



AIKTC/KRRC/SoET/ACKN/QUES/2018-19/

Date: _____

School: SoET-CBSGS

Branch: CIVIL ENGG.

SEM: VII

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	Limit State Method for Reinforced Concrete Structures	CE-C701		✓	02
2	Quantity Survey Estimation and Valuation	CE-C702		✓	02
3	Irrigation Engineering	CE-C703		✓	02
4	Environmental Engineering – II	CE-C704		✓	02
5	Elective – I	CE-E705		✓	02
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Note: SC – Softecopy, HC - Hardecopy

(Shaheen Ansari)
 Librarian, AIKTC

[3 hrs]

[80 marks]

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

(2) Solve any **three** questions from remaining questions.

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

(4) Use of IS 456 not permitted.

1. (a) What are partial safety factors for load and material strength? What is their significance in limit state method of design? 4
- (b) Compute the area of reinforcement required for a balanced section of width 200 mm and effective depth 425 mm as per limit state design. Use M 25 grade concrete and Fe 415 grade steel. 4
- (c) What are the functions of longitudinal and transverse reinforcement in columns? 4
- (d) Explain the concept of effective flange width for analysis and design of T beams 4
- (e) Explain one way shear and two way shear in footings. 4

2. (a) A reinforced concrete beam section of size 250 x 500 mm (overall depth) is reinforced with 4 bars of 20 mm diameter on the tension side at an effective cover of 30mm. Determine the concentrated load that the beam can support at the centre on an effective simply supported span of 5m. The grades of concrete and steel used are M20 and Fe 415 respectively. 10
- (b) Design a reinforced concrete beam with its size restricted to 200 x 400 mm deep overall due to architectural considerations. The beam is subjected to a maximum factored moment of 180kNm at the midspan. Adopt M 20 concrete and Fe 415 steel at an effective cover of 35 mm 10

d' / d	0.05	0.10	0.15	0.20
f_{sc} (N/mm ²)	355.1	351.9	342.4	329.2

3. (a) Draw Whitney's Stress block and hence determine the ultimate moment of resistance of a beam 300 mm wide and 500mm deep considering it as a balanced section. Take $\sigma_{cu} = 20$ N/mm² and $\sigma_{sy} = 425$ N/mm². 05
- (b) Design a combined footing for two columns of a multi-storey building. The columns are of sizes 400mm x 400mm, transmit a working load of 300 kN each and they are spaced at 5m c/c. The safe bearing capacity of soil at site is 200 kN/m². Adopt M20 grade concrete and Fe415 grade steel. Sketch the details of reinforcements in the combined footing. 15

4. (a) A R.C. beam 250 mm x 450 mm effective depth is subjected to an ultimate moment of resistance of 225 kN-m. Calculate the steel reinforcement required for the beam. Assume $\sigma_{cu} = 20 \text{ N/mm}^2$ and $\sigma_{sv} = 425 \text{ N/mm}^2$. Use Ultimate Load Method. 10
- (b) A rectangular R.C beam 300mm x 400 mm deep is subjected to an ultimate torsional moment of 6 kNm, ultimate BM of 40kNm and ultimate shear force of 80kN. Design the torsion reinforcement if the grades of concrete and steel are M 20 and Fe 415 respectively. Assume effective cover to reinforcement as 40mm 10

ρ_t	≤ 0.15	0.25	0.50	0.75	1.0	1.25	1.50	1.75	2.00
τ_c	0.28	0.36	0.48	0.56	0.62	0.67	0.72	0.75	0.79

5. (a) Design a slab on a hall of size 3 m x 5 m effective. The slab is simply supported on 230 mm wall on all four sides. Consider LL 4 kN/m² and floor finish 1 kN/m². Assume M 20 grade of concrete and Fe-415 steel 12

L_y/L_x	1.1	1.2	1.3	1.4	1.5	1.75	2.0
α_x	0.074	0.084	0.093	0.099	0.104	0.113	0.118
α_y	0.061	0.059	0.055	0.051	0.046	0.037	0.029

- b) Design a reinforced concrete T beam section with the following dimensions: 8
 Width of flange = 1250mm
 Thickness of flange = 110 mm
 Width of rib = 275mm
 Effective depth of beam = 550 mm.
 The beam is subjected to a factored moment of 475kNm. Use concrete of grade M 20 and steel of grade Fe 415.
6. (a) A rectangular column of dimensions 250 mm x 500 mm is subjected to an ultimate axial load of 1200kN. Design an isolated footing for the column assuming safe bearing capacity of soil to be 210 kN/m². Adopt grade of concrete M 20 and grade of steel Fe 415. 12
- (b) Design a short square column subjected to a factored load of 2000kN. Adopt grade of concrete M 20 and steel Fe 415. 8

Values of (k) for Solid Slabs

Overall Slab Depth (mm)	≥ 300	275	250	225	200	175	≤ 150
(k)	1.00	1.05	1.10	1.15	1.20	1.25	1.30

NOTE:

- Question No. 1 is compulsory.
- Attempt any three out of the remaining five questions.
- Figures to the right indicate full marks
- Assume suitable data if required and mention it.

- Q.1 Work out the following quantities from given plan & section. (Fig.01) 20
- Concrete (M20) in super structure
 - Internal plaster in c:m 1:4, 12 mm thick.
 - Brick work in c:m 1:5
 - Flooring and skirting
- Q.2 A) Prepare an approximate estimate of the RCC Bungalow with carpet area of 300 sqm. Assume cost of construction of super structure as Rs.8000 / sqm. Assume other necessary required data. 10
- B) What is price escalation clause? Explain it with an example. 05
- C) Draft a typical tender notice for construction of School building in a city area. The work is estimated to cost Rs. 15 crores, to be completed in 18 months. 05
- Q.3 A) Explain factors affecting Task i.e. output of a labour with an example. Perform rate analysis for UCR masonry work in cement mortar 1:6. 10
- B) Define specification. What are the principles of writing a good specification? 10
- Q.4 A) Explain the hook and 90 degree bend allowance for Fe 415 steel. Work out the quantity of materials sand, cement, aggregate, steel and form work in Column of size 300 x 400 mm and height of 3.3m. Main steel 6-16#, Link of 8# @ 200 c/c. 10
- B) A plot of land cost Rs. 40 lacs. The cost of construction of building on the plot including all installation is Rs. 20 lacs. 10
- Allowing a net return of 10 % on the cost of construction and 7% on cost of land, work out the standard rent of the property from the following data -
- Sinking fund @ 6.5% for the future life of 60 years.
 - Annual maintenance @ 0.5% of cost of construction.
 - Other outgoings @ 25% of gross rent.
- Q.5 A) Estimate the quantity of earthwork for a portion of a proposed road from the following data. 10
- | | | | | | | | | | | |
|-------------|-------|------------------------|-------|-------|----------------------|------|-------|-------|-------|-------|
| Dist. in m. | 0 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 |
| GL | 73.12 | 72.44 | 71.86 | 72.08 | 71.3 | 70.8 | 70.54 | 70.82 | 70.96 | 71.50 |
| FL | 72.42 | Downward gradient 0.8% | | | Upward gradient 0.5% | | | | | |
- Proposed formation width of road is 10 m, side slope 1.5:1 in cutting and 2:1 in banking.
- B) List out types of contract and explain any one with its advantages and disadvantages and 8

suitability.

Q.6 Write short notes on (any four)

- Mass haul diagram
- Liquidated damage clause
- IS: 1200
- Price variation clause

• Arbitration

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20

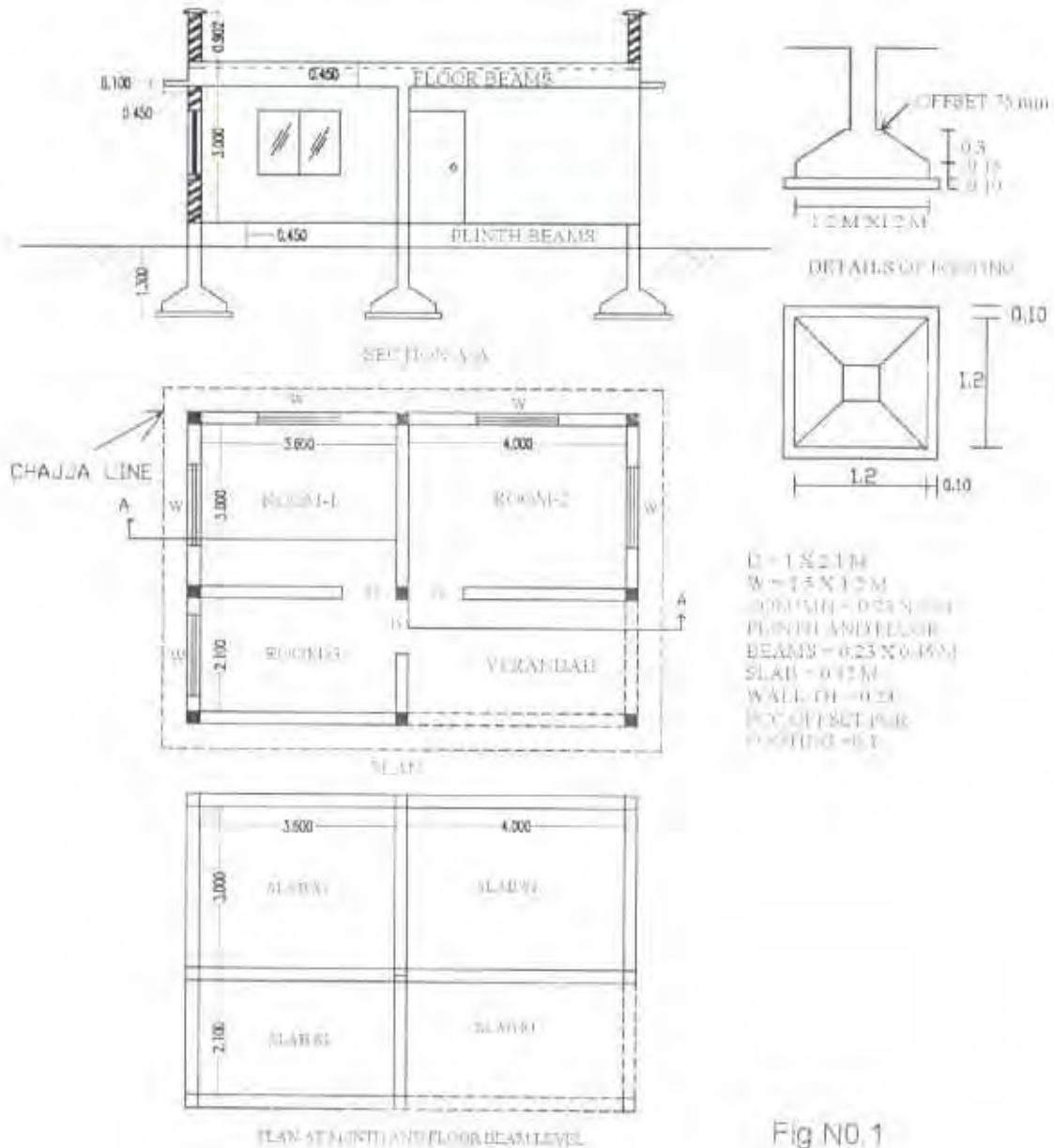


Fig NO.1

1. Question No. One is compulsory.
2. Attempt any Three questions out of remaining five questions.
3. All questions carry equal marks.
4. Assume Suitable data if necessary

Q.No.1 Attempt any four:-

- [a] Explain briefly various method of Irrigation. [5]
- [b] Define Duty and Derive the relation between Duty and Delta. [5]
- [c] What are various irrigation efficiencies? [5]
- [d] Explain briefly various forces acting on gravity dam [5]
- [e] Explain aquifer, aquifuge and aquiclude.. [5]

Q.No.2 [a] The data about the crop, their duty and the area under each crop, commanded by a canal taking off from a storage tank are given below. Taking a time factor for the canal to be $13/20$, calculate the discharge required at the head to the canal. If the capacity is 0.8, determine the design discharge. [7]

Crop	Base period (days)	Duty at the head of canal (ha/cumec)	Area under crop (ha)
Wheat(Rabi)	120	1600	600
Sugarcane	320	580	850
Overlap for sugarcane in hot weather	90	580	120
Vegetable (Hot weather)	120	600	360
Bajra	120	2000	500

- [b] Explain with neat sketch Tipping Bucket Type Rain gauge. [07]
- [c] Explain briefly various methods of computing average rainfall over a basin. [06]

Q.No.3[a] Explain infiltration and infiltration capacity What are various effects of infiltration. [07]

[b] Explain Computation of Runoff by Infiltration Method. [07]

[c] What is Hydrograph? Draw a single peaked hydrograph and explain its components. [06]

TURN OVER

- Q.No.4 [a] Derive an expression for discharge from a well fully penetrating a confined aquifer. [07]
- [b] What do you understand by recuperation test? [07]
- [c] Design an open well in fine sand to give a discharge of 0.003 cumec when worked under a depression head of 2.5 meter. [06]
- Q.No.5, [a] Explain various types of reservoirs. What do you understand by multipurpose reservoir? [07]
- [b] Discuss briefly various causes of failure of earthen dams. [07]
- [c] Explain various components of a diversion headwork. [06]
- Q.No.6 [a] Explain various types of cross drainage works. [07]
- [b] Write short notes on Bhandara Irrigation. [07]
- [c] What are the factors affecting Runoff. [06]
- Q.No.6. Write short notes on following:
- (a) Silt extractor and silt ejector [05]
- (b) Cross Drainage Work [05]
- (c) Reservoir Planning [05]
- (d) Needs of Irrigation [05]

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BE-sem-VI - CBSGS - (iv)

23/5/19

Paper / Subject Code: 42004 / Environmental Engineering- II

Q.P.Code:16960

Marks- 80

Duration- 3 Hrs.

- N.B.: 1) Question **number one** is **compulsory**.
2) Attempt **any three** of **remaining five** questions.
3) Assume **suitable** data if required.
4) Draw **neat sketches** wherever **necessary**.

- Q.1. Solve any four of the following: (20)
- A) Explain self purification of streams
 - B) Give the differences between aerobic and anaerobic processes
 - C) Draw a flow sheet for conventional sewage treatment plant with trickling filter.
 - D) What is BOD? How BOD differs from COD?
 - E) Explain effects of noise pollution with control measures.
- Q.2.A) Design the dimensions of a septic tank for a colony of 250 persons (10)
provided with an assured water supply from the municipal head-works at a
Rate of 100 liters per person per day. Assume any data if required.
- B) Explain causes, effects and control measures of air pollution. (10)
- Q.3.A) Calculate the discharge of 1.5m circular sewer laid at a slope of 1 in 400. (10)
When it is running half full. Assume n in manning's formula as 0.011.
- B) Explain the process mechanism of trickling filter with neat sketch. (10)
- Q.4.A) The results of a BOD test of a waste sample are as given: 5 ml waste (10)
Sample in 300 ml bottle. Initial DO=7.8 mg/lit and 5-day DO=4.8 mg/lit.
Find d-day BOD and ultimate BOD. Assume $k=0.10$ per day.
- B) Enlist different types sewer appurtenances. Explain any two with (10)
neat sketches.

Turn Over

Q.5.A) Enlist different types of traps in plumbing. Explain any two with neat sketches. (10)

B) Following is the data for activated-sludge process:- (10)

I) Flow 3 MLD

II) BOD_5 of raw sewage 250 mg/lit

III) Dimension of aeration tank 25m long X 8m wide X 4m liquid depth

IV) MLSS to be maintained 2250 mg/lit

V) SVI 100 ml/lit

Compute F/M, HRT and BOD loading.

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

I) Methods of disposal of sewage

II) Crown corrosion

III) Combined & separate system of sewerage.

IV) Factors controlling sludge digestion

V) Sampling of sewage.
