive plate margin/ Divergent boundaries
ii) Destructive plate margin / Convergent boundaries
iii) Conservative plate margin/ Transform boundaries

b) Define the following terms:- 04
i) Resonance
ii) Epicentral distance

Q.2 a) Write a short note on accelerogram OR an earthquake with a neat sketch. 06
b) Find the expression for the response of a single degree of freedom system for under critical damping. Note that the system is having initial displacement x_0 and initial velocity = 0. 09

Q.3 a) I) differentiate between magnitude and intensity of earthquake. 04
II) Describe any five lessons learnt from failure of RCC building during Bhuj earthquake. 05
b) Explain the effect of foundation soil and damping on the nature of response spectrum. 06

Q.4 a) Derive expression of the Duhamel Integral function for damped and undamped single degree of freedom system. 09
b) Describe with sketch the motion of body waves in earthquake event. 06

Q.5 a) Draw schematic diagram of design response spectrum for earthquake. Express various regions in that. 09
b) What is the ratio of successive amplitudes of vibration if the viscous damping ratio is known to be: 06
i) $\xi = 0.01$ and ii) $\xi = 0.25$

Section – B

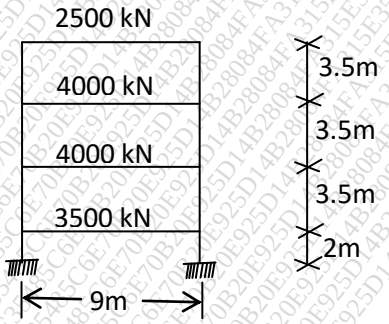
Q.6 Explain the following terms (Any two) 10

a) Moment resisting frame
b) Structural damping
c) Floor diaphragm action

Q.7 a) Write a short note on elastomeric base isolation system with figure. 07
b) As per IS 1893 (Part I):2002, vertical component of earthquake is to be considered in which types of structures? 08

Q.8 a) Explain the concept of soft story in a building and implications of that on overall response of the structure to earthquake loading. 08
b) Sketch the details of longitudinal and transverse reinforcement (typ.) as per IS13920:1993. 07

Q.9 Calculate the story shear distribution as per IS 1893-2002 for the frame shown in figure Assume zone III, OMRF without infill walls made in steel, foundation is on hard rock. Assume suitable data if necessary. 15



Note: Forces indicated in above figure are seismic weights of the floor.

Q.10 a) Draw schematic diagrams of common slope failure surface geometries. 04
b) Write a short note on flow liquefaction. 05
c) Write a short note on ground improvement technique used for soil densification: Dynamic Compaction. 06

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-219
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Elective-II: Industrial Waste Treatment
[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. Answer any two questions among the remaining questions (i.e.2 to 5) of section A and any two questions (i.e. 7 to 10) of section B.
3. Assume suitable data if necessary.

SECTION A

Q.1 Answer the following questions. 10
a) Describe EIA
b) Name various Chemical Pollutants
c) What is MPCB
d) Explain "waste exchange"
e) What do mean by Natural system of stream purification.

Q.2 a) Explain importance and functions of CPCB and SPCB 08
b) Explain disposal methods of waste water and state the ISI effluents standards for disposal of industrial waste. 07

Q.3 a) Explain the oxygen sag curve with neat diagram. 07
b) Describe in detailed about Equalization and Neutralization. 08

Q.4 a) Explain by product recovery with context to industrial waste treatment 07
b) Describe in complete the strength reduction in waste water. 08

Q.5 Write Short Notes on (any three) 15
a) Streeter Phelps DO model
b) Water pollution control Act
c) Volume Reduction
d) Environmental Audit

SECTION B

Q.6 Answer the following questions 10
a) Give mechanism of ASP
b) What do you mean by Industrial Waste water
c) Enlist disposal methods of radioactive waste
d) Describe F/M ratio

e) Explain Detention period.

Q.7 a) Explain waste water characteristics and treatment process in Cotton textile industry. 07

a) Design a conventional activated sludge for waste flow=50000^3/d 08
Volume of aeration tank = 1600m^3.
Influent BOD=200mg/l
Effluent BOD=20mg/l
MLSS=3000mg/l
Effluent SS=40mg/l
Waste sludge SS=12000mg/l
Quantity of waste sludge=300m^3/d
Based on above information, determine
1. A.T(hours)
2. F/M ratio
3. Percentage efficiency of BOD removal
4. Sludge age (days)

Q.8 a) Explain the treatment process of Dairy industry. 08

b) What are nitrification and de nitrification in industrial effluent treatment process? 07

Q.9 a) Design an oxidation pond for treating sewage from a hot climatic residential colony with 1000 persons, contributing sewage at 100 liter per capita per day. The 5-day BOD of sewage is 250 mg/l. 07

b) Explain in detail on oxidation pond with neat sketch. 08

Q.10 Write short Notes on (any three) 15

a) Air Stripping
b) Nitrification
c) UASBR
d) High rate anaerobic filters

H-220

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-220
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-II)
Elective-II: Geographic Information Systems
[Revised]

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

Please check whether you have got the right question paper.

N.B (a) This question paper contains 10 questions divided into two sections, namely A and B.
(b) Attempt three questions from each section.
(c) Question 1 from section A, and Question 6 from section B are compulsory.

SECTION A

Q.1 Answer any five questions out of the following (2 markseach): 10
a. Define GIS.
b. List the fundamental operations in GIS.
c. What is generalization?
d. What are the components of a polar coordinate system?
e. What are the properties of a vector layer?
f. List the different types of map projections.
g. What are the different parameters of a projection transformation?

Q.2 a. What are the advantages of digital representation of data? 07
b. What is the role of generalization in the digital representation of data? Illustrate with an example. 08

Q.3 a. Explain the difference between raster and vector data formats. 08
b. Explain the various coordinate systems, with illustrative diagrams where applicable. 07

Q.4 Write a detailed note on the different coordinate systems for mapping. 15

Q.5 Explain the concept of digital objects and continuous fields. 15

SECTION B

Q.6 Answer any five questions out of the following (2 marks each) 10
a. What are attributes?
b. How are attributes captured?
c. What are the different sources of spatial and non-spatial data?
d. What are the principles of map design?
e. What is a spatial query?
f. Define consolidation.
g. What are the different software vendors for GIS software?

Q.7 a. Explain spatial queries and illustrate them with example. 08
b. Write a short note on the applications of cartography. 07

Q.8 Describe the role of GIS in natural resources management with illustrative examples. 15

Q.9 Write a descriptive note on Spatial Analysis with an illustrative example. 15

Q.10 Write a descriptive note on various database management systems. 15

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-228
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil/Mech/EE/ECT) (Sem-II)
Elective-II: SAP Material Management – II
[Revised]

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

Please check whether you have got the right question paper.

N.B i) Question no.1 and Question no. 6 are compulsory.
ii) Solve any two questions from remaining questions from each Section A and B.

Section A

Q.1 What are different features of good receipt? Explain. 10

Q.2 (a) Explain good receipt posting with or without reference. 07
(b) What are different steps in automatic generation of purchase order? Explain. 08

Q.3 (a) What is subcontracting and Discuss process of subcontracting in details. 08
(b) Discuss in detail the various levels of stock transfer. 07

Q.4 (a) Describe the process of invoice verification in detail. 07
(b) Why there is need of transferring stock from one storage location to another storage location. Explain by using suitable example. 08

Q.5 Write short note on (Any three) 15

a. Inventory management
b. Vender consignment
c. Version management in purchasing
d. Material master records

Section B

Q.6 What is book inventory and differentiate between book inventory and physical inventory. 10

Q.7 a. Describe vendor master records. 07
b. Explain output messages in inventory management. 08

Q.8 a. Describe in detail process of defining and assigning plants in master data. 08
b. Explain how material master data is useful in purchasing and accounting. 07

Q.9 a. Discuss the relevance of master material record and material types. 07
b. Describe the significance of valuation and account assignment in material management. 08

Q.10 Write short note on (Any three) 15

a. Vendor master records.
b. Relevance of company code and valuation area
c. Account assignment categories
d. Split valuation.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-303
FACULTY OF SCINECE AND TECHNOLOGY
B.E. (Civil) (Sem-I)
Environmental Engineering-II
[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. Answer any two questions among the remaining questions (i.e 2 to 5) of section A and any two questions (i.e 7 to 10) of section B.
3. Assume suitable data if necessary.

Section -A

Q.1 Attempt five 10

a) Define
   i) Self –cleaning velocity
   ii) Sullage
b) Limitation of BOD
c) List out the chemical properties of waste water
d) Explain Conservancy system
e) Differentiate between vertical and horizontal inlet
f) Define sewage ventilator.

Q.2 a) Calculate the velocity of flow and corresponding discharge in a sewer of circular section having diameter equal to 1.5m, laid at a gradient of 1 in 400. The sewer runs at 0.6 depths. Use Manning's formula taking N=0.012. 07

b) Explain the characteristics of waste water in detail. 08

Q.3 a) Explain 1st stage BOD formation in detail. 07

b) The BOD of the sewage incubated for one day at 30^{o}C has been found to be 100mg/1. What will be the 5 day 20^{o}C BOD? Assume K= 0.12 (base 10) at 20^{o}C. 08

Q.4 a) Explain in detail the self –purification of the stream. 07

b) Design the grit chamber for a maximum flow of 6000m^{3}/day to remove particles of 0.2 mm diameter having specific gravity of 2.65. The settling velocity of these particles is found to range from 0.016 to 0.022m/sec. Maintain a constant flow through velocity of 0.3m/sec through the provision proportional weir. 08

Q.5 Write short note (any three) 15

1) Sewage Pumping
2) Combined and separate sewage system
3) Skimming Tank
4) Dilution into sea
5) Physical unit operation

Section – B

Q.6 a) Explain unit operation and unit process with examples. 05

b) Explain Tricking filter in detail with neat sketch 05

Q.7 a) Design a conventional activated sludge plant population -30000Avg. 15
Sewage flow -18-0 lpcd
BOD of sewage -200 mg/lit
BOD removed in primary treatment -30%
Overall BOD reduction -85%
F/M ratio =0.33
MLSS=2000mg/lit
Sludge volume index =100

Q.8 a) Compare between low rate and high rate tricking filter. 07

b) The sewage flows from a primary settling tank to a standard rate tricking filter at a rate of 6 MLD having a 5 –day BOD of 150mg/I. Determine the depth and the volume of filter, adopting a surface loading of 2500 l/m^2/day and an organic loading of 165g/m^3/day . Also determine the efficiency of the filter unit , using NRC formula. 08

Q.9 a) Explain method of collection, handling and processing of solid waste. 07

b) Explain Solid waste disposal method in detail. 08

Q.10 Write short note (any three) 15

1) Aerated Lagoons
2) UASBR
3) Nitrogen Removal
4) Oxidation Pond

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-337
FACULTY OF SCINECE AND TECHNOLOGY
B.E. (Civil) (Sem-I)
Water Resources Engineering-II
[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 each section
3. Assume suitable data if necessary.

Section -A

Q.1 Attempt the following 10

a) What is reservoir? Discuss the different types of reservoirs & the purpose served by each type.
b) What do you understand by mass inflow curve and how is it prepared?

Q.2
a) A masonry dam 6 meter high is 1.5 meter wide at top and 4.5 meter wide at the bottom, with vertical water face. Determine the normal stresses at the toe and heel for reservoir empty and full conditions take $\rho = 2.4\ and\ C = 1$ 07
b) Explain briefly with neat sketches the different forces that may act on a gravity dam indicate their magnitudes , directions and locations . 08

Q.3
a) Explain the method of stability analysis of upstream slope during sudden drawdown 07
b) Explain the method of plotting phreatic line for an earth dam with horizontal filter at d/s 08

Q.4
a) Explain the different types of buttress dam and explain how a slab type of buttress dam differs in its design as compared to a concrete gravity dam. 07
b) Discuss in brief various types of Arch Dam. 08

Q.5
a) Write a short note on (a) slope protection (b) filter criteria in earthen dam 10
b) Discuss advantages and disadvantages of buttress dam. 05

Section – B

Q.6 Compare kennedy's and lacey's silt theory. Why is lacey;s conception superior to that of kenned's theory. 10

Q.7
a) What do you understand by? 07
i) Regime channel
ii) Initial and final regime channel

iii) True channel
iv) Permanent regime

b) Using lacey's theory design a irrigation channel for the following data Dicharge (Q)= 50 cumecs, Silt factor (f)= 1, Side slope =1/2:1 08

Q.8 a) A spillway is a safety Valve in Dam. Discuss the statement? 07

b) Explain with the help of sketch, the components and working of Tainter Gate and Drum gate. 08

Q.9 a) What is transition? What is its purpose? Discuss various methods of design of transitions? 07

b) Give the sketch of suitable design of aqueducts for each of the following crossings 08
i) A major canal over a small drainage
ii) A canal carrying low discharge over a large drainage.

Q.10 a) Briefly explain Khosala theory and how it is used in design of weir on permeable foundation? 08

b) Explain the procedure for a design of vertical drop weir on the basis of Bligh's theory . 07

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-372
FACULTY OF SCIENCE AND TECHNOLOGY
B.E.(Civil) (Sem-I)
Design of Structures- III
[OLD]

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

Please check whether you have got the right question paper.

N.B
1) Attempt any two questions from Section A and B each.
2) Use of IS: 456, IS: 3370 is allowed.
3) Assume suitable data, if necessary, state it clearly.

Section - A

Q.1
a) Write disadvatages of a flat slab over a conventional slab supported on beams. 04
b) Design an interior panel of flat slab $6m \times 6m$ for a live load of $4\ kN/m^2$. Show the reinforcement details on a neat sketch. 16

Q.2 Two columns A and B are located 3.8m apart. The sizes of the columns are 450 mm and 450 mm. Loads on them are 1100kN and 1700kN respectively. The projection of the footing parallel to the length of footing beyond axis of column 'A' is restricted to 1m. The SBC of soil is $300kN/m^2$. Design a combined footing for two columns. Use M-20 and Fe-500 grades. 20

Q.3 Design heel slab and vertical wall of a counter fort retaining wall 7m high above G.L is to be provided to retain earth with top. Density of earth is $16kN/m^3$ and its angle of repose is 30°. Hard strata having SBC of soil $260kN/m^2$is available at 1m below ground level. The counter forts are provided at 3.3 m c/c. 20

Section - B

Q.4 Design an elevated rectangular water tank to store 30,000 litres of water. Design walls and base slab of water tank. Assume walls are fixed at base and free at top. Show reinforcement detailing. Use M-35 concrete and Fe-500 grade steel. Use IS code method. Show reinforcement detailing. Take L/B = 1.6. 20

Q.5
a) Design the formwork for a columnof size $400\ mm \times 400\ mm$, having a height of 3m. It is proposed to pour the entire concrete in one stage. 15
b) Write requirements of an ideal formwork for RCC constructions. 05

Q.6
a) Explain Freyssinet system of prestressing in detail. Draw sketches. 10
b) Design a circular slab for a room of 6 m effective diameter with partially restrained edges. Total superimposed load on the slab is $5kN/m^2$. Use M-20 and Fe-500 grades. Show the reinforcement details on neat sketches. 10

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-406
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-I)
Foundation Engineering
[OLD]

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

Please check whether you have got the right question paper.

N.B.: 1) Attempt any three question from each Section.
2) Draw neat diagram when required.
3) Assume suitable data if necessary.

Section A

Q.1 a) Explain different type of foundation settlement. 06
b) Explain seisimic refraction method with neat diagrams. 07

Q.2 a) Explain standard penetration test with neat sketch. 06
b) Drive Terzaghi's ultimate bearing capacity equation for a strip footing. 07

Q.3 a) Define & explain: 06
1) Ultimate bearing capacity.
2) Net bearing capacity
3) Safe bearing capacity
b) Determine the width of strip footing to carry a load of 850 KN/m at depth of 1.6m in c-ϕ soil having unit weight of 18 KN/m^3 & $c = 28\ KN/m^2$ $\Phi = 25°$. Assume factor of safety =03 using Terzaghi's equation. 07
For $\Phi = 25°$ $N_c = 25.1$, $N_q = 12.7$, $N_y = 9.7$

Q.4 a) Explain Design procedure for Trapezoidal combined footing. 06
b) Proportionate a strape footing for two column at distance of $6.5m$ $^{c}/_{c}$ with load 2500KN & 4000KN. The lighter column ($400mm \times 400mm$) is at distance of 250mm clear from property line. The safe bearing capacity of soil is $300\ KN/m^2$. 07

Q.5 Write note on following:-
1) Floating foundation 04
2) Depth & spacing of bore hole 05
3) General shear failure. 05

Section B

Q.6 a) Explain analysis of sheet pile cantilever wall in cohesive soil. 08

b) Explain circular and diaphragm type cellular coffer with neat sketch. 05

Q.7 a) Calculate the efficiency of square group of 16 pile using Feld's rate. 06

b) A group of squar pile of 60 cm diameter is arranged in square pattern with centre to centre spacing of 1.2m. The pile are 12 m long embedded in Clayey soil with cohesion (c)=30 KN/m^2 Assuming adhesion factor is 0.6, Determine the ultimate load carrying capacity of group. Neglect the tip resistance. 07

Q.8 a) Explain pile load test to determine load carrying capacity of pile. 07

b) Write a note timber pile. 06

Q.9 a) Explain advantages of drilled pier over the group of pile. 06

b) Explain working of Pneumatic Caisson with neat sketch. 07

Q.10 Write a note on:-

i) Caisson Disease 05

ii) Difficulty in sinking of Caisson. 05

iii) Uses of sheet pile. 04

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-445
FACULTY OF SCIENCE AND TECHNOLOGY
B.E (Civil) (Sem-I)
Elective-I: Prestressed Concrete
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Solve any three questions from section A and B each section
2. Use of IS 1343 and IS 456-200 is allowed
3. Assume suitable data where required and mention it clearly
4. Draw neat sketches in justification where necessary.

Section -A

Q.1 Answer any three of the following

1. The firm got a bulk order of manufacturing of PSC precast electric poles. Which method one shall adopt for manufacturing the same. Explain in detail. 05
2. Is it always necessary that only high strength concrete shall be used for Prestressed Concrete? Justify your statement. 05
3. What is upper and lower kern points in prestressed concrete section. Explain with the help of neat sketch. 04
4. Which are the time dependent losses occurring in pre and post tensioning? Explain in detail loss due to shrinkage and its provisions as per IS 1343. 04

Q.2 An unsymmetrical PSC I section has dimensions as mentioned. Top flange 300mm wide and 60mm thick, bottom flange 100mm wide and 60mm thick, web thickness 80mm and overall depth of beam is 400mm. The beam is used to support a live load of 2kN/m over a span of 8m. The effective prestressing force of 110kN is located at 60mm from soffit of beam. Loss ratio is 0.80 during the entire process. 13

a) Compute the stresses in the concrete at soffit at the center of the span at initial and final stage.
b) If the modulus of rupture of the concrete is 5N/mm^2, determine the load factor against cracking.

Q.3
a) Derive an expression for loss due to friction in post tensioned beam considering length and curvature effect. 03
b) A post tensioned prestressed concrete beam of span length of 12.0m has a rectangular section 300mm wide and 850mm deep. The beam is prestressed by a parabolic cable having eccentricity of 50mm above the center at support and 200mm below at the center of the span. The cross sectional area of HT wires in the cable is 510mm^2. The wires are stressed by using a jack at the left end so that the initial force in the cable at the right end is 250kN. Using following data calculate 10
   a) The jacking force required at the left end
   b) Total loss of stress in the wire
   Coefficient of friction for curvature effect =0.55, friction coefficient for wave effect=

0.003/m, anchorage slip at jacking end =3.0mm, relaxation of steel stress=3% shrinkage of concrete=0.0002, creep coefficient = 2.20, E_s=210kN/mm^2 andE_c= 35kN/mm^2

Q.4 a) What is pressure line? How it is located at various locations along the span i. e end,quarter span and midspan of the beam? 02

b) A beam of symmetrical I section spanning over a length of 9.0m has a flange width 250mm and thickness 75mm. The overall depth of the beam is 500mm. Thickness of the web is 80mm. the beam is prestressed by a parabolic cable having an eccentricity of 150mm at center and zero at support with an effective force of 100kN. The live load on the beam is 2200N/m. Analyze the section at the mid span section for the following conditions **using load balancing concept** 11

i) Prestress + self weight ii) prestress + self weight +live load

Q.5 a) Explain stress distribution of end block as per Guyon's method when single anchor plate is used. 03

b) A post tensioned concrete beam 400mm wide and 800mm wide is prestressed by an effective prestressing force of 1100kN at an eccentricity of 120mm. the anchor plate is 400mm wide by 400mm deep. Calculate the bursting force using IS 1343 code provisions and design the reinforcement to resist this force. Sketch the details of the reinforcement. 10

Section – B

Q.6 Answer any three of the following

1) What is the structural difference in one way and two way slab. Explain with the help of neat sketches where requires. 04
2) How moment of resistance is calculated as per Indian code provisions for rectangular and T-beam for prestressed concrete section. 05
3) Which are the major modes of shear failure? Explain in detail failure due to web shear crack. 05
4) Write down the advantages of prestressed concrete poles. 04

Q.7 a) The composite beam consists of a 120mmX 210mm precast stem and cast – in –situ flange 180mm X 50mm. The stem is a post tensioned unit which is subjected to an initial prestressing force of 230kN. The loss of prestress is 15%. The tendons are provided such that their center of gravity is 80mm above the soffit. The composite beam has to supporta live load of 4.0kN/m. Determine the resultant stresses in the stem and flange if the beam is i) unpropped and ii) propped 13

Q.8 a) A pretensioned PSC Tee section having a flange width of 1200mm and thickness of flange 150mm, thickness of web being 30mm is prestressed by 4700mm^2 of high tensile steel located at an effective depth of 1600mm. If f_{ck}= 40N/mm^2 and fp=1600N/mm^2 then estimate the ultimate moment capacity of pretensioned PSC Tee section 08

b) A PSC beam having an unsymmetrical I section has a fiber stress distribution 13 N/mm^2 compression at the top reducing to zero at the bottom. The top flange width and thickness are 2400 and 400mm respectively, the bottom flange width and thickness are 1200 and 900mm respectively, the depth and thickness of web are 1000 and 600mm respectively. The total vertical service load shear in the concrete at the section is 2350kN. Compute and compare the principal tensile stress at the centroidal axis and junction of web with the lower flange. Consider I_{xx}= 1.54 X 10^{12}. 05

Q.9 A non cylindrical PSC pipe having ID 1200mm and thickness 75mm is required to convey the water at working pressure of 1.20 N/mm^2. The length of the pipe is 6.0 m. The maximum and minimum compressive stresses in the concrete are 15 and 2.0 N/mm^2. The loss ratio is 0.85. 13

i) Design circumferential wire winding using 5mm dia. Wires stressed to 1000N/mm^2

ii) Design longitudinal prestressing using 7mm dia. Wires tensioned to 980N/mm^2. The maximum permissible tensile stress under critical transient loading (wire wrapping at spigot end) should not exceed 0.8 $(f_{ck})^{0.5}$ where f_{ck} is cube strength of concrete at transfer and is 40N/mm^2.

iii) Check safety against longitudinal stresses that develop considering the pipe as hollow circular beam as per IS 784.

Q.10 a) Design the prestressing force and eccentricity for a symmetrical I- section beam having flanges of width 260mm and thickness of flange being 100mm. Thickness of web= 50mm. overall depth of I- section = 520mm, span of the beam =9.0m.The beam supports uniformly distributed live load of 8.0 kN/m. assume compressive strength of concrete at transfer stage as 15.0N/mm^2, loss ratio = 0.80. No tensile stresses are permitted at any of the stage. If 5.0mm dia. HT wires are used which are initially stressed to 1200 N/mm^2, find the no. of wires. 11

b) The horizontal prestress at the centroid of the concrete beam of rectangular section 120mm X 250mm is 7N/mm^2 and the maximum shearing force on the beam is 70.0kN.Calculate the maximum principle tensile stress resulted. 02

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-446
FACULTY OF SCIENCE AND TECHNOLOGY
B.E.(Civil) (Sem-I)
Elective-I: Town Planning
[OLD]

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

Please check whether you have got the right question paper.

N.B.: 1) Q.1 and Q.6 are compulsory.
2) Answer any two questions from each section.

Section A

Q.1 Solve any five:- 10

1) Explain the necessity of Town planning.
2) Explain beginning of civilization.
3) Explain golden age of greece(5^{th} century)
4) What do you mean by vertical growth?
5) What are the objectives of BYE LAWS.
6) Define set back.
7) Why was Borlow commission appointed?
8) Describe monumental planning.

Q.2 a) What is the aim, objectives and principles of Town planning? 07
b) Describe river valley civilization. 08

Q.3 a) What are the salient of town planning act 1909? 07
b) Describe monumental structures during the Moghul period. 08

Q.4 a) What are the bye laws? Explain bye law related to set back with typical example. 07
b) Write a note on Dudley report. 08

Q.5 Write short note on any three:- 15

1) Need for organic planning.
2) Garden city
3) Bombay Town Planning act 1915.
4) Fire Protection Bye laws.

Section B

Q.6 Answer any five questions. 10

1) Explain the importance of public building.
2) What are the different methods of data collection?
3) Describe height zoning.

4) Describe aesthetic of road.
5) What are the various forms of recreation amenities?
6) Explain the distribution of land for built up areas.
7) Describe classification of Industries.
8) What are the different forms of road markings?

Q.7 a) What are the objectives, principles and advantages of zoning? 07

b) What are the objects of Development plan? Which data has to be collected from various surveys? 08

Q.8 a) What are the objectives of Traffic management? What traffic surveys are to be carried out? 07

b) What is the purpose of street lightning? Explain different arrangement with neat sketch. 08

Q.9 a) What are the different housing problems in India? 07

b) Define slum. What are the different causes and preventive measure against slums? 08

Q.10 Write short note on any three:- 15

i) Site selection for industries
ii) Planning of Public building
iii) Smart city
iv) Parking survey

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-447
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-I)
Elective-I: Computer Applications in Civil Engineering
(OLD)

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

Please check whether you have got the right question paper.

N.B i) Solve any three questions from each section.
ii) Q. No 1 & 5 are compulsory.

Section A

Q.1 Solve any three 12
a) Enlist applications of finite difference method in various fields.
b) What is mean by finite element methods? Give advantages for it
c) Enlist boundary conditions for finite element methods for beams.
d) Enlist boundary condition for finite element method for columns.

Q.2 Analysis buckling in short column by using finite difference method. 14

Q.3 a) Enlist different approaches used in finite element method. 07

b) Give introduction and applications, in civil engineering for finite element method. 07

Q.4 Analysis of rigid jointed frame by using finite element method. 14

Section B

Q.5 Solve any three 12
a) What is SCILAB and what does SCILAB do?
b) Describe SDOF
c) What is mean by dumpers? Explain in details of their functions.
d) Describe overviews on SCILABS.

Q.6 Make Algorithm for Analysis of beam for SCILAB. 14

Q.7 A structure is modeled as a dumped oscillator having a spring constant K=30KN/m and undamped natural frequency $w = 25rad/sec.$ Experimentally it was found that force of 1KN produced a relative velocity 1.0 m/sec in the damping element. 14
Determine
a) The damping ratio ξ
b) The damped period T_D
c) The logarithmic decrement δ
d) The ratio between Two consecutive amplitudes.

Q.8 A machine having a total weight of 820kg, including its foundation, is to be isolated from the vibration of the ground , which is $f = 22.8cPc$, due to other machines operating nearby . Determine the stiffness of a rubber isolation spring to limit the transmitted vibration to $1/10$: 14

a) Neglect damping and

b) Consider damping given by the expression $c = K/170$obtained experimentally [unit $c = kg.sec/cm$ and$k = kg\ /\ cm$].

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-448
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil) (Sem-I)
Elective-I: Plumbing Engineering
[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 each section.
3. Assume suitable data if necessary.

Section– A

Q.1 Attempt the following. 10

I. Design a water supply system for 10 floors residential building of 36 flats, each flat is occupied by 5 persons. Ground floor for parking. Assume suitable data if necesssary. Use UPC-I-2017-India.

Q.2 (a) What is flood rim level in vent? Explain the basic floor rim level system in residential building with neat sketch. 07

(b) How will you select pump for water supply in residential building. Explain the procedure for calculating efficiency of centrifugal pump as per UPC-I-2017-India. 08

Q.3 (a) What is plumbing engineering? State the various objectives and application of plumbing engineering. 05

(b) Calculate the velocity and rate of flow in sewerhaving diameter 40cm with an invert slope of 1 in 600. Sewer in running full condition. Take Manning's constant N=0.015. Use UPC-I-2008-India. 10

Q.4 (a) Write in details DO'S and DONT'S for plumbing and sanitary work in detail. 07

(b) What is indirect waste? Under which circumstances, indirect waste is required. Explain with neat sketch. 08

Q.5 (a) What is trap? Enlist various types of traps. Explain all traps according to location and purpose in detail with neat sketch. 07

(b) What are the various types of pipes used in plumbing systems of building? Explain with neat sketches jointing methods of any four pipes in detail. 08

Section – B

Q.6 Attempt the following 10

I. A combined sewer of circular cross section is to be constructed for a colony. Design the sewer for following data.

1) Area to be covered by sewer line =100 hectors
2) Population = 90,000
3) Maximum velocity of flow=3 m/sec.

4) Time of entry=3 minutes
5) Time of flow=17 minutes
6) Rate of water supply=250 lit./head/day
7) Impermeability factor=0.50. Design as per UPC-I-2017-India.

Q.7 a) Explain the septic tank with neat sketch. Find the size of septic tank designed to serve 200 hostel students in village area. 07

b) Explain fitting suitability for following pipes for building sewers. 08
i) RCC ii) PVC iii) Vitreous china clay.

Q.8 a) What is rain water harvesting? Why rainwater is to be harvested? Explain rainwater harvesting system in case of residential building with neat sketch. 07

b) What is solar hot water? Explain solar hot water system for residential building with neat sketch. 08

Q.9 a) Explain various principles of good sanitary drainage system? Draw neat sketch of drainage plan by considering principles and explain working as per flow chart. 07

b) Explain with neat sketch one pipe and two pipe sanitary drainage systems in detail 08

Q.10 Attempt the Following (Any Five) 15

i. A PVC pipe of length 12m connected to a roof tank. Calculate the pressure at exit of pipe.
ii. If water flow rate at wash basin is 7 lit/minute with pipe diameter 1 inch, calculate velocity.
iii. If a customer complains their house has too little water pressure, what steps would you take to fix this problem?
iv. A residential apartment consist of eight floors having 2-BHK-3 flat and 1-BHK-3 flat on each floor. Find out demand of water supply for apartment.
v. What is the minimum rate of flow at all fixture of plumbing?
vi. Draw elevation of two pipe sanitary drainage system.

H-449

Total No. of Printed Pages:01

SUBJECT CODE NO:- H-449
FACULTY OF SCIENCE AND TECHNOLOGY
B.E.(Civil) (Sem-I)
Elective-I: Ground Water Engineering
[OLD]

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

Please check whether you have got the right question paper.

N.B.: 1) Q.1 and Q.6 are compulsory.
2) Solve any two questions from each section.

Section A

Q.1	a)	What do you mean by infiltration gallery?	05
	b)	Distinguish between Laminar flow and turbulent flow.	05
Q.2	a)	What are the different methods adopted for groundwater exploitation?Explain any one in detail.	07
	b)	Write a note on the various geologicalformations that act as a good aquifer.	08
Q.3	a)	State the assumptions and limitations of Dupuits theory.	07
	b)	Explain the importance of study of ground water table fluctuations.	08
Q.4	a)	Explain Thesis and Jacobs method for discharge analysis.	07
	b)	What are the different types of wells? Explain any one in detail.	08
Q.5	a)	State the principle of sludge test in wells. Also enumerate its objectives.	07
	b)	How does the maintenance of wells are carried out?	08

Section B

Q.6	a)	Explain electrical resistivity method of geological investigation.	05
	b)	Discuss various preventive measures of ground water contamination.	05
Q.7	a)	What do you mean by Tracer techniques? Where it is used?	07
	b)	Explain in detail gravity method for ground water exploration.	08
Q.8	a)	List out the various methods of artificial recharge. Explain any one in detail with a neat sketch.	07
	b)	Write short note on water shed management.	08
Q.9	a)	How can define pumps & its types for suitability.	07
	b)	What are the different types of pumps? Explain the suitability of each.	08
Q.10	a)	Write a short note on rain water harvesting.	07
	b)	Explain the salient features of ground water legislation.	08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-456
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil/Mech./EE/ECT) (Sem-I)
Elective-I: SAP Material Management - I
(OLD)

[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 & Q.No.6 from Section B is compulsory.
2) Form remaining questions in Section A & B students are supposed to solve any two questions from each section.
3) Assume suitable data whenever necessary.
4) Draw neat sketches wherever necessary.

Section A

Q.1 Write note on(Any Two) 10
a) SAP ERP Financial.
b) Human capital management.
c) SAP Net weaver.

Q.2 a) Explain procedure for vendor creation. 07
b) How to maintain purchase record? 08

Q.3 a) Explain drafting, executing a planning run. 07
b) What is outlining MRP procedure? 08

Q.4 a) State "SAP Services". 07
b) What is mean by material valuation? Explain in brief. 08

Q.5 a) What are the essential components in SAP MM? 07
b) List out and explain important fields in purchasing view. 08

Section B

Q.6 Write note on(Any Two) 10
a) Special function in info record.
b) Schedule agreement without release document.
c) Document release procedure.

Q.7 a) Explain configuring release procedures in customizing. 07
b) Explain in brief optimizing purchase procedure. 08

Q.8 a) How to release blocked invoices? 07
b) What are the possible reasons for blocking of invoices? 08

Q.9	a)	How to block sources of supply.	07
	b)	Explain in brief source determination.	08
Q.10	a)	How does the system calculate non-deductible taxes?	07
	b)	What is the difference between a contract and scheduling agreement?	08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-646
FACULTY OF SCIENCE AND TECHNOLOGY
B.E.(CIVIL) (Sem-I)
Elective-I Ground Water Engineering
(CGPA)

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

Please check whether you have got the right question paper.

N.B
1) Q.No.1 and 6 are compulsory.
2) Attempt any two questions from each section from remaining.
3) Draw neat sketches wherever necessary.
4) Figures to right indicate full marks.

Section A

Q.1 Answer the following questions (any five) 10
a) Define aeration zone
b) Define aquifer in short
c) Explain in short infiltration mechanism
d) Define void ratio
e) Define porosity
f) Define laminar flow in short
g) Define unconfined aquifer

Q.2 a) Explain electric resistivity method in detail. 08
b) Explain soil as three phase system. 07

Q.3 What is ground water exploration? Write down its subsurface investigation method and surface investigation method and explain. 15

Q.4 a) Explain vadose zone in detail with suitable diagram. 08
b) Explain phreatic zone (zone of saturation) in detail with suitable diagram. 07

Q.5 Write short note on (Any three) 15
a) Write a note on water table fluctuation
b) Explain flow net analysis with suitable diagram
c) Write a note on steady flow state of fluid
d) Write a note on cone of depression
e) Write a note on construction of well

Section B

Q.6 Answer the following (any 2) 10

a) Explain discharge ratesand demand
b) Explain Ratiometric method
c) Write a note on water quality

Q.7 a) Explain waste water recharge in detail. 07

b) What is saline water intrusion explain in detail? 08

Q.8 Why watershed management techniques are essential? Explain any five watershed management techniques. 15

Q.9 a) Which watershed management technique will you choose or which is the best watershed management technique? 08

b) Write a short note on Prevention and control of saline water intrusion 07

Q.10 Write short note on (Any three) 15

a) Importance of watershed management in agricultural field
b) Heads and Losses
c) Farm pond watershed management technique
d) Artificial recharge methods of ground water
e) Importance of rain water harvesting in urban (city) area