

MAHARASHTRA JEEVAN PRADHIKARAN
Examination Conducted by
**MAHARASHTRA ENVIRONMENTAL ENGINEERING TRAINING &
RESEARCH ACADEMY (MEETRA) NASHIK**
Professional Examination of A. E. E. / A. E. I/S.D.E./S.D.O.(Civil) -
October 2016

Subject: - General Engineering (Civil) - (Written)

Date :- 18/10/2016 Time : 10.00 to 13.00 Marks - 75

Note :- (i) Questions No. 1 is compulsory and write any five Question from the Remaining.
(ii) Use of Calculator, log table are allowed.
(iii) Figure in bracket on right hand side indicates total marks
(iv) Mobile, Laptop, Tablets are not allowed.
(v) Make suitable assumption if required. Assume suitable data wherever Necessary and state them clearly.

Question No. 1 : (15)

Design RCC slab required to carry Live Load of 350 Kg/cm². The Size of slab 4.0 x 4.0 M clear inside with walls for support on all, sides with corner held down. Make suitable assumptions as per Codes, concrete grade M 20 and steel grade fe.415 and draw Sketches showing details of reinforcements.

OR

Question No. 1 : (15)

Design of footing for circular column 50 cm dia to support load of 27 M . T. Inclusive of self weight, bearing capacity .20 M.T. /Sqm, make suitable assumption As per I.,S. code as above. Draw sketches showing details of reinforcement.

Question No. 2 : Write short note on (Any three) (12)

- i) Curing of Concrete.
- ii) Self cleaning velocity and non scouring velocity.
- iii) Slump test.
- iv) Grouting
- v) Shoring and strutting.

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Question NO. 3 : Differentiate between (Any Four) (12)

- i) R.C.C. and P.C.C.
- ii) E.S.R. & G.S.R
- iii) Ground water Source and surface source.
- iv) Short Column and long column.
- v) C.R. Masonary and U.C.R. Masonary.

Question NO. 4 :

- (A) Write about Maharashtra Ground water act 1993 and its implementation. (6)
- (B) Describe different types of ground water sources used in designing Rural water supply scheme. (6)

Question No. 5

- (A) Draw flow diagram of W.T.P. showing T.P. units and direction of flow with Appropriate dimensions for 10 Mld. capacity. (6)
- (B) Attempt any three (6)
 - i) What is meant by water cement ratio ? State its importance.
 - ii) What is workability of concrete ? State any one method to measure it.
 - iii) Concrete cubes of same concrete tested for compressive strength for 3 days and 7 days from casting date which cube will have more strength ? Why ?
 - iv) What is meant by segregation and bleeding in relation with wet concrete ?
 - v) Water audit in water supply scheme.

Question No.6 : Explain in brief (Any three) (12)

- 1) Well Sinking.
- 2) Water hammer pressure.
- 3) Hydraulic testing of Pipe line
- 4) Uplift Pressure.
- 5) Ready mix concrete.

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Question No. 7 : Write detailed specifications, Mode of measurements and payment. (Any Two) (12)

- (1) Lowering, Laying, Jointing and testing CI/DI Pipes.
- (2) Murum Bedding.
- (3) Providing and laying P.C.C.(1:2:4)
- (4) B.B. Masonary in C.M.(1:6)

Question NO. 8 : Describe the Procedure of Preparation of tender document of any water supply scheme (From invitation of tenders to issuing work orders.) (12)

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Professional Examination of A.E.E. / A.E.-I / S.D.E./ S.D.O. (Civil)
October 2016

Subject: - General Engineering (Civil) - (Oral)

Roll No:-

Date: - 18/10/2016

Time : 14.00 to 14.30

Marks - -75

- Note: - (i) All Questions are compulsory
(ii) Use of Calculator, log table is allowed.
(iii) Figure in bracket on right hand side indicates total marks
(iv) Use of mobile, Laptop & tablets are not allowed.

Question No.	1	2	3	4	5	Total
Marks obtained						

Signature of Supervisor

Signature of Examiner

Question No. 1 : (A) Define the following terms (Any Five)

(10)

- a) Proof Stress: -----

- b) Aquaduct : -----

- c) Slenderness Ratio: -----

- d) Seasoning of timber:- -----

..2..

e) Ductility : _____

f) Bench Mark: _____

g) Admixture in Concrete : _____

h) Negative Super Elevation: _____

B) State True or False

(5)

- 1) Connecting Main is laid below scour depth _____
- 2) Confined reinforcement is provided for water tank column as per I.S. 456 _____
- 3) The strength of brick masonry in CM (1:6) is 20 ton /sq.M. _____
- 4) 53 grade Cement is having coarser size grain than that of 43 grade cement. _____
- 5) Cement Provides durability & Water tightness to The concrete. _____

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Question No. 2 :

A) What is the average weight per cum. of the following (5)

- i) R.C. C. _____
- ii) Sand (dry clean) _____
- iii) Portland cement _____
- iv) B.B. Masonry _____
- v) Teak wood _____

B) What is the safe bearing Capacity of the following? (5)

- a) Hard rock _____
- b) Soft rock _____
- c) Alluvial Soil _____
- d) Black cotton soil _____
- e) Hard Murum _____

C) How many Cement bags are required for following (5)

- a) Cement concrete (1:1.5:3) _____
- b) PCC in 100 grade _____
- c) 25 mm thick cement plaster in _____
c.m. (1:4) Proportion
- d) B.B. Masonry in CM (1:6) _____
- e) U.C.R. Masonry in cement _____
Mortar (1:6) Proportion.

Question No. 3 :- Fill in the Blanks (Any ten) (15)

- a) Water cement ratio for M-25 concrete is _____
- b) Slump test is carried out for _____
- c) Effective size of Uniformity coefficient of filter sand is _____ &

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- d) The Initial setting time of ordinary Portland cement is -----
- e) Recuperation test of supply well is taken for ascertaining -----
Of supply well
- f) The defect liability period for ESR is -----
- g) Specific weight of water is -----
- h) The minimum number of main steel bar provided in RCC Circular column is -----
Nos.
- i) The foundation in which a cantilever beam is provided to join footing is known as
----- footing
- j) The form work from the underside of slab can be removed only after ----- days
- k) Aggregate having size less than ----- is called fine aggregate.
- l) Minimum width of trench for the 350 mm dia pipeline is -----

Question No. 4 :- Give long form of the following terms (Any ten) (15)

- 1) J.T.U. -----
- 2) AMRUT -----
- 3) G.I.S, -----
- 4) ISMB -----
- 5) MCFT -----
- 6) MLSS -----
- 7) BIS -----
- 8) MSL -----
- 9) P.F. -----
- 10) CPHEEO -----
- 11) MSJNA -----
- 12) RSJ -----

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Question No. 5 : Answer in short (Any three)

(15)

- 1) Give main constituents of cement with their approximate percentage .

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- 2) Give any four methods of population forecasting.

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- 3) What is the use of admixture of concrete and name any two admixture?

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- 4) Why expansion joints are provided in construction of bridge?

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RESEARCH ACADEMY (MEETRA) NASHIK

Professional Examination of Asstt.E. E./ A.E.-I / S.D.E./ S.D.O.(Civil)
October 2016
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Subject – Water Supply & Sanitary Engineering (Written)

Date: 19/10/2016

Time 10.00 to 13.00 P.M.

Marks- 75
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- Note:-** 1) Question No.1 is compulsory and solve any 5 out of remaining
2) Use of Log table, slide rule, calculator is allowed
3) Fig. in bracket on right side indicate full marks.
4) Use of mobile, Laptop, Tablets are not allowed.
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Question No.1:-

(9)

- (I) Following census data is recorded for particular town

1981	8000
1991	12000
2001	17000
2011	22500

Calculate the population for the year 2021, 2031 and 2041 using (i) incremental method and (ii) Geometrical increase method.

- (II) What is sewage sickness ? How it can be prevented.

(3)

- (III) What is super chlorination ?

(3)

Question No.2:- Solve Any Three

(12)

- (1) State and narrate the factors affecting selection of source for a water supply scheme
- (2) Write a note on Drop manholes
- (3) Define continuous system and intermittent system of water supply, what are disadvantages of intermittent system?
- (4) Write a note on aqua privy.

Question No.3:- Solve Any Three

(12)

- (1) Design the size of rapid sand gravity filter for a town having present population of 20,000 souls and a population of 33,500 souls after 15 years. The rate of supply of water per head per day is 150 lit. pumping hours are 20. Assume suitable data if required.
- (2) Write the procedure for backwash of filter
- (3) What is water audit? Define apparent losses and physical losses of water

Page No. ..2

- (4) Calculate quantity of bleaching power and Alum to treat 14 million lit of water per day. Bleaching powder concentration (Chlorine percentage) is 33% and dose is 2ppm. Alum dose is 30 ppm. Calculate dose of poly aluminium chloride powder if it is required $\frac{1}{3}$ rd of Alum required.

Question No.4:- Write a short notes on (Any Three) (12)

1. Water hammer
2. Filter sand
3. One pipe system and two pipe system
4. Purpose of screening in sewage treatment plant

Question No.5:- (10)

- (1) For the distribution main of a city water supply 30cm dia main is required. As pipes of 30cm dia are not available it is decided to lay two parallel mains of same diameter. Determine the diameters of the parallel mains.
- (2) Write shot note (Any one)
 - (a) Effect of water cement ration on strength of concrete
 - (b) State the technical terms used PERT analysis. Define them.

Question No.6:-

- (1) For Water Supply of a town water is pumped from a river 3 Km away, into a reservoir. The maximum difference of levels of water in river and the reservoir is 20 meter. The population of the town is 50,000 souls and per capita water demand is 120 liters per day. If the pumps are to operate for total of 8 hours and the efficiency of pumps is 80% , determine the BHP (hores power) of pumps. Assume friction factor as 0.03 , velocity of flow 2m/sec and maximum daily demand as 1.5 times the average daily demand. (8)
- (2) What are the reasons for taste and odour in water supply? How odowr is measured? (2)
- (3) Explain the term reservoir sedimentation. (2)

Question No.7:- Write a Short Note on (Any Four) (12)

1. Factors affecting choice of pipe material
2. Coagulation and flocculation
3. Jar Test
4. Dilution test for B.O.D.
5. Self purification of natural waters

Question No.8:- Solve Any Two (12)

- 1) Design a Septic tank for a small colony of 300 persons with average daily sewage flow 85 liters per head. Detention period is 30 hours. Cleaning interval is 6 months.
- 2) What are aerobic , anaerobic and facultative bacteria? What is meant by aerobic decomposition of sewage?
- 3) Design a sedimentation tank for a water works, which supplies 1.4 million lit of water to the town the sedimentation period is 5 hours, the velocity, of flow is 12 cm/minute, depth of water in the tank is 4.0 meter. Allowance for sludge is 0.80 meter.

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Professional Examination of A.E.E./ A.E.(I)/ S.D.E./ S.D.O. (Civil)
October 2016

Roll No.

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Subject – Special Subject - Water Supply & Sanitation Engineering (Civil)(ORAL)
Date:- 19/10/2016 Time 14.00 to 14.30 P.M. Marks- 75

=====

- Note:-** 1) Solve all Questions
2) Use of Calculator log table is allowed
3) Fig. in bracket on right side indicate full marks.
4) Use of mobile, Laptop & tab are not allowed
5) Make suitable assumption if required. Assume suitable data, wherever necessary and state them clearly
- =====

Question No.	1	2	3	4	5	Total
Marks Obtained						

Signature of Supervisor _____

Signature of Examiner _____

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Question No.1:- (A) Wire down long form of (5)

- 1) SLB -----
- 2) SCADA -----
- 3) UIDSSMT -----
- 4) DWF -----
- 5) ULB -----

Question No.1:- (B) State the use of (7)

- i) Drop manhole -----

- ii) Flushing tank in sewerage system-----

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October 2016

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Date:- 19/10/2016 Time 14.00 to 14.30 P.M. Marks- 75

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- Note:-** 1) Solve all Questions
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Marks Obtained						

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Question No.1:- (A) Wire down long form of (5)

- 1) SLB -----
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- 4) DWF -----
- 5) ULB -----

Question No.1:- (B) State the use of (7)

- i) Drop manhole -----

- ii) Flushing tank in sewerage system-----

Question No.2:- (A) Fill in the blanks

(10)

- i) The Desirable amount of chlorine in water at consumer end is -----
- ii) In general TOD benefit can be taken from ----- pm to -----pm
- iii) The norms for water supply per head per day in Mukhyamantri Rural Drinking Water Programme is -----
- iv) In Nagarothan programme of State Government the financial pattern for 'C' class Municipal Council is -----
- v) The longform of CPHEEO is -----
- vi) The water is said to be alkaline when PH of water is -----
- vii) In sludge digestion gases produced are -----
- viii) The quantity of sewage produced is ----- to ----- percent of supply of water.
- ix) In Hazen-William formula for flow in conduit 'R' refers to -----
- x) Chemical name of Alum is -----

Question No.2 :- (B) Sate True or False

(5)

- i) Suitable method for forecasting population for a young and rapidly developing city is Arithmatical increase method -----
- ii) The maximum pressure which a pipe can withstand without any leakages during hydrostatic pressure test is called working pressure-----
- iii) Handpumps make use of reciprocating pumps -----
- iv) Blue baby disease may be caused in infants due to higher contents of nitrates in drinking water -----
- v) Binding phenomena in a rapid sand gravity filter may occure due to excessive negative pressure.-----

Question No.3:- (A) Answer in one sentence

(10)

- i) Activated carbon is used in water treatment for which purpose?

- ii) Where the grid –iron system for Distribution system is used?

iii) Poly Aluminum Chloride -----

iv) Underdrain system -----

v) N.R.V. -----

vi) Capacitor -----

vii) Boning rod -----

Question No.1 :- (C) What does following terms refer to ? **(3)**

i) Orthotolidine -----

ii) Threshold number -----

iii) MPN -----

iii) Why water Audit of a water supply system is necessary?

iv) What are trap in house plumbing?

v) What is oxidation pond?

Question No.3:- (B) Match the following

(5)

Drinking water parameters	Acceptable limits
i) Chlorides (as Cl)	a) 500 ppm
ii) Fluorides (as F)	b) 0.2 ppm
iii) Free residual	c) 0.3 ppm
iv) Iron (as Fe)	d) 1 ppm
v) Total dissolved solid	e) 250 ppm

Question No.4:- (A) Choose the correct option

(10)

(i) Biochemical oxygen demand of safe drinking water is

a) 5ppm b) 25ppm c) NIL d) 10 ppm

(ii) Water is said to be acidic if PH of water is

a) 7 b) more than 7 c) less than 5 d) none of these

iii) Water hammer pressure in pipe is reduced by using

a) Non return valve b) Air cushion valve

c) Pressure relief valve d) Sluice valve

iv) The most commonly used chemical for dechlorination of water is

- a) Sodium sulphate b) Potassium sulphate
- c) Bromine d) Calcium chloride

v) The most efficient method of BOD removed, is

- a) Oxidation ditch b) Trickling filter
- c) Oxidation pond d) aerated lagoon

vi) The Bacteria which requires free oxygen for their survival are called

- a) Pathogenic bacteria b) Aerobic bacteria
- c) E-Coli d) Anaerobic bacteria

vii) The population of a city in 2000 is 50,000 souls. The average increase in population over last 8 decades is 7500 and average incremental increase during decades is 750. The population of the city based on incremental method, in the year 2020 will be

- a) 55000 b) 60500 c) 66500 d) 72500

viii) In the activated sludge process

- a) Aeration is continued till stability
- b) Aeration is done with an admixture of previously aerated sludge
- c) Sludge is activate by constant stirring
- d) Water is removed by centrifugal action

ix) Removed of oil and grease from sewage is known as
 a) Screening b) skimming c) Filtration d) non of these

x) If the depth of flow in a circular sewer is $\frac{1}{4}$ th of its diameter 'D', the wetted perimeter is

- a) $\frac{\pi D}{2}$ b) $\frac{\pi D}{4}$ c) $\frac{\pi D}{3}$ d) πD
-

Question No.4:- (B) Define the following terms

(5)

- 1) PH -----

- 2) Turbulent flow -----

- 3) Threshold number -----

- 4) Effective size of sand -----

- 5) Self cleansing velocity -----

Question No.5 : (A) Match the following

(4)

List I		List II	
i)	Trickling filter	a)	Anaerobic attached
ii)	Activated Sludge process	b)	Aerobic attached
iii)	Dispersion trench	c)	Aerobic suspended
iv)	Septic tank	d)	Anaerobic suspended

Question No.5 : (B) Match the following

(4)

List I	List II
i) Three system	a) Satisfactory water Supply
ii) Grid iron system	b) Well planned sector of city
iii) Ring system	c) For towns with rectangular road layout
iv) Radial system	d) For irregularly developed town

Question No.5 : Fill in the blanks

(7)

- 1) When the mode of measurement of turbidity is the " absorption of light", the measuring apparatus is called -----
- 2) What the PH of water is equal to 9, the hydrogen ion concentration is equal to -----
- 3) If the temperature of a sedimentation tank is increased the sedimentation speed will -----
- 4) Laying of sewers is usually done with the help of -----
- 5) A manhole is generally classified as deep manhole if the depth is more than-----
- 6) The detention period for an oxidation pond is -----
- 7) For Disposal of sewage by separate system , the cross section of sewer most suitable is -----

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Professional Examination of A.E.E. / A.E.-I / S.D.E./ S.D.O. (Civil)
October 2016

Subject: - Sub.Divisional Accounts Paper III (Written)

Date: - 20/10/2016 Time : 10.00 to 13.00 Marks - 75

- Note: - i) Question No.1 is compulsory. Solve any Five questions out of the remaining.
ii) Use of Calculator, log table is allowed.
iii) Figure in bracket on right hand side indicates total marks.
iv) Use of mobile, Laptop & tablets are not allowed.
v) Assumptions made should be stated clearly.

Question No.1:- Post the following transactions in the cash book of the Executive Engineer of Aurangabad Division., for the month of August 2016
Close the cash book by giving necessary analysis of the closing Balance , classification of receipt, payments , certificate, etc.
(15)

Date	Details	Amount in Rs.
1	2	3
1/8/2016	Opening Balance a) Notes and coins b) Self cheque No. 100 dtd. 31/7/2016 c) Service & Postage Stamps d) F.D.R. received from contractor 'x' towards initial Security deposit for work . e) Imprest with S.D.E. (I) S.E.O.(II) f) Cheque dated 30/7/2016 received from the Consumer Mr. A. B. towards water charges g) Opening balances :- Operation A/c 4,50,000/- Collection A/c 1,000/-	50/- 2000/- 60/- 15000/- 1000/- 1000/- 1000/-
1/8/2016	Self cheque No. 100 dt. 31/7/2016 encashed	2000/-
3/8/2016	Water charges cheque received from Mr.A.B remitted in Bank	1000/-
4/8/2016	Drew self cheque bearing No. 101 & encashed.	403000/-
5/8/2016	Paid office salary of staff for the month of July 2016 Gross salary Rs. 4,00,000/-	

Date 1	Details 2	Amount in Rs. 3
	Recoveries a) H.R.A. Rs. 2000/- b) G.P.F. Rs. 31000/- c) GIS Rs. 3000/- d) Festival Advance Rs. 1000/- e) Income tax Rs. 2000/- f) Prof. tax Rs. 1000/- Net salary paid Rs. 3,60,000/-	
5/8/2016	Amount remitted in Bank, recoveries through salary bill. (a) SBI Collection A/c (b) SBI Income Tax (c) SBI Professional Tax	37000/- 2000/- 1000/-
7/8/2016	Paid cash to Petrol Pump, purchase of Diesel for Car	1600/-
10/8/2016	Temporary Advance given to S.D.O. (II) for passed vouchers	1500/-
12/9/2016	Funds received from Central Office Advice No. 201	800000/-
12/9/2016	SDO (II) submitted imprest A/c showing expenditure Rs. 870 towards purchase of fuel A/c passed and recouped	870/-
16/8/2016	Paid to Mr. Y. contractor for the construction works 2nd R.A. bill vide cheque No.106 dtd. 16.8.2016 value of works done Rs. 6,50,000/- Secured advance to be paid Rs. 2,00,000/- Recoveries a) Cost of Special of pipes Rs. 1500/- b) Income tax Rs. 11000/- c) fine for bad work Rs. 500/- d) Cost of C.I. Pipes Rs. 15700/- e) Balance Security Deposit Rs. 35000/- Net cheque paid to Contractor 'Y'	786300/-
20/8/2016	SDO (II) reported that Temporary Advance held by him had been lost	1500/-
22/8/2016	Income tax recovered from 2nd R.A. Bill of Mr. Y Contractor remitted in Bank.	11000/-
24/8/2016	Cheque received back of Rs.2,50,000/-issued on 2nd May 2016 cancelled being time barred fresh cheque issue In lieu of thereof.	250000/-
30/8/2016	As per Bank scroll of collection A/c Rs. 37900/-is shown as transfer to H.O. collection A/c & Rs. 50/- is shown as Bank charges. Close Cash Book with balance Certificate.	37950/-

Question No. 2 : Write Short Notes on (Any Five)

(12)

- 1) Price Variation Clause.
- 2) Earnest Money Deposit & Security Deposit
- 3) Schedule A and Schedule B of B-1 Agreement.
- 4) Tax deducted at sources.

Question No. 3 : Distinguish between (Any Five)

(12)

- 1) Secured Advance and Advance Payment.
- 2) Clause 3(a) and Clause 3(c) of B-1 Agreement.
- 3) Cash Book and cheque Book.
- 4) Recurring and Non- recurring expenditure.

**Question NO. 4 : What are general principal to be followed by Govt. Officers while
Entering into contracts involving expenditure from state revenues?**

(12)

Question No. 5 :

(12)

- a) Write a brief note on the works committee under the Industrial Dispute act. 1947.
- b) Define 'lay-off' and 'strike' under Industrial Dispute Act 1947
- (c) What is the purpose of Minimum wages Act, 1948 to be achieved ?

Question NO. 6 : Comment on the following (Any Three)

(12)

- a) When are TDS returns to be filed by the Executive Engineer ? What is the form prescribed by Income Tax Department for filling these returns.
- b) Executive Engineer had proposed compensation of Rs. 50/- per day for slow progress of work under execution on 'A-1' agreement.
- (c) The Executive Engineer had accepted the Second lowest Tender when the First lowest didn't turn up to pay Security deposit and his earnest money forfeited .

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- (d) An extra item is cropped up during execution of work on A-1 agreement. S.D.E. had proposed extra item rates list of Rs. 15000/- and submitted to Executive Engineer for sanction.

Question No.7 : Prepare 2 nd Running Account Bill for the work of construction of Quarter under Ambarnath Division of the contractor xyz (12)

Item of work	Qty. executed upto date	Qty. executed as per 1st R.A. Bill	Unit	Rate Rs.
1) Earth work	5000	2000	Cum	7/-
2) Brick work	600	300	Cum	320/-
3) R.C.C.	400	---	Cum	950/-
4) Steel work	32 Metric Ton	16 Metric Ton	Kg.	7/-

- i) Advance payment of Rs. 20,000/- for wood work made in this bill.
- ii) Advance payment of Rs. 1,00,000/- was made for work done but not measured in the first R.A. Bill for R.C.C. work.,
- iii) Secured Advance for 1,50,000 bricks was given in the 1st R.A. bill this assessed rate is Rs. 500/-per 1000/- bricks consumptions of bricks to be assumed as 500 Nos per cubic meter of brick work.
- iv) Security Deposit to be deducted @ 5% and Income tax @ 2%
- v) Cost of 250 M.T. Cement (for this work) to be deducted @ Rs. 1000/- per M.T.
- vi) In the 1st R.A. bill Rs. 500/- was withheld for non-submission of labour reports. It is now decided to release Rs. 300/-to Contractor and balance credited to MJP A/c.

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Examination Conduct By
Maharashtra Environmental Engineering Training & Research Academy
(MEETRA NASHIK)
Professional Examination of A.E.E. /A.E.-1/S.D.E./S.D.O. (CIVIL)
OCTOBER 2016

Subject:- Practical Drawing Test (Civil)
Date:- 21/10/2016

Time:- 08.00 to 14.00
Marks:- 50

- NOTE:-
- 1) All question compulsory
 - 2) Figure in right side brackets indicates full marks
 - 3) Mobile, Laptop , Tablets are not allowed
 - 4) Make suitable assumption wherever necessary

Question No. 1:- Draw the detailed foundation plan of R.C.C. Circular E.S.R. having Hexagonal shape . Work out capacity of E.S.R . having urban population of 5000 souls having no drainage system & size of footing with the help of following data. Also set it on ground.

- 1) Bearing capacity-30T/M²
- 2) Footing Size in square.
- 3) Water depth – 3.5 m & Thickness of container 200mm
- 4) ESR to be filled thrice a day.
- 5) Assume Total load -500MT(excluding water load).

Prepare a line sketch plan showing an arrangement of By-pass, overflow, washout & inlet & outlet arrangement. Overflow pipe should be connected to Delivery pipe. Propose the necessary valves wherever required. (20)

Question No. 2:- Carryout the Survey from given T.B.M. & workout reduced levels for given points A,B,C,D,E by rise & fall method or height of collimation method. Rule out the page of field book & mention all the details, apply field check by fly levelling survey & give usual checks. (20)

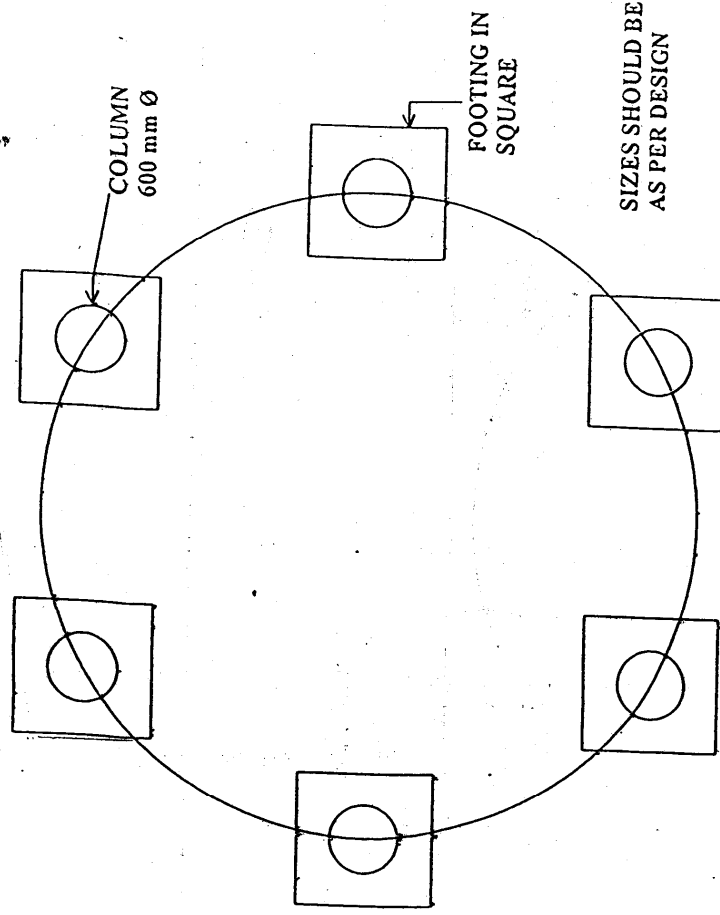
Question No. 3:- Set up the theodolite at point 'O' given to you & measure vertical angle AOB between A & B. Also measure the vertical angle between plane of collimation & the point. (10)

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ANNEX - I

QUESTION NO - 1

FIGURE 1



LINE PLAN OF CIRCULAR ESR

