AIKTC/KRRC/SoET/ACKN/QUES/2018-19/ **Date:** _____

School: SoET-CBCS **Branch:** CIVIL ENGG. **SEM:** V

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Structural Analysis – II	CE-C501		✓	02
2	Geotechnical Engg. - I	CE-C502		✓	02
3	Applied Hydrolics-I	CE-C503		✓	02
4	Environmental Engineering - I	CE-C504		✓	02
5	Transportation Engg. – I	CE-C505		✓	02
6	Department Level I–Optional Course Building Services & Repairs (DLOC)	CE-C506		✓	02
7	~~Business and Communication Ethics~~ Advanced Concrete Technology			✓	02

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

60

9/5/19

(3 Hours) [Total Marks: 80

N.B: (1) Question **No. 1** is compulsory.

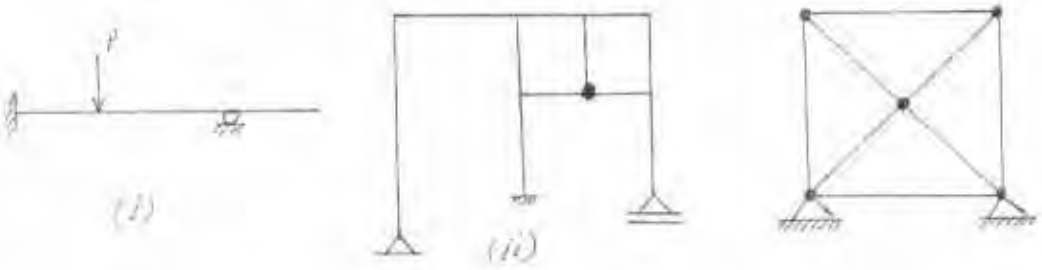
(2) Attempt any **Three** questions out of remaining five questions.

(3) Assume suitable data wherever required and state it clearly.

(4) Illustrate your answers with neat component sketches wherever required.

1. Attempt any four of the following 20

(a) Determine degree of static and kinematic indeterminacy of following structures. 06

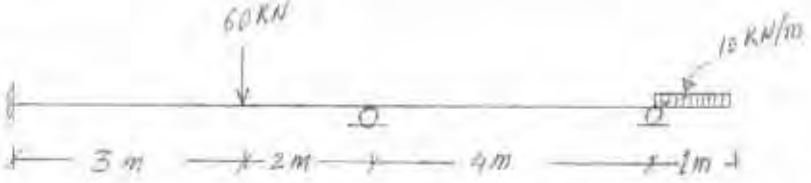


(b) Derive the slope deflection equation for continuous beam subjected to sinking of support. 04

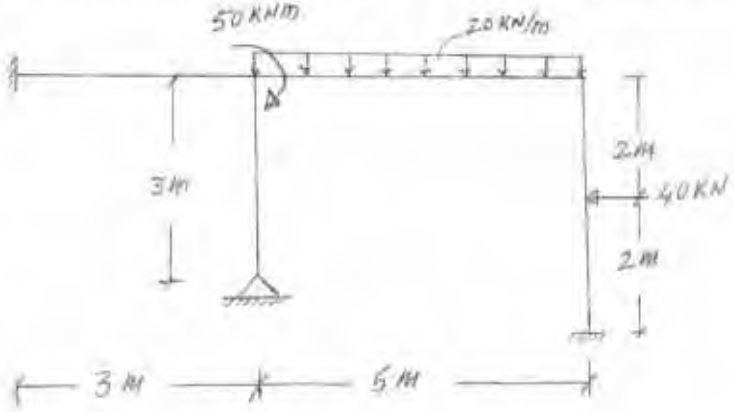
(c) Determine shape factor for isosceles triangular section having base 'b' and height 'h' 07

(d) Explain stiffness factor, carry over moment and distribution factor. 03

2. (a) Draw BMD and SFD for continuous beam shown below using Clapeyrons theorem. 08

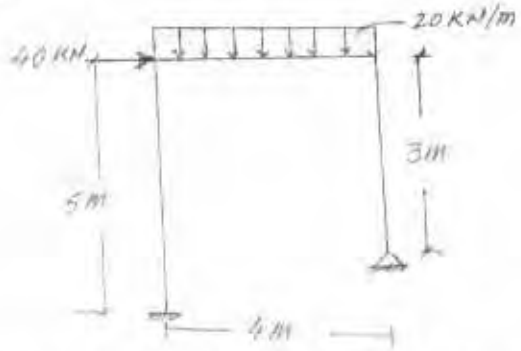


(b) Analyze the frame given below using slope deflection method. Draw BMD 12

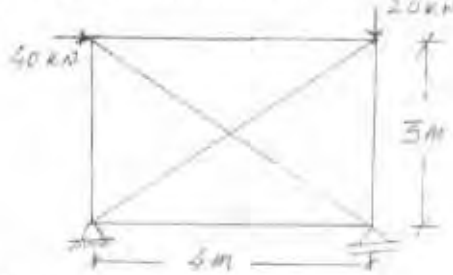


1/3

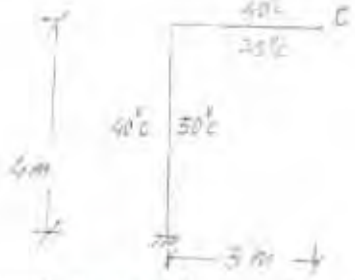
3. Analyse the frame shown, using Moment distribution method or Kani's method. 20



4. (a) Determine forces in each member of pin jointed frame as shown. Use force method. A=200 mm², E=200GPa. 10

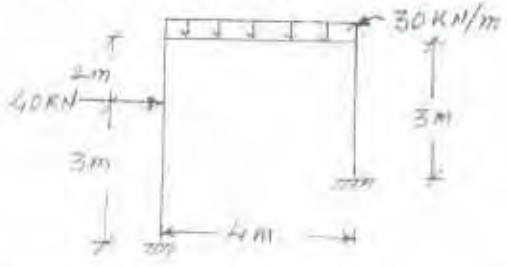


(b) Work out the vertical deflection of point C due to change in temperature as indicated. Take thickness of each member 400 mm. and $\alpha_t = 12 \times 10^{-6}/^{\circ}C$. E=200 GPa 07



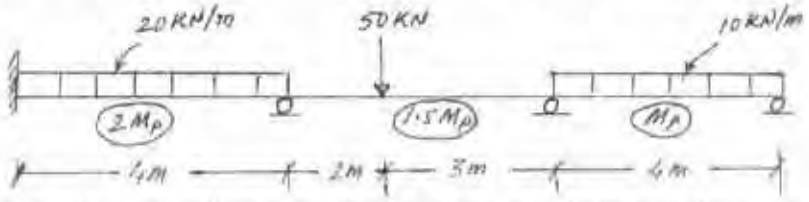
(c) State the assumptions made theory of plastic analysis. 03

5. (a) Analyse the portal frame shown below, using stiffness matrix OR Flexibility Matrix method. Draw BMD and deflected shape. 16

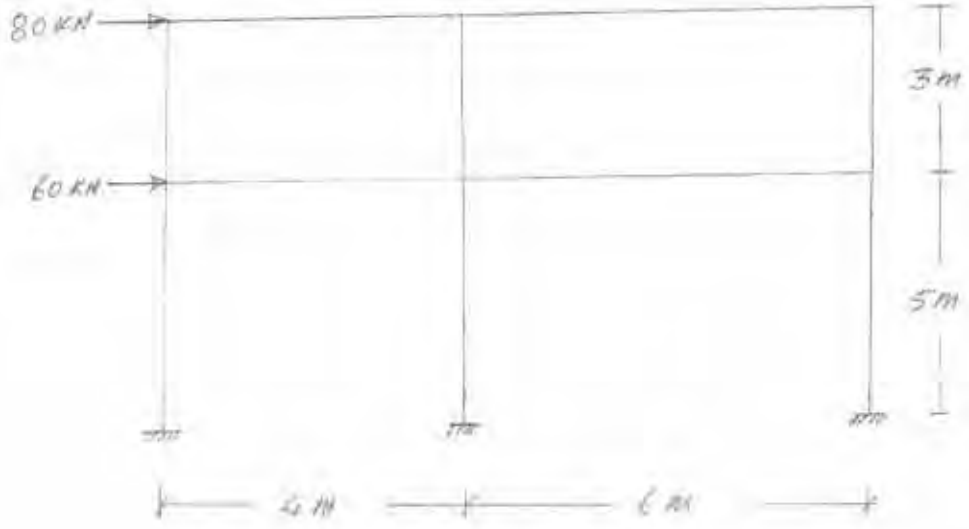


(b) State the advantage and disadvantage of indeterminate structure 04

6. (a) Find plastic moment of resistance for beam shown in figure. 08



(b) Using the approximate method analyse the building frame subjected to horizontal forces as shown in figure. Also draw BMD. 12



T.E - Sem-V - Choice Based - Civil

15/5/19

30

Paper / Subject Code: 31802 / Geotechnical Engineering - I

(Time: 3 Hours) **Max Marks: 80**

N.B 1. Attempt any **4** out of six questions
2. Question **1** is compulsory
3. Assume any suitable data where ever required

Q.1 Attempt any **four**

a. Derive the relation between Bulk unit weight, Specific gravity ,void ratio and degree of saturation starting from fundamentals **05**

b. Explain the principle of sedimentation analysis for determining the particle size distribution of soil passing through 75 μ and explain the corrections applied in hydrometer analysis **05**

c. What will be the ratio of average permeability in horizontal direction to that of vertical direction for the soil deposit consisting of three horizontal layers, if the thickness and permeability of second layer twice of first ,and those of third layer twice those of second **05**

d. Explain briefly the effect of compaction on engineering properties of soil **05**

e. Define liquidity index and flow index. Also classify the soil having w_l=56% and w_p=25%and comment on its use as embankment material **05**

Q.2 a. Derive the expression for determining moisture content by pycnometer method **05**

b. Soil is required to be excavated from borrow pits for building an embankment of height 6m ,top width 2m and side slopes 1:1. The unit weight of undisturbed soil in wet condition is 18kN/m^{3}and natural water content is 8% and dry density required in embankment is 20kN/m^3 with water content of 10%.G=2.7. Estimate the quantity of soil to be excavated from borrow area to construct one meter length of embankment. If each truck has a capacity to carry 80kN/trip, calculate how many truck loads are required? What are the values of porosity and degree of saturation of embankment **10**

c. Write a short notes on Atterberg limits **05**

Q.3 a. The plastic limit of soil is 25% and plasticity index is 8%.when the soil is dried from its state at plastic limit, the volume change is 25% of its volume at plastic limit. Similarly the corresponding volume change from liquid limit to dry state is 34% of its volume at liquid limit. Find the shrinkage limit and shrinkage ratio **06**

b. Sieve analysis was performed on 1000 gm of dry soil sample and the following observations were made: **10**

Sieve Size (mm)	20	10	4.75	2	1	0.6	0.425	0.3	0.212	0.15	0.075
Mass Retained (gm)	33	49	85	140	160	142	118	82	56	35	23

If the liquid limit and plasticity index of the sample is 15% and 20% respectively, classify the soil sample as per IS classification.

c. Explain the role of Montmorillonite and Kaolinite minerals in producing plastic behaviour 04

Q.4 a. A laboratory constant head permeability test was conducted in a silty specimen of void ratio 0.45. The cylindrical specimen had a diameter of 7.3cm and height of 16.8cm.the head during the test was 75cm.after one minute of testing a total 775.6gm of water was collected. Compute the coefficient of permeability in m/sec. If the void ratio changes to 0.38 what would be the change in permeability. Also calculate the seepage velocity for both the void ratios 10

b. A granular soil deposit 8m deep over an impermeable layer. The ground water table is 4m below ground level. The deposit has a zone of capillary rise of 2m with a saturation of 50%. Plot the variation of total, pore water and effective pressure diagram with e=0.6 and G=2.65. 10

Q.5 a. A pumping out test was carried out in the field in order to determine the average coefficient of permeability of 18m thick sand layer. The ground water table is at a depth of 2.2m below the ground level. A steady state was reached when the discharge from the well was 21.5lt/sec. A this stage the drawdown in the test well was 2.54m while the drawdown in the two observation wells situated at 8m and 20m from the test well were found to be 1.76m and 1.27m respectively. Find coefficient of permeability and radius of influence 10

b. Define Darcy's Law and list out the assumptions of Laplase equation for Two dimensional flow 05

c. A 1.25m layer of soil n=35%, G=2.65 is subjected to an upward seepage head of 1.85m. What depth of coarse sand would be required Above the existing soil to provide a factor of safety of 2 against piping? Assume the coarse sand has the same porosity and specific gravity as soil and there is negligible head loss in sand 05

Q.6 a. Define relative compaction , placement water content and zero air voids line 05

b. Explain the corrections applied for standard penetration test 05

c. A core cutter 12.6cm in height and 10.2cm in diameter weighs 1071gm when empty. It is used to determine the insitu unit weight of an embankment. Height of the core full of soil is 2970gm. If the water content is 6%, what are the insitu dry density and porosity? If the embankment is fully saturated due to heavy rains what will be the increase in water content and bulk density if there is no change in porosity. Given G=2.69 10

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TE-sem-V- choice Based - Civil.

Paper / Subject Code: 31803 / Applied Hydraulics

21/5/1

(Time: 3 hours) **Total marks: 80**

N:B **(1)Question no. 01 is compulsory.**
(2)Attempt any 3 questions out of the remaining 5 questions.
(3)Assume data wherever necessary and clearly mention the assumption made.
(4)Draw neat figures as required.

Q1		Attempt Any Four	20
	A	Define hydraulic efficiency, mechanical efficiency and overall efficiency of a Turbine.	
	B	Explain undistorted models. What is the use of undistorted models?	
	C	What is priming? Why is it necessary?	
	D	Derive the conditions for most economical circular channel section for maximum discharge.	
	E	Derive moment of momentum equation.	
	F	Compare between impulse turbine and reaction turbine.	
Q2	A	Derive on the basis of dimensional analysis suitable parameters to present the thrust developed by a propeller. Assume that the thrust P depends on the angular velocity ω, speed of advance V, diameter D, dynamic viscosity μ, mass density ρ. elasticity of the fluid medium which can be denoted by the speed of the sound in the medium C.	10
	B	A lawn sprinkler has two nozzles of diameter 10 mm each at the end of a rotating arm and the velocity of flow of water from each nozzle is 12 m/sec. One nozzle discharges water in the downward direction, while the other nozzle discharges water vertically up. The nozzles are at distance of 42 cm from the center of the rotating arm. Determine the torque required to hold the rotating arm stationary. Also determine the constant speed of rotation of arm, if it is free to rotate.	10
Q3	A	What are the methods of dimensional analysis) Explain it.	10
	B	What is jet propulsion of ship ? Explain with neat sketch.	10
Q4	A	A jet of water having a velocity of 15 m/s strikes a curved vane, which is moving with a velocity of 5 m/s in the same direction as that of the jet at inlet. The vane is so shaped that the jet is deflected through 135 degrees. The diameter of jet is 100 mm. Assuming the vane to be smooth, find force exerted by the jet on the vane in the direction of motion, power exerted on the vane and efficiency of the vane.	10
	B	A turbine is to operate under a head of 25 m at 200 r.p.m. The discharge is 9 cumec. If the efficiency is 90%, determine the performance of the turbine under a head of 20 meters.	10
Q5	A	Define cavitations. What are the effects of cavitations?	5
	B	What do you mean by multistage pumps	5
	C	The discharge through a rectangular channel of width 6 m, is 18 m^3/sec when depth of flow of water is 2 m. Calculate i) Specific energy of the flowing water, ii) Critical depth and critical velocity and iii) Value of minimum specific energy.	10
Q6	A	Describe briefly the functions of main components of Pelton wheel turbine with neat sketches	10
	B	Explain hydraulic jump. And Derive an expression for loss of energy due to hydraulic jump.	

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(78)

TE-sem-V-choice Based – Civil

Paper / Subject Code: 31804 / Environmental Engineering - I

27/5/1

(3 hours) Marks : 80

N.B.

1. Question **No 1 is compulsory**
2. Attempt any three questions from the remaining **five** questions
3. Assume **suitable** data where ever required
4. **Figures** to the **right** indicate **full** marks

Q.1 Attempt any four (20)

a. Write down the permissible limits for following parameters set by BIS and its significance **i)** Residual chlorine **ii)** Turbidity **iii)** hardness **iv)** chlorides **v)** Alkalinity.
b. Explain classification of distribution system with neat sketch.
c. Give the requirements of good water meter.
d. What are the impacts of air pollution on man and environment?
e. Compare chlorine and ozone as disinfectant

Q.2

a. Draw the flow diagram of water treatment process and explain each component in details. (10)
b. What do you mean by intake structure? Explain any 3 types of it (05)
c. What are the factors that affecting efficiency of sedimentation? (05)

Q.3

a. Design approximate dimensions of a set of rapid gravity filters for treating water required for a population of 65,000. The rate of supply being 140 lpcd. The filters are rated to work 5000 lit/ hr/m^2. Assume data necessary. (05)
b. Draw the neat and well labeled sketch of pressure filter. (05)
c. Explain different methods of disinfection and its suitability (10)

Q.4

a. Explain in detail sources, effects, control methods of noise pollution. (10)
b. Calculate quantity of bleaching powder required per day for disinfecting 5 MLD. The dose of chlorine has to be 0.7 ppm and bleaching powder contains 30% of available chlorine. (10)

Q.5

a. Classify and discuss the different air pollutants. (10)
b. Define water softening. Explain Ion-exchange process in detail (10)

Q.6 Write short note on following **(any four)** (20)

a. Residual chlorine.
b. Tube settlers.
c. Rapid mixing devices.
d. Reverse osmosis.
e. Methods of collection of rain water for direct use.
f. Occupational hazards due to air pollution.

(AV)

TE - sem - V - ~~CBSGS~~ choice Based - QP1 31/5/19

Paper / Subject Code: 31805 / Transportation Engineering - I

(3 Hours) **[Total Marks: 80**

Note: i. Q. No. 1 is **compulsory**
ii. Attempt **any 3** out of remaining 5
iii. Support all **theory and numerical** with neat sketch

1. **Solve any four** (20 M)
   A. Discuss on the Role of IRC, MORTH and CRRI
   B. Compare Bitumen, Tar and Asphalt
   C. What is L.O.S? explain various L.O.S.
   D. The value of characteristic deflection is 2.35 mm, find the corrected Characteristic value if temperature of pavement during test was 29°C and Moisture correction factor is 1.2.
   E. Find vehicle damage factor for:
      a. Bike with 2 Occupants
      b. Car with 4 Occupants
      c. LCV with rear axle load of 2 tons
      d. HCV with rear axle load of 15 tons

2. A. Determine Median & Modal Speed for the following data. Also determine the design speed, upper limit & lower limit speed. (08 M)

Speed Range (KMPH)	Frequency (qi)
0-8	0
8-16	8
16-24	12
24 – 30	21
30 – 36	29
36 – 42	35
42 – 48	28
48 – 54	11
54 – 60	0

   B. Discuss in detail on desirable properties of pavement materials (06 M)
   C. Compare the following (06 M)
      i. AADT and ADT
      ii. Journey Speed and Running Speed
      iii. Space headway and Time headway

3. A. What is Lane distribution factor? Give its value. Also determine Million Standard Axle for divided road having 3 lanes with initial traffic 600 cvpd during start of construction. Rate of growth is 7.5 %, VDF is 2.5, CBR is 4 %, construction period is 2 years & design life is 15 years. (08 M)

B. Two cars are travelling at 35 kmph on a road with coefficient of friction 0.2. Driver of car 1 has reaction time 2.5 sec and driver of car 2 has 2.0 sec. If in case both cars stop at same distance from first seeing obstacle, determine break efficiency of car 1, if that of car 2 is 0.3. (06 M)

C. Explain Construction procedure of Cement concrete pavement in detail (06 M)

4. A. Derive the equation for Overtaking Sight Distance. Also draw sketch of overtaking zone if the speed of vehicle is 65 KMPH. (08 M)

B. Compare rigid, flexible and WBM pavement on the basis of suitability, Binding material used, load distribution, value of camber and maintenance required (06 M)

C. Design a tie bar for pavement width 3.5 m & thickness of pavement 26 cm. Assume value of f = 1.2 (06 M)

5. A. Design Super-elevation for a curve having radius 500 m & speed is 100 kmph. Also find the amount of super-elevation to be given if it is a 2-lane road. (08 M)

B. Find out the warping stress of 25 cm thick CC pavement with transverse joint at 5 m & longitudinal joints at 3.6 m interval. Take k = 6.9 kg/cm^3, a = 15 cm, temperature difference is 0.6°C /cm slab thickness in day. Take E = 3 x 10^5 kg/cm^2, e = 10 x 10^{-6}/°C, Radius of relative stiffness = 87.2 cm. (06 M)

C. Discuss on various rigid pavement failures. (06 M)

6. A. **Write short note on any 3.** (15 M)

i. Setback distance
ii. Highway drainage
iii. Rotary Island
iv. Bitumen stabilization

B. **Answer the following**

i. What is meant by Abrasion Charges? (01 M)
ii. Discuss on Golden Quadrangle project. (02 M)
iii. Define Flaky and Elongated Aggregates (02 M)

(3) TE - sem - V - Choice Based - 4N1 7/6/19

Paper / Subject Code: 31808 / Elective - I Building Services and Repairs (DLOC)

Time: 3 Hours Total Marks:80

PLEASE NOTE:

1. Question **No 1** is **Compulsory.**
2. Attempt any **three** questions out of remaining questions
3. Figures to the right indicate full marks.

Q1		Answer any four questions	20
	a)	Write a note on concrete mixers & vibrators.	
	b)	Why the water meter is to be installed. Discuss its working.	
	c)	What are the various causes of fire in a building	
	d)	Explain single phase & three phase electric supply	
	e)	Discuss the various causes of deterioration of concrete structures.	
	f)	Write a note on concrete core test.	
Q2	a)	Describe desired properties of a repair material	05
	b)	Explain with neat sketch Ultrasonic pulse velocity test	05
	c)	Describe Classification of lighting	05
	d)	Write a note on Septic tank	05
Q3	a)	Explain the lifts & escalators.	07
	b)	Discuss about the various plumbing services in a building.	07
	c)	Explain pull-out test.	06
Q4		Write notes on any **FOUR**:	20
	a)	Polymer modified concrete used for repair	
	b)	Causes of seepage & leakage in structures	

c) Visual task & factors affecting visual task

d) Rebound hammer test

e) Heat & smoke detectors

Q5 a) Explain above grade & below grade water-proofing of concrete structures. 10

b) Explain transformers & switchgears. 10

Q6 Write notes on the following(any four) 20

a) Lighting for stores

b) Corrosion inhibitors

c) Types of earthing

d) Cathodic protection

e) Explain above grade & below grade water-proofing of concrete structures.

f) Transformers & switchgears.

(3 Hours) (Total Marks: 80)

Note: 1. **Question number 1** is **compulsory**; attempt **any three** out of remaining five questions.
2. Assume suitable **data** if **required** and mention it clearly.
3. Draw neat sketches wherever necessary. Figure to the right indicates full marks.

1. Attempt any four. **[20]**

(a) Explain hydration of cement and requirement of water in hydration

(b) Write a short note on maturity of concrete.

(c) Explain the properties of fresh concrete.

(d) Mention methods of prevention of steel corrosion. Explain any one in brief.

(e) Write a short note on waste material-based concrete.

2. (a) What are the special problems encountered in hot weather concreting? How are they rectified? **[06]**

(b) Design a concrete mix by IS 10262: 2009 for the following data: **[14]**

i. Characteristic compressive strength required in the field at 28 days grade designation = M 25
ii. Standard Deviation = 4.0
iii. Nominal maximum size of aggregate = 20 mm
iv. Shape of C.A aggregate = Angular
v. Degree of workability required at site = 50-75 mm slump
vi. Type of exposure = mild
vii. Method of concrete placing = Pumpable concrete
viii. Specific gravity of cement = 3.15
ix. Specific gravity of C.A = 2.84
x. Specific gravity of F.A = 2.64
xi. Aggregates are assumed to be in saturated surface dry condition.
xii. F.A belongs to Zone II

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(*Clauses* 4.2, A-5 *and* B-5)

Sl No.	Nominal Maximum Size of Aggregate	Maximum Water Content [1]
	mm	kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

[1] Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate
(*Clauses* 4.4, A-7 *and* B-7)

Sl No.	Nominal Maximum Size of Aggregate	Volume of Coarse Aggregate[1] per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	mm	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

[1] Volumes are based on aggregates in saturated surface dry condition.

Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 8.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(i)	Mild	220	0.60	–	300	0.55	M 20
(ii)	Moderate	240	0.60	M 15	300	0.50	M 25
(iii)	Severe	250	0.50	M 20	320	0.45	M 30
(iv)	Very severe	260	0.45	M 20	340	0.45	M 35
(v)	Extreme	280	0.40	M 25	360	0.40	M 40

NOTES

1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of pozzolana and slag specified in IS 1489 (Part 1) and IS 455 respectively.

2 Minimum grade for plain concrete under mild exposure condition is not specified.

3. (a) Explain cracking mechanism in FRC member subjected to flexure with neat labelled sketch. **[08]**
   (b) What are the effects of aspect ratio on relative strength and toughness of concrete. **[03]**
   (c) What are the factors to get good concrete performance in aggressive environment? **[04]**
   (d) Explain various methods of curing of concrete. **[05]**

4. (a) What is non -destructive testing of concrete? What are the various tests involved? Explain any one in detail with a neat sketch. **[10]**
   (b) Define High performance concrete. Give its constituents. What are the various parameters considered in the production of H.P.C? **[05]**
   (c) Define cold weather concrete. What are the precautions to be taken during cold weather concreting? **[05]**

5. (a) Explain Alkali Carbonate reaction in concrete in detail. **[05]**
   (b) Explain in detail the advantages and disadvantages of light weight aggregate concrete. **[05]**
   (c) Design a concrete mix by ACI method for the following data: **[10]**
      i. Characteristic compressive strength required in the field at 28 days grade designation = M 20
      ii. Standard Deviation = 4.0
      iii. Nominal maximum size of aggregate = 20 mm
      iv. Type of cement = Type I
      v. Shape of C.A aggregate = Crushed Angular
      vi. Degree of workability required at site = 100 mm slump
      vii. Type of exposure = mild
      viii. Dry rodded density of coarse aggregate = 1640 kg/mm^3
      ix. Specific gravity of cement = 3.15
      x. Specific gravity of C.A = 2.78
      xi. Specific gravity of F.A = 2.72
      xii. Degree of supervision = Good
      xiii. Maximum water cement ratio = 0.50
      xiv. Fineness modulus = 2.8
      xv. Aggregates are assumed to be in saturated surface dry condition.

6. Write a short note on any four of the following: [20]

(a) Self-Compacting concrete
(b) Sulphur concrete
(c) Properties of metallic fibers
(d) Gap graded concrete
(e) Durability of concrete

Table 6 Approximate mixing water and air contents for different slumps and max. size of aggregates

Slump (mm)	*Maximum quantity of water (kg/m³) for specified nominal maximum size of aggregate@*							
	10	*14*	*20*	*28*	*40*	*56**	*80**	*150**
1. Non-air-entrained concrete								
Stiff-plastic (25–50)	207	199	190	179	166	154	130	113
Plastic (75–100)	228	216	285	193	181	169	145	124
Flowing (150–175)	243	228	216	202	190	178	160	-
Approximate Entrapped air (%)	3.0	2.5	2.0	1.5	1.0	0.5	0.3	0.2
2. Air-entrained concrete								
Stiff-plastic (25–50)	181	175	168	160	150	142	122	107
Plastic (75–100)	202	193	184	175	165	157	133	119
Flowing (150–175)	216	205	197	184	174	166	154	-
3. Recommended average total air content (%)								
Mild exposure	4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0
Moderate exposure	6.0	5.5	5.0	4.5	4.5	4.0	3.5	3.0
Severe exposure	7.5	7.0	6.0	6.0	5.5	5.0	4.5	4.0

Table 7: Water-Cement Ratio and Compressive Strength Relationship

28-day compressive strength (N/mm²)*	*Water/cementing material ratio by mass**	
	Non-air-entrained concrete	*Air-entrained concrete*
45	0.38	0.30
40	0.42	0.34
35	0.47	0.39
30	0.54	0.45
25	0.61	0.52
20	0.69	0.60
15	0.97	0.70

Table 8: Volume of Coarse Aggregate per Unit Volume for Different Fine aggregate Fineness Moduli

Nominal maximum size of coarse aggregate (mm)	*Bulk volume of oven-dry-rodded coarse aggregate (m³) fineness modulus of fine aggregate*			
	2.40	*2.60*	*2.80*	*3.00*
10	0.50	0.48	0.46	0.44
14	0.59	0.57	0.55	0.53
20	0.66	0.64	0.62	0.60
28	0.71	0.69	0.67	0.65
40	0.75	0.73	0.71	0.69
56	0.78	0.76	0.74	0.72
80	0.82	0.80	0.78	0.76
150	0.87	0.85	0.83	0.81