



a treatise by  
Dr A R Santhakumar



**VELAMMAL**  
ENGINEERING COLLEGE  
The Wheel of Knowledge rolls on!  
**DEPARTMENT of**  
**CIVIL ENGINEERING**

Indian Concrete Institute



ICI Students' Chapter **ETHICAL ENRICHING ENGINEERS**

The Engineers' HUB



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Chennai

REGISTER by email and / or WhatsApp  
on or before August 19, 2019

Quiz on August 21, 2019

WEDNESDAY

(SPOT Registration also welcome)

email to BOTH the 2 email IDs below

<mailto:thiaraj.raja@gmail.com>

[rajharajswaran@velammal.edu.in](mailto:rajharajswaran@velammal.edu.in)

and also to

[hubofcivilengineering@gmail.com](mailto:hubofcivilengineering@gmail.com)

PI Call -- Rajha 988 410 7703

Rajarajan 944 25 866 52 or

Dhanush 90 800 11 807 or

Indira kumar 83 44 73 99 60

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## CON QUIZ 2019

One Day Inter-collegiate Civil Engineering Quiz  
for the Students of  
Full Time B E / B Tech Civil Engineering  
Brought to you by

**ICI-- Indian Concrete Institute**  
Students' Chapter  
Department of Civil Engineering  
**VELAMMAL Engineering College**  
( an Autonomous Institution )

Chennai - 600 066  
in association with

## The Engineers' HUB

Conducted in the HONOUR of the Contributions of



### Dr. A. R Santhakumar

Professor Emeritus - IIT Madras  
Former Dean - College of Engg, Guindy,  
Anna University  
on August 21, 2019 WEDNESDAY  
at Velammal Engineering College  
Surapet, Ambattur - Redhills Road, Chennai -  
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## VELAMMAL ENGINEERING COLLEGE

Velammal Engineering College ( VEC ), affiliated to Anna University, is the flagship institution of the Velammal Educational Trust catering to higher education in the field of science, engineering and technology and management. Founded in 1995 – 96, VEC offers B E / B Tech degree courses in 8 different disciplines and PG degree courses in 8 different disciplines.

**VEC is accredited by NBA, NAAC, and is ISO 9000– 2008 certified. The college is consistently placed academically among the top creamy layer of engineering colleges at the state level and is a preferred recruitment source for many top notch corporates.**

With the Vision of **Mr M V Muthuramalingam, our Founder - Chairman and a Civil Engineer himself** and with the farsightedness and dynamism of our **CEO Mr M V M Velmurugan**, VEC is spreading its wings wide and high to greater zeniths

**And as the latest feather added to our Crown, the college has been granted the Autonomous status since the academic year 2019 – 20.**

### **DEPARTMENT of CIVIL ENGINEERING**

The Civil Engineering Dept. founded in 2007-08 is having a student strength of 200 and has been accredited by NBA continuously since 2015.

Prestigious companies like, BGR Energy Systems, CTS, CCCL, WIPRO, VA Tech WABAG, etc. recruit our students. Many have taken up higher studies both in India and abroad.

**5 students chapters affiliated to ICI, ACCE(I), IWWA, EWB and The Engineers' HUB are actively functioning**

**The Civil Engg Dept of VEC has won the prestigious Anna University CIVILIZATION Overall Trophy continuously for 5 times since 2015.**

## ICI STUDENTS' CHAPTER

Functioning since September 2011 with active membership, the Chapter conducts Annual Inter-collegiate Civil Engg Technical Quiz Competitions and this CONQUIZ 2019 is the 6<sup>th</sup> in series. Also the chapter has conducted Diploma Quiz in July 2013 in tie- up with Dr MGR University, and Model Competition in Sep 2013 in association with The Engineers' HUB and ATNHE – Association of Tamil Nadu Highway Engineers.

### **The ENGINEERS' HUB**

Founded in January 2009, The Engineers' HUB – the Civil Engineering Bigwigs with Unabated Humanity - is a charitable trust meant for the exchange of ideas and experiences so that the senior professionals can share their knowledge and guide the young students and professionals of civil engineering for a fruitful and fulfilling career. The HUB conducts seminars, training programmes and also sponsors students to conferences at free of cost or at concessional fee.

Apart from various seminars, the HUB conducted IPT - In-plant Training or Onsite Training on themes of Highway Engg and Bridge Engg for 100 to 200 students from various engineering colleges 2012, 2017 and 2019. Also the HUB has been the co-organiser cum sponsor for the all quiz competitions conducted at Velammal Engineering College.

The HUB is conducting free coaching programme for 2 weeks for Civil Engineers who appear for TNPSC AE Recruitment Examination -- 2010, 2018 and 2019.

**CONQUIZ 2019 is conducted in the Honour of our beloved Professor, Living Legend --- a Civil Engineer both for The Common Man and also for the Complex Structures**

## **Dr A R Santhakumar**

Prof. A R Santhakumar is former Dean and Chairman of Faculty of Civil Engineering, Anna University and a former Emeritus fellow (AICTE) and former Professor in IIT Madras. He has contributed a number of research papers to National and International

Journals and delivered invited lectures in New Zealand, Australia, USA and Singapore. He has set up Center for Disaster Mitigation and Management with assistance from UNDRRO and Building Technology Center with assistance from HUDCO at Anna University.

His validation works on the two Laurie Baker technologies ---- Rat-Trap Bond for Wall Masonry and Filler Slab Roofing Technology during 1990s were funded by HUDCO and have been accepted by UN HABITAT and circulated worldwide as guidebooks.

### **CON QUIZ Rules & Regulations**

- 1 Open to all students of FULL Time B E / B Tech Civil Engg Students--- 2<sup>nd</sup> year to 4<sup>th</sup> year
- 2 Morning 10.30– 12. 30 AM -- Preliminary Test (**QUESTION BANK HINTS without the 4 Options ATTACHED HEREWITH**)
- 3 Afternoon 2.30 – 4.30 PM Finals between the top 10 teams selected from Prelims
- 4 Maximum **3 students per team**
- 5 Registration FEE **Rs.500 PER TEAM** of 3 members or Rs 350 for teams of 2 members and Rs 200 for solo participant--**SPOT PAYMENT only**

**6 Registration Fee will be REFUNDED fully if the team scores 75% or more marks in the Preliminary Test**

**PRELIMS Questions will be from the subjects**

- 1 **Concrete Technology**
  - 2 **Construction Technology**
- ( **125 question HINTS without the 4 choices from these 2 subjects attached herewith** )

**Date of Quiz    AUGUST 21, 2019,**  
**WEDNESday**

<b>TEAM CASH Prizes</b>		<b>WELCOME</b>
<b>1<sup>st</sup> Prize</b>	<b>Rs. 5,000</b>	
<b>2<sup>nd</sup> Prize</b>	<b>Rs. 3,000</b>	
<b>3<sup>rd</sup> Prize</b>	<b>Rs. 2,000</b>	<b>WIN</b>

Hints / Question Leads for CON QUIZ 2019  
**Dept of Civil Engg VELAMMAL ENGINEERING COLLEGE Chennai**

#	QUESTION HINT	#	QUESTION HINT
1	Strength Vs Time Curves of OPC, PPC, RHC , QSC	2	LHC
6	Water Pour, Water Spray, Water Store, Steam, Pressure	3	SRC
11	Slump Cone, Vee Bee Consistometer, CF, Flow Table,	4	FA / CA
16	How to Export Cement to Foreign Countries by Ships?	5	SCC
21	<b>Cracks in concrete slabs / pavements even before</b>	7	OPC
26	Stress Strain Curves for Concrete and its Raw Materials	8	HPC
31	Grinding of Clinkers and its effects on Cement	9	IRC
33	Device delivering concrete in Piles & / or below GWL	10	SCM
35	<b>Some water in concrete, pumped out after partial setting</b>	12	PQC
38	<b>Bleeding, Segregation, Laitance, Cracking, Slump Loss, etc.</b>	13	RCA
39	Relationship between Strength / Stress / Grade values of Concrete Cube & Cylinder from SAME Concrete	14	FRC
41	<b>Compress the Concrete before building inauguration</b>	15	TMT
43	<b>Cement Companies change IST &amp; FST against IS Code limits</b>	170	PSC
44	Aggregate Shapes and Names – Technical /Colloquial	18	RHC
46	Coarse Aggregates separate from Wet Mix due to excess compaction or due to poor mix design	19	HYSD
48	Wartime; Airport Runway damaged by Enemy Bombing; To be repaired urgently	20	IST, FST
50	$f_{ck}$ and $f_{ck}'$ of Concrete of Concrete <b>■ Meaning ** Values ** Relationships</b>	23	QSC
53	Concrete Properties affected by different CA types	24	AAC
55	<b>Water Mixing -- Paste - Solid - Strong --Strong Concrete – Different stages of Concrete</b>	25	LWC
		27	PPC
		28	NDT
		29	SSD
		30	SFRC
		32	V-Funnel, L – Box, U – Box, J- Ring, Flow Table,
		34	CF values for Conventional Concrete and SCC
		36	Workability tests for Concrete and their Mechanisms
		38	<b>Binding Wire, Coupler, Splice, Butt Weld, Lap Weld</b>
		40	Effect of Steel Reinforcement Diameter and Spacing on Cracking Behaviour of RCC Slabs
		42	Both FA and CA are in SSD condition. And its effect on Concrete Mix Proportioning Water Qty
		45	cement raw materials FUSED in this Firing Unit
		47	The portable equipment carrying wet concrete from RMC Plant to Construction Sites
		49	Fly Ash, Ground Granulated Blast Furnace Slag, Rice Husk Ash, Silica Fume and such other materials added in concrete
		51	Small sized CA and Bigger sized CA -- effects on Concrete
		52	Time for Formwork Removal -- Beams, Slabs Columns,
		54	<b>Clay, Lime, Cement, Geopolymer, Calcined Clay, ....</b>
		56	sand- dry, wet, saturated, compacted, loose, partially saturated, oven dried

57	Cement type to build massive Gravity Dam			<b>Tall Steel Cylinder- cement storage RMC plants</b>		FA & CA -- Sp Gr -- effects on Concrete
60	Epoxy, Mortar, Paint, Coating,		61	Fibre Dimensions Length / Dia		62 CA type and Mix Water Content
63	Cement type suitable for different applications			<b>CF Test--Concrete, SCC, Water; Dry Aggregates</b>		65 <b>E and <math>f_{ck}</math> values of Concrete</b>
66	long distance concrete Transport: Chemical Admix		67	Sand Bulking; Variations in Measuring		68 <b>Rounded CA and Water</b>
69	Concrete Tech Scientists & their contributions		70	NDT tests & their Mechanisms		71 <b>Cement bags not stored properly; spoiled</b>
72	Rebar Corrodes; Concrete Cracks; Why?		73	<b>Slump Cone Apparatus</b>		74 Split Tension Test on Concrete
75	Effect of Bulking in Volumetric		76	Rebar, Wire, Tendon, Mesh, Fibre,		77 Role of Gypsum in Cement
78	Using Beach / Sea Sand for Concrete?		79	Rubber Ball in Concrete Pumping		80 Purpose of Cover Concrete
81	Heat Control Measures for RMC		82	W/ C Ratio and Concrete Strength		83 Test for Free Lime in Cement
84	Add Water to Cement; changes it undergoes		85	Product obtained from Rotary Kiln		86 Lean Mix, Por Mix, Rich Mix
87	Standard Sand used in India for lab tests			Core Test, Pull Out Test, Split Tension		89 Measuring the Water / Cement Ratio?
90	Inert and Reactive Parts of Concrete		91	Workability tests & their Mechanisms		92 Sand particle size & bulking effects
93	Vehicles carrying Cement and Concrete			Concrete Pump WASHED with Cement		95 28 days Cube results fail? What to do?
96	Superplasticizer, Water Content, Slump			Cement Tests -- Apparatus, Equipment, Concepts		Cube Test -Table 11, Page 30, IS 456 - 2000
99	<b>Cantilever Props Removal Sequence</b>			Formwork for tall and long structures		Cover Block Shapes; Forms; Materials
102	OPC bag-Weight/ Volume	103	Cover Block Strength		Chemical Reaction of Cement	Cement Fineness Measuring
106	Splice / Splicing	107	4 Zones of River Sand		108 pH Value of Concrete	109 Spalling
110	Autoclaving	111	Lime + Cement + Sand		112 <b>Cement Bag Size in India</b>	113 Setting Times Tests
114	Causes for Bulking	115	Rebar Vs Tendons		116 Ferrocement Composition	117 CF value for Water
118	Slump types	119	4 Compounds of Hydration		120 FA vs CA - Sizes	121 Concrete Yield
122	Shape of Transit	123	Parts of a Batching Plant		124 Cement / Concrete	125 Concrete Cylinder Size
126	Vibrators& Compactors		Air Entraining Agents effects on Concrete		128 Zero Slump Concrete	Alite, Belite, Celite, Felite
	Cement Paste in Concrete		W/ C effects on Creep and Shrinkage		<b>Cement Chemical Composition</b>	Transit Mixer Operations
	Hydraulic Lime, Fat Lime, Poor Lime, Slaked Lime, Quick Lime		Types of Elastic Moduli for Concrete		Steel Rebars Joining Methods	adjusting the Setting Rate of Cement
			FA and CA Roes in Concrete		Calcareous Materials	
	Role of Water in Cement		Cement types --purposes		<b>Concrete Weight &amp; Volume checking</b>	<b>Batching Plant ; Transit Mixer</b>