G H PATEL COLLEGE OF ENGINEERING
& TECHNOLOGY, VALLABH VIDYANAGAR

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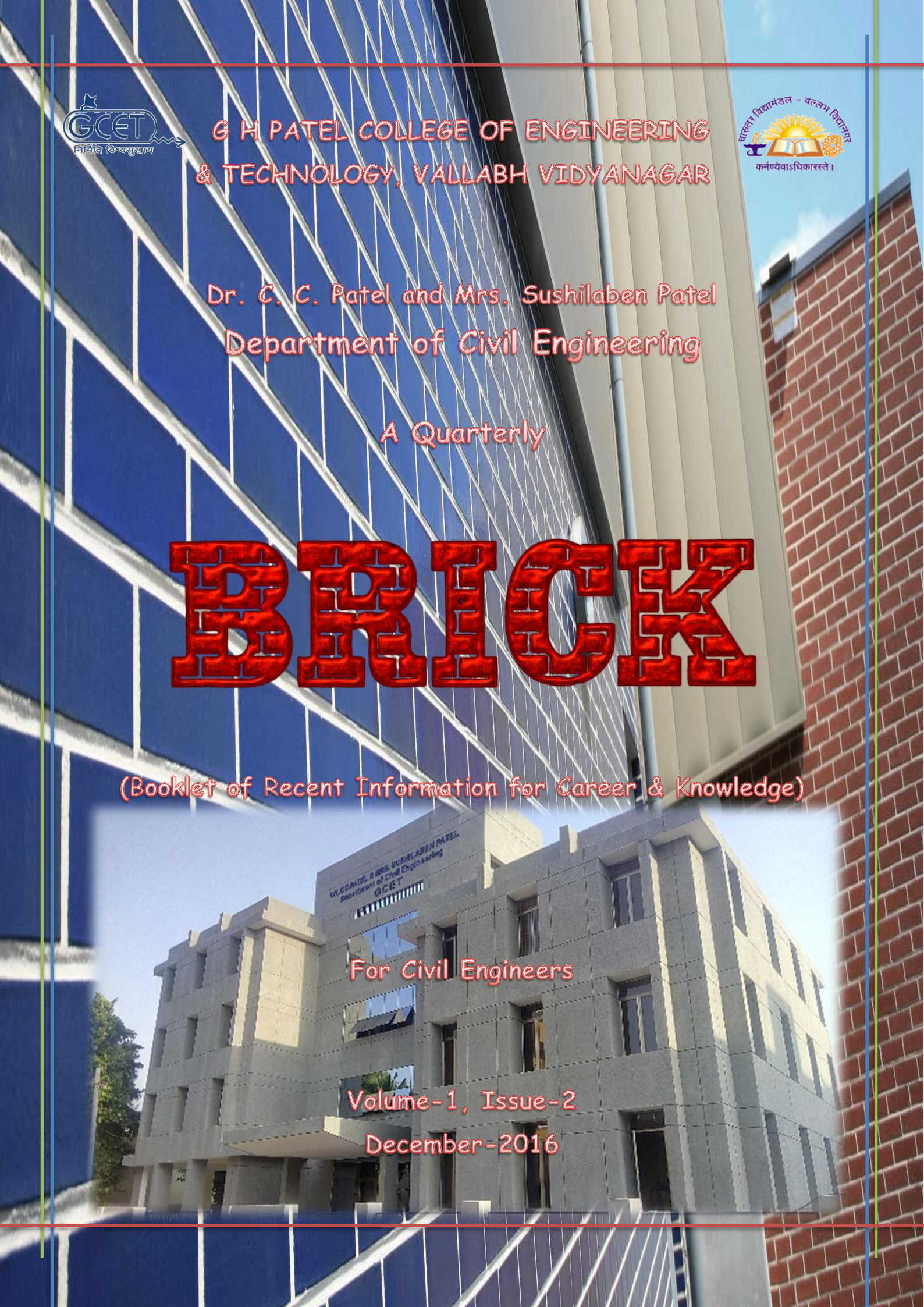
Department of Civil Engineering

A Quarterly

BRICK

(Booklet of Recent Information for Career & Knowledge)



For Civil Engineers

Volume-1, Issue-2
December-2016

Contents

CASHLESS INDIA
A STEP TOWARDS BEING CASHLESS

After the announcement of demonetization of Rs. 500 and 1000 notes, a phrase, 'cashless India' got fledges. A concept of being cashless is spread more by Government of India. The Digital India programme is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. "Faceless, Paperless, Cashless" is one of the professed role of Digital India. This programme has many advantages but if implemented at high scale in India has some disadvantages too!

Modes of Digital Payment:

These modes are:

Banking Cards

USSD

AEPS

UPI

Mobile Wallets

Banks Pre-paid Cards

Point of Sale

Internet Banking

Mobile Banking

Micro ATMs

Advantages of being cashless:

- The main advantage of a cashless society is that a record of all economic transactions through electronic means makes it almost impossible to sustain black market or underground e economies that often prove damaging to national economies.

- Cashless societies are generally corruption free. There are lots of benefits for being cashless. Cost of handling cash is high; it is in the favor of economies to go cashless. Recently transparency international 'The Global Anti-Corruption Coalition' did a research on corruption in countries and results was that the cashless countries are in Top-30.

- It will be very convenient for everyone if cashless transactions are widely accepted. No hassle to carry cash is less risky. You can view history of your expenses easily and manage your budget smartly.

- Less need to print paper currency and replace it so reducing those costs.

Disadvantages of being cashless:

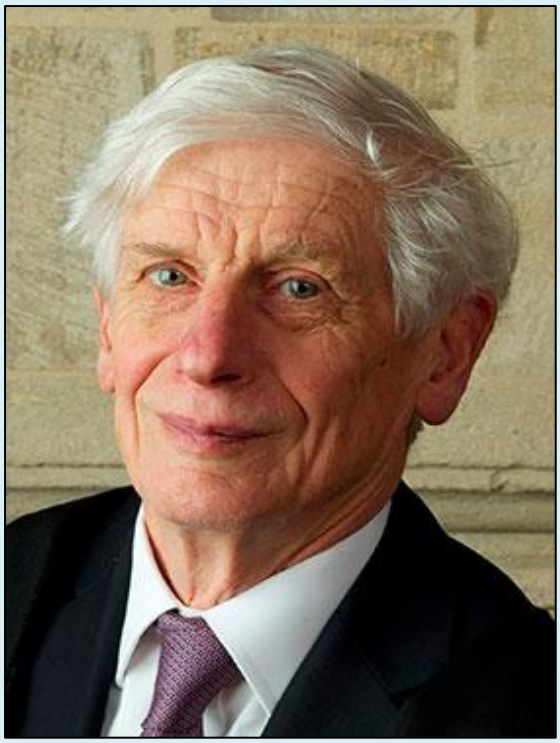
- The danger associated with cashless economy is that it being based on the electronic payment system which is a part of huge network called Internet. So the dangers or disadvantages associated with the cashless economy are Financial Policing and Financial Meltdown because of cyber-attack and data theft. As India is a developing country where the Cyber security is not fully developed and the data's are not that secured as in developed countries.

- If there is an implementation of 100% cashless transactions, there would be possibility of electronic cards being stolen or lost. In this situation your transactions get fully blocked for some period of time. While cash could be stolen or lost in some value only.

- India is at a developing stage where people live in various culture, orthodox mindsets, and some with no bank accounts as being unaware towards it. So there will be a small society of people who will never accept cashless transactions. So conceptually cashless society is beneficial and that is why everyone is praising the decision.

NOBEL PRIZES 2016

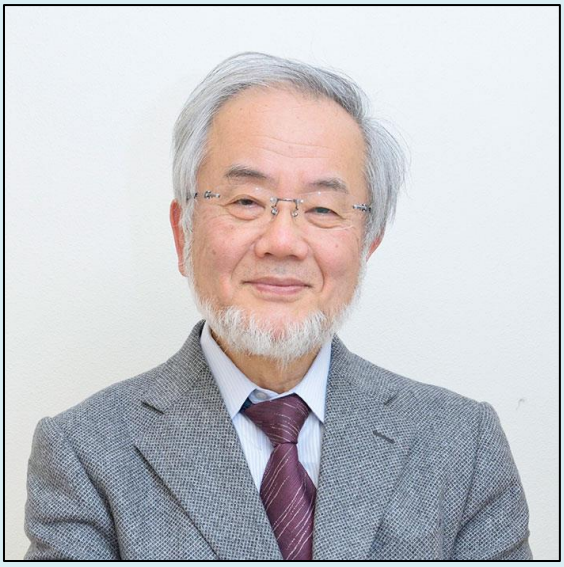
- The Nobel Prize in Physics 2016
  David J. Thouless, F. Duncan M. Haldane and J. Michael Kosterlitz
  "For theoretical discoveries of topological phase transitions and topological phases of matter"



David J. Thouless

- The Nobel Prize in Chemistry 2016
  Jean-Pierre Sauvage, Sir J. Fraser Stoddart and Bernard L. Feringa
  "For the design and synthesis of molecular machines"

- The Nobel Prize in Physiology or Medicine 2016
  Yoshinori Ohsumi
  "For his discoveries of mechanisms for autophagy"



Yoshinori Ohsumi

- The Nobel Prize in Literature 2016
  Bob Dylan
  "For having created new poetic expressions within the great American song tradition"

- The Nobel Peace Prize 2016
  Juan Manuel Santos
  "For his resolute efforts to bring the country's more than 50-year-long civil war to an end"

Juan Manuel Santos

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2016
Oliver Hart and Bengt Holmström
"For their contributions to contract theory"

Civil Engineering Updates

MEGASTRUCTURES

1. Karcham Wangtoo Hydroelectric Plant

The Karcham Wangtoo Hydroelectric Plant is a 1200 megawatts (1,600,000 hp) run of the river hydroelectric power station on the Sutlej River in Kinnaur district of Himachal Pradesh, India. Construction on the power station began on 18 November 2005. In 2015 Jaypee Group sold out Karcham Wangtoo Project to JSW Group. The first generator was commissioned in May 2011, the second in June and the final two in September. The 98 m (322 ft) diverts a substantial portion of the Sutlej into a 10.48 m (34.4 ft) diameter and 17.2 km (10.7 mi) long headrace tunnel to the underground power station downstream at Wangtoo. At the station, the water powers four 250 MW Francis turbine-generators before it is sent back into the Sutlej via a 1.2 km (0.75 mi) long tailrace tunnel. Further a 5.25 km long silt flushing tunnel with gravity flow for effective flushing of sediments from the sedimentation chambers has been provided which is the longest flushing tunnel in the history of hydropower plants in India.

2. Chenab Bridge

The Chenab Bridge is a railway steel arch bridge under construction between Bakkal and Kauri in the Reasi district of Jammu and Kashmir in India. When finished, the bridge will span the Chenab River at a height of 359 m (1,178 ft) above the river, Key technical data of the bridge include. Deck height (height above river): 359 m

(1,178 ft). Bridge length: 1,315 m (4,314 ft), including the 650 m (2,130 ft) long viaduct on the northern side. Arch span: 467 m (1,532 ft). Arch length: 480 m (1,570 ft). This makes the Chenab Bridge the **world's highest railway bridge** the bridge with the **widest span in the Indian** broad gauge railway network.

3. Kamuthi Solar Power Project

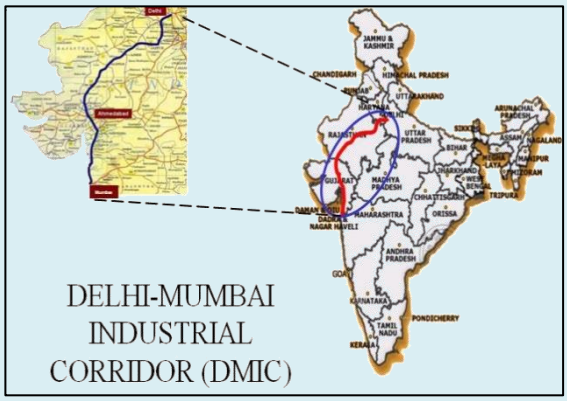
Kamuthi Solar Power Project is a solar photovoltaic power generating station

at Kamuthi, 90 km from Madurai, in the state of Tamil Nadu, India. This project has been commissioned by Adani Power. With a generating capacity of 648 MW at a single location it is billed as the world's largest single location solar project. The project was completed on 21 September 2016 with an investment of around 4,550 crores. The solar plant consists of 2,500,000 solar modules and 27,000 meters of structures. It consists of 576 inverters and 154 transformers and almost 7500 km of cables. Panels occupy 1270 acres of land. 30,000 tons of galvanized steel were used. About 8500 personnel worked on average installing about 11 MW in a day to set up the plant in stipulated time. Given the solar resource of around 5.5 kWh/m2/day an annual generation of 1.3 TWh/yr may be possible.

4. Yamuna Expressway

Yamuna Expressway is a 6-lane (extendable to 8 lanes), 165 km long, controlled-access expressway, connecting Greater Noida with Agra in the Indian state of Uttar Pradesh. It **is India's longest six-lane** controlled-access expressway stretch. The total project cost was 128.39 billion Rs. The expressway project concept was proposed by former Chief Minister of Uttar Pradesh ,Mayawati, its construction began in December 2007, completed about two years ahead of its original target completion date, and inaugurated on 9 August 2012 by Chief Minister Yadav. The expressway starts from Greater Noida and ends at Kuberpur on NH 2 towards Kanpur and Agra. In addition, a total of 13 service roads of about 168 km have been built for local commuters to access the expressway.

5. Delhi Mumbai Industrial Corridor Project



The Delhi-Mumbai Industrial Corridor Project is a planned industrial development project between India's capital Delhi and its financial hub, Mumbai. It is one of the world's largest infrastructure projects with an estimated investment of US$90 billion, and is planned as a hi-tech industrial zone spread across seven states, along the 1,500 km long Western Dedicated Freight Corridor which serves as its backbone. It includes 24 industrial regions, eight smart cities, two airports, five power projects, two mass rapid transit systems and two logistical hubs. The eight investment regions proposed to be developed in Phase I of DMIC are Dadri-Noida-Ghaziabad, UP, Manesar-Bawal, Haryana, Khushkhera-Bhiwadi-Neemrana and Jodhpur PaliMarwar,Rajasthan,Pithampur-Dhar-Mhow,MP, Ahmedabad-Dholera Special Investment Region (SIR) in Gujarat, the Shendra-Bidkin Industrial Park and Dighi Port Industrial Area in Maharashtra.India needs to employ over 100 million people within the next decade and so this project assumes vital importance to develop manufacturing centers that could employ millions. The project has received major boost

with India and Japan inking an agreement to set up a project development fund with an initial size of 1,000 crore (US$148.6 million). Both the Japanese and Indian governments are likely to contribute equally. The work is already underway and progressing at a rapid pace, with the dedicated freight corridor expected to be completed by December 2019.

6. Dibang Dam Hydropower Project

The Dibang Dam is a planned concrete gravity dam, located in the Lower Dibang Valley District in Arunachal Pradesh, India. At the time of its future completion, it will be **India's largest dam and the world's tallest concrete gravity dam**, standing 288 meters (945 ft) tall. The Dibang Dam is expected to provide up to 3,000 megawatts of hydroelectric power, and will also assist with flood control in the Dibang Valley.[3] The foundation stone for the dam was laid on 31 January 2008 by Prime Minister Manmohan Singh. Construction on the project, however, has yet to begin. In 2013, the Ministry of Environment and Forests rejected the project's application but NHPC (national hydroelectric power corporation.) Limited will resubmit it in 2014. The dam has also been under intense local and international opposition to its tentative negative environmental impacts and forced relocations.

7. World one

World one is a super tall residential

skyscraper under construction in Mumbai, India. It is located in Lower Parel, South Mumbai on the 7.1-hectare (17.5-acre) site of the defunct Shrinivas Mill. The site also houses two other towers—World View and World Crest. World One is being built at an estimated cost of over US $321 million. Construction began in 2011, and is expected to be completed in 2018. Once complete, World One will be the tallest building in India, and the second tallest residential tower in the world.

✓ **Two Big Cable-Stayed Spans Taking Shape in the UK**

River Mersey crossing is just beginning, while Firth of Forth bridge's stays are nearly all in place.

Large, multispan cable-stayed bridges are relatively rare structures, yet two are now being built in the U.K. alone. Nearly all the cables on the emerging bridge across Scotland's Firth of Forth waterway are in place, while the first stays are beginning to rise over the River Mersey crossing, 320 kilometers to the south.

Both cable-supported bridges include three towers. The bridges differ in financing, structural form and construction methods.

Funded directly by the Scottish government, the "Queensferry" crossing, near Edinburgh, is being built to take traffic off the nearby Forth Road suspension bridge, which has suffered corrosion since its 1964 opening. Procured under a design-build contract, the new bridge's deck is formed by prefabricated steel-tub girders with compositely cast concrete tops.

Taking a different approach, the owner of the "Mersey Gateway" bridge, running between Widnes and Runcorn, adopted a design, build, finance and operate (DBFO) contract for its castin-place prestressed-concrete crossing. The bridge will augment the heavily trafficked 55-yearold Silver Jubilee steelwork arch bridge.

In Scotland, work began on the Queensferry crossing in 2011, with a May 2017 completion deadline, says a spokesman for the owner, Transport Scotland.

The roughly 2.7-km-long crossing includes a cable-stayed stretch, with two 650-m-long main spans and 223-m back spans. Its deck is about 40 m wide, including walkways, and about 5 m deep. Fanning down from the towers, 288 cables, some up to 420 m long, support the crossing.

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The Queensferry's cables are in two planes along the deck's centerline. Some cables from opposite towers overlap on either side of the central spans to increase their stiffness. The north and south towers are 203 m tall, and the center tower is 210m.

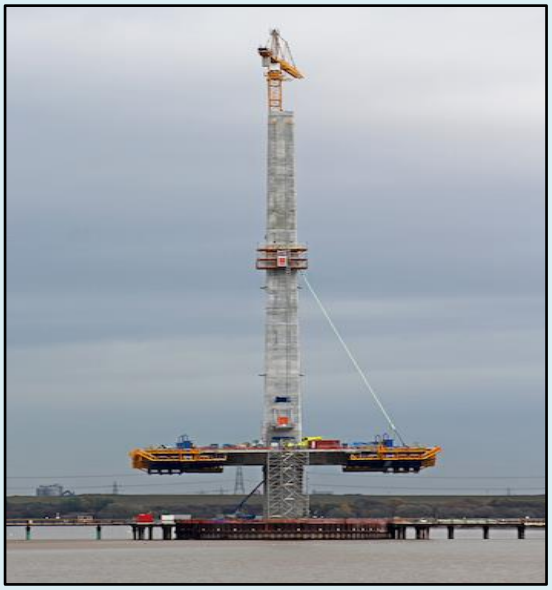
Forth Crossing Bridge Constructors has the project's fixed-price design-build contract, which is worth nearly $1 billion at current exchange rates. The consortium is controlled equally by Germany's Hochtief Construction A.G., U.S.-based American Bridge International and Spain's Dragados S.A. Locally based Morrison Construction Ltd. has a minority share.

FCBC procured 35,000 tons of steelwork from China, delivered in five shipments, according to American Bridge. Other elements came from Poland, Spain and the U.K.

The first prefabricated deck module went up in October 2014. It was one of 12 placed by a floating crane on temporary falsework fixed to the towers. Starting in September 2015, the remaining 110 elements are being placed by gantries on the previously erected deck and suspended by stay cables.

Early this year, the contractor linked the deck with the northern approach. Next, the team closed gaps on deck sections between the center tower and the south tower in October and between the center tower and the north tower in November.

"The focus now is on achieving … final closure between the south tower and the southern approach viaduct, which is planned for early in the new year," notes the contractor's project director, Michael Martin.



With much more modest spending power than Scotland has, the Halton Borough Council, a small local authority, got contractors to finance its Mersey bridge. In 2014, the council signed a 30-year design-build-finance-operate contract with Merseylink Consortium. The contract's whole-life value, including extensive highway work, is roughly $870 million at today's prices. Spain's FCC Construction S.A. and two investment companies make up Merseylink, which is financing the deal in exchange for toll revenues. A separate joint venture of FCC, Kier Infrastructure and Overseas Ltd., and Samsung C&T Corp. forms Merseylink's design-build contractor.

The Mersey Gateway bridge will cross the river, east of Liverpool, in four spans, totaling 998 m. It will be supported by 146 cables from three towers, ranging in height from 80 m to 125 m.

Concrete teams now are casting the 4.5-m-deep trapezoidal box-girder deck on sets of traveling formwork. Crews are working out from either side of the towers in

generally 6 m lengths. The first cable went up on the south tower late last month, marking "a new, very visual phase," according to Gareth Stuart, Merseylink's project director.

- ✓ **Double Decker Living bridge - Nongriat village, India**

The Khasi Tribes of Meghalaya have been trained to grow these bridges across the raised banks of streams to form a solid bridge, made from roots. The living bridges are made from the roots of the 'Ficus Elastica' tree, which produces a series of secondary roots that are perched atop huge boulders along the streams or the riverbanks to form bridges.

These Root Bridges are grown, and it takes around 15 years to be functional.The root bridges, some of which are over a hundred feet long are extraordinarily strong – strong enough to support the weight of fifty or more people at a time. The bridges are alive and still growing and gain strength over time.

- ✓ **Self-Healing Concrete (Using Bacteria Concept)**

Concrete is the world's most popular building material. Irrespective of how carefully it's mixed or reinforced, cracking is inevitable in all types of concrete. If these cracks turn out to be too large, they may result in corrosion of the steel reinforcement. Hence more than needed quantity of steel reinforcement is used inside concrete structure with the intention to prevent the cracks from turning into too large. This additional steel has no structural use and is an costly answer as steel costs are high.

Self Healing concrete can provide answers to all these question on which Henk Jonkers from Delft University Of Technology, Netherlands is working on.
Bacteria is used in concrete to get self healing properties. When a crack appears and water gets into those cracks bacteria gets activated and produces limestone which fills the cracks. There are certain issues with this method as survival of bacteria is difficult because of extreme alkaline nature of cement.

Jonkers used **Bacillus a type of alkaliphilic bacteria** which has the capabilities to withstand such harsh environment. Another problem Jonkers encountered was feeding of these bacteria. Sugar is not good option as adding it to the mix will make it weak. He used calcium lactate which was set in capsules with bacteria and added to the mix.

Practical Uses
Using Self healing concrete can in concept result in substantial financial savings, particularly in steel strengthened concrete. It can additionally imply durability issues could be tackled in a brand new and more economical method when designing concrete structures. Self healing concrete is good for developing underground retainers for hazardous waste, as there will be no need of humans to go there and repair those cracks.

SMART CITY MISSION

Smart City Mission is an urban renewal and retrofitting program by Government of India with a mission to develop 100 cities (target has been revised to 109 cities) all over the country. The Union Ministry of Urban Development is responsible for implementing the mission in collaboration with state governments of the respective cities.

In August 2015, the Govt. of India released the list of nominees. The list comprises of 98 cities, including many state capitals. The Ministry of Urban Development received proposals from the 97 cities to be the beneficiaries of the first year financing from 2016 onwards. Honorable Minister of Urban Development Shri Venkaiah Naidu announced the selected top 20 from them on 28 January 2016, which are given below:

1. Bhubaneswar, Odisha
2. Pune, Maharashtra
3. Jaipur, Rajasthan
4. Surat, Gujarat
5. Kochi, Kerela
6. Ahmedabad, Gujarat
7. Jabalpur, Madhya Pradesh
8. Visakhapatnam, Andhra Pradesh
9. Solapur, Maharashtra
10. Davangere, Karnataka
11. Indore, Madhya Pradesh
12. New Delhi
13. Coimbatore, Tamil Nadu
14. Kakinada, Andhra Pradesh
15. Belgaum, Karnataka
16. Udaipur, Rajasthan
17. Guwahati, Assam
18. Chennai, Tamil Nadu
19. Ludhiana, Punjab
20. Bhopal, Madhya Pradesh.

2nd round - Selection of 13 Smart Cities:

21. Lucknow, Uttar Pradesh
22. Warangal, Telangana
23. Dharamasala, Himachal Pradesh
24. Chandigarh
25. Raipur, Chhattisgarh
26. New Town, Kolkata, West Bengal
27. Bhagalpur, Bihar
28. Panaji, Goa
29. Port Blair, Andaman & Nicobar
30. Imphal, Manipur
31. Ranchi, Jharkhand
32. Agartala, Tripura
33. Faridabad, Haryana

3rd round - Selection of 27 Smart Cities:

34. Amritsar, Punjab
35. Kalyan, Maharashtra
36. Ujjain, Madhya Pradesh
37. Tirupati, Andhra Pradesh
38. Nagpur, Maharashtra
39. Mangalore, Karnataka
40. Vellore, Tamil Nadu
41. Thane, Maharashtra
42. Gwalior, Madhya Pradesh
43. Agra, Uttar Pradesh
44. Nashik, Maharashtra
45. Rourkela, Odhisa
46. Kanpur, Uttar Pradesh
47. Madurai, Tamil Nadu
48. Tumakuru, Karnataka
49. Kota, Rajasthan
50. Thanjavur, Tamil Nadu
51. Namchi, Sikkim
52. Jalandhar, Punjab
53. Shimoga, Karnataka

54. Salem, Tamil Nadu
55. Ajmer, Rajasthan
56. Varanasi, Uttar Pradesh
57. Kohima, Nagaland
58. Hubli-Dharwad, Karnataka
59. Aurangabad, Maharashtra
60. Vadodara, Gujarat
61. Srinagar, Jammu & Kashmir

BHUBANESWAR SMART CITY PROPOSAL

The Vision is to Make Bhubaneswar a;

- ✓ **Transit oriented city** with a compact urban form that promotes active, connected and sustainable mobility choices.
- ✓ **Livable city** providing diverse range of housing, educational and recreational opportunities; while enhancing its heritage, arts and traditional communities.
- ✓ **Child-friendly city** providing accessible, safe, inclusive and vibrant public places.
- ✓ **Eco-city** co-existing in harmony with nature for nurturing a resilient, clean, green, and healthy environment.
- ✓ **Regional economic centre** attracting knowledge based enterprises and sustainable tourism activities by leveraging and empowering its institutions, local businesses and informal workforce.

- ✓ **Area Based Development :**

Mobility:

- Multimodal Integration- Integrated bus terminal and railway station.
- NMT Zones- Pedestrian friendly roadways.
- NMT Network- Dedicated, continuous pedestrian and cycle network.
- PBS Scheme.
- IPT & Rickshaw Management.

*NMT = (Nordic Mobile Telephony) It is the first fully automatic cellular phone system. It is opened for service on 1st October, 1981 as a response to the increasing congestion and heavy requirements of manual mobile phone networks.

- **Physical Development:**
  - ✓ LED Street lighting Project.
  - ✓ Solar Roof Tops.
  - ✓ Waste Recycle Centres.
  - ✓ Sewerage Treatment System.
  - ✓ Water Recycling System.
- **Social Development :**
  - ✓ 4 Slum Redevelopment Projects.
  - ✓ Public Art Installations.
  - ✓ Safety: Community Policing “Ama Police”.
  - ✓ Modern Education Facility.
  - ✓ Women & Child Health Care.
- **Pan City Proposal - Mobility**
  - ✓ **Traffic Management** :Traffic signaling | Video surveillance | e-challan | simulation and modeling
  - ✓ **Parking:** Electronic parking systems | Parking availability data | Parking mobile app.

Total Cost: Rs. 4,450 Cr | SCP (Stronger Communities Program)
Funding: Rs. 973 Cr

General Awareness

Discipline is the act of keeping our body, mind and soul under control and does all the works in right manner by following the orders of the parents, teachers or elders of the family. It is the act to train our mind to accept rules and regulations to be in discipline. We can see the example of real discipline in every natural resource in our daily lives. Sun rises and sets at right time every day, moon rises and sets at right time, morning and evening come daily without getting late, river always run, parents always love, teachers always teach us and many more. So why we should be back in our life, we too should follow all the discipline necessary in our lives to go ahead without suffering from problems.

We should follow parents, teachers and our elders. We should listen them to know about their experiences and learn from their wins and failures. Whenever we start looking deeply at anything, it gives us a valuable lesson in the life. The seasons come and go in right pattern, sky rains and stops, etc. becomes at right time to make our lives in balance. So, we too need to be in discipline to maintain the life cycle on this earth. We have lots of responsibilities to our life, parents, teachers, family, environment, atmosphere, etc. As a human being, we have great mind to think, decide about right or wrong, and implement our plans to change it into action. So, we are highly responsible to know the necessity and importance of this discipline in our lives.

Indiscipline causes lots of confusion in the life and makes a human being irresponsible and lazy. It lowers the confidence level and makes mind unsure to do anything even a simple work. However, being in discipline lead us ahead towards highest ladder of the life.

MUMBAI CIVIL ENGINEER BECOMES FIRST INDIAN TO WIN SILVER AT MR. OLYMPIA, SETS AN EXAMPLE FOR ALL

27-year-old Iqbal Sayed from Mumbai, not only represented India at the Mr. Olympia amateur event held in Hong Kong, but also made the whole country proud by winning the silver medal. Sayed is a civil engineer with Reliance Infrastructure and Mumbai Metro and this is said to be his very first tournament. Sayed, the 2015 Mr. Mumbai runner up, beat nearly 20 participants from other countries in the Classic Bodybuilding category and finished second.

"I'm very happy that I've been able to do justice to the training that I put in for the past 6 months. Since I have a day job, it means that I had to dedicate all my time into this game" Sayed told Sportskeeda. "I suffered with Typhoid 10 days prior to the tournament; I was literally in tears as the doctor told me I won't be able to participate. However, I had to participate as I put in so much effort," Sayed further added, while showing gratitude towards all the people around him who helped him win.

INDIA'S JUNIOR HOCKEY TEAM WON WORLD CUP AFTER 15 YEAR

In its first such final in 15 years, India overwhelmed Belgium 2-1 to lift the 2016 Hockey Junior World Cup at Lucknow's Major Dhyan Chand Hockey Stadium on Sunday and become the second team, after Gagan Ajit Singh's colts in 2001, to get their hands on the most coveted title.

PARALYMPICS

India's Paralympic athletes came out to demonstrate that India had more sports champions in her fold than she was aware of. They collectively made the nation proud and drew attention to the fact that para athletes, too, could bring laurels for the nation and deserved the same recognition as regular champion achievers.

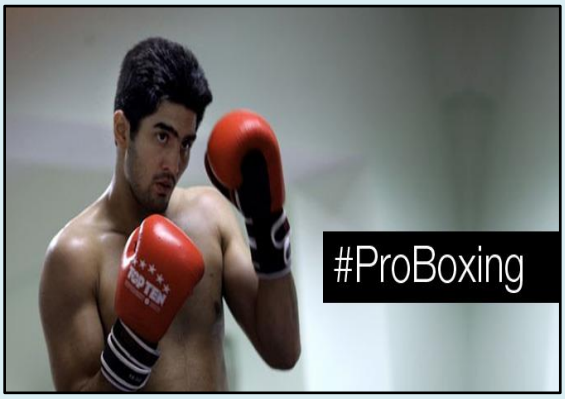
The stars at Rio 2016 Paralympic Games were:

Devendra Jhajaria – Gold Javelin F46
Mariyappan Thangavelu – Gold High Jump T42
Deepa Malik – Silver Shot Put F53
Varun Singh Bhati – Bronze High Jump T42

KABADDI

India won the Men's Kabaddi World Cup for the 3rd consecutive time, defeating three-time finalists, Iran. The achievement is even more significant since this event drew a total of 114 million viewers in India and overseas, and 20.3 million for the finals, which makes it the highest non-cricketing event watched in the country.

PROBOXING



Vijender Singh, India's Bronze medal winner in 2008 Beijing Olympics and now a professional boxer, retained his WBO Asia Pacific Super Middleweight title defeating Francis Cheka of Tanzania in a championship bout in New Delhi in December. This was his 8th consecutive win.

CRICKET

Ravichandran Ashwin was named ICC Cricketer of the Year for 2016 and also named ICC Test Cricketer of the Year. He ended the year being ranked No-1 Test Bowler. **Ravinder Jadeja** was ranked No#2 Test Bowler for 2016, a feat last seen in the '70s when Bishen Singh Bedi

and BS Chandrasekhar were ranked No-1 and No-2 respectively.

Karun Nair created a world record by scoring a triple hundred (303 not out) in only his 3rd innings, surpassing Len Hutton's triple ton in 9 innings, Don Bradman and John Edrich's triple tons in 13 innings.

He created this record against England in the 4th Test played in Chennai in India. Indiabroke another record when the team notched up 759 for 7, their highest ever in Tests, in the same match. India beat England 4-0.

Virat Kohli ended as ICC No-1 ranked player in T20 format and Ranked No-2 in Test and ODI.

He emerged as India's leading cricketer in all three formats of the game, as he transitioned into an aggressive captain leading from the front. In 2016, Virat led India to reclaim the Test No-1 position after briefly losing it to Pakistan. He has amassed 973 runs in IPL, over 1000 runs in T20, and over 1000 runs in Test cricket. His Test average for the year is 55+, ODI average is 90+, and T20 average is 100+.

The T20 Women's cricket team created history when they beat three-time world champions Australia for the first time, winning by 10 wickets, in Melbourne earlier this year. Cricket in India continues to remain the dominant sport of interest.

CHESS

10 year old R Pragganandhaa became the world's youngest International Master in chess. He achieved this at the KIIT International Open in Bhubaneshwar with an ELO Rating of over 2400. He, thus, surpassed Judith Polgar, who, for 27 years, held the record as the world's youngest International Master.

TENNIS

Sania Mirza continued to retain her World No#1 ranking in Women's Doubles. Her major achievements in the year were winning the Australian Open along with Martina Hingis, and Runners-up position in Mixed Doubles French Open along with Ivan Dodig.

Facts & Figures

- After the Government of India decided to rationalize the numbering system of highways in 2010, all highways directed from north to south are numbered in even digits and from east to west in odd digits.

- As of today, over 30,000 km of new highways are under construction plans.

- Indian Railways is the largest railways network to be operated by a single government and is the world's third largest network with a total length of 127,760 km.

- Indian Railways owned the longest railway platform in the world at Kharagpur with a length of 2,733 feet. Now, breaking the record, Gorakhpur station has recently taken its place with a span of 4,430 feet.

- Srirampur and Belapur are two different stations in Ahmednagar district of Maharashtra. They are both situated at the same point on the railway route, but are located on opposite sides of the track.

- Mathura junction has the maximum number of routes emerging from it.

- The Indian Railways is constructing the world's highest rail bridge over Chenab.

- The longest tunnel in the country is Pir Panjal Railway tunnel in Jammu and Kashmir which is 11.25 km long.
- The Indian Railways is the world's eighth largest employer with a total of 1.4 million employees.

- The Ram Jhula stands 450 feet long. The civil engineering feat is the fact that the 450 feet bridge has no supports anywhere, but at the ends. It was finished in 1986.

✓ **Jeddah Tower to be the tallest building**

It is looking like Burj Khalifa is going to loose it Guinness world record of world tallest building and Saudi Arab is looking to construct Jeddah Tower which is whooping 1 km tall in its initial designs. On the other hand, Burj Khalifa is 827m tall. Its completion is expected to be 2020.

Jeddah Tower is expected to afford 200 floors and this project will require about 5.7 million square feet of concrete and 80,000 tons of steel.

Foundations of Jeddah tower are designed to be 60 meters deep. These foundations have to resist coastal water action.

✓ **Facts About Construction In India**

- Sardar Sarovar Dam being executed by the group is the third largest in the world for volume of chilled concrete to be placed -nearly 7 million cum.

Sardar Sarovar Dam

- Indira Sagar a 1000 MW Power house is the second largest surface power house in the country.

- Nathpa Jhakri a 1500 MW Power House is the largest underground power house in India.
- Tehri Dam is the third tallest rockfill dam in the world, and the largest in Asia invloving placement of over 25 million cum of all types of fill material.

Tehri Dam

- Baglihar Hydroelectric project involved construction of 30km of project road along with three bridges.

Baglihar Hydroelectric project

- Brahmaputra Guide Bund completed in a record time of 7 months.
- Baspa-II and Chamera-II projects involved continuous concrete shuttering for tunnel lining which is used for the first time in the country.
- Teesta V project has been provided with Jet Grouting curtain is being provided below the coffer dams for the first time in India.
- Alimineti Madhva Reddy Irrigation project is the longest underground face to face tunnel in the world.

Alimineti Madhva Reddy Irrigation project

English Comprehension

Charles Darwin was born in 1809 in Shrewsbury, England. He was a biologist whose famous theory of evolution is important to philosophy for the effect it has had on ideas relating to the nature of men. After many years of careful study, Darwin attempted to show that higher species came into existence as a result of the gradual transformation of lower species, and that the process of transformation could be explained through the selective effect of the natural environment upon organisms. He concluded that the principles of natural selection and survival of the fittest govern all life. Darwin's explanation of these principles is that because of the food supply problem, the young of any species compete for survival. Those young that survive to produce the next generation tend to embody favorable natural changes that are passed on by heredity. His major work that contained these theories is On the Origin of the Species, written in 1859. Many religious opponents condemned this work.

1. According to the passage, Charles Darwin was which of the following?

a. a priest

b. a biologist

c. an animal trainer

d. a politician

2. Which of the following statements supports Darwin's belief about the origin of all species?

a. Man is descended from monkeys.

b. All life forms developed slowly over time from lower life forms.

c. Natural forces do not affect life on Earth.

d. All species were individually created.

3. Darwin's explanation that the young of any species compete for food and survival, and those that survive are strong and pass their traits on to their young was called which of the following?

a. belief in creationism

b. the catastrophic theory

c. theory of natural selection and survival of the fittest

d. the study of anthropology

4. According to the passage, how was Darwin's book, On the Origin of the Species, received?

a. Scientists gave their immediate approval of Darwin's book.

b. Religious opponents condemned Darwin's book.

c. The world ignored Darwin's book.

d. Darwin's book became an immediate bestseller.

Ans:- 1. (b) , 2. (b) , 3. (c) , 4.(b)

Quantitative

APTITUDE

Quantitative Aptitude

1. What will be the least possible number of the planks, if three pieces of timber 42 m, 49 m and 63 m long have to be divided into planks of the same length?
   (A) 7 **(B)** 8 **(C)** 22 **(D)** None of these

2. Find the greatest number, which will divide 215, 167 and 135 so as to leave the same remainder in each case.
   (A) 64 **(B)** 32 **(C)** 24 **(D)** 16

3. Find the L.C.M of 2.5, 0.5 and 0.175
   (A) 2.5 **(B)** 5 **(C)** 7.5 **(D)** 2.25

4. Find the number of divisors of 1728.
   (A) 18 **(B)** 30 **(C)** 28 **(D)** 31

5. Find the number of divisors of 1080 excluding the divisors, which are prefect squares.
   (A) 28 **(B)** 29 **(C)** 30 **(D)** 31

6. Find the number of divisors of 544 excluding 1 and 544
   (A) 12 **(B)** 18 **(C)** 11 **(D)** 10

7. Find the number of divisors of 544 which are greater than 3.
   (A) 15 **(B)** 10 **(C)** 12 **(D)** None of these

8. Find the maximum value of n such that 157 is perfectly divisible by 10^n.
   (A) 37 **(B)** 38 **(C)** 16 **(D)** -1.15

9. Find the maximum value of n such that 157! is perfectly divisible by 12^n.
   (A) 77 **(b)** 76 **(c)** 75 **(d)** 78

10. Find the maximum value of n such that 157! is perfectly divisible by 18^n.
    (A) 37 **(b)** 38 **(c)** 39 **(d)** 40

Ans:-1. (C) , 2. (D) , 3. (D) , 4.(C) , 5. (A), 6. (D) , 7. (B) , 8. (B) , 9. (C) , 10. (A)

Multiple Choice Questions

Multiple Choice Questions

1. The point on the celestial sphere vertically below the observer's position, is called
   A. zenith
   B. celestial point
   C. nadir
   D. pole
   Answer: Option C

2. The stereo plotting instruments are generally manufactured on the principle of
   A. optical projection
   B. optical mechanism projection
   C. mechanical projection
   D. all the above
   Answer: Option D

3. Latitude of a place is the angular distance from
   A. Greenwich to the place
   B. equator to the poles
   C. equator to the nearer pole
   D. equator to the nearer pole along the meridian of the place

E. none of these

Answer: Option **E**

4. International date line is located along

A. standard meridian

B. Greenwich meridian

C. equator

D. 180° longitude

E. none of these.

Answer: Option **D**

5. The shortest distance between two places measured along the surface of the earth, is

A. length of the equator between their longitudes

B. length of the parallel between their longitudes

C. length of the arc of the great circle passing through them

D. none of these

Answer: Option **C**

6. The maximum shear stress occurs on the filament which makes an angle with the horizontal plane equal to

A. 30°

B. 45°

C. 60°

D. 90°

Answer: Option **B**

7. For determining the moisture content of a soil sample, the following data is available Weight of container = 260 g, Weight of soil sample and = 320 g container, Weight of soil sample (dried) and = 310 g container. The moisture content of the soil sample, is

A. 15%

B. 18%

C. 20%

D. 25%

Answer: Option **C**

8. A pitot tube is used to measure

A. pressure

B. difference in pressure

C. velocity of flow

D. none of these.

Answer: Option **C**

9. The thickness of a sharp crested weir is kept less than

A. one-third of the height of water on the sill

B. one-half of the height of water on the sill

C. one-fourth of the height of water on the sill

D. two-third of the height of water on the sill

E. none of these

Answer: Option **B**

10. The property of steam function ψ are :

A. ψ is constant everwhere on any stream line

B. the flow around any path in the fluid is zero for continuous flow

C. the rate of change of ψ with distance in an arbitrary direction, is proportional to the component of velocity normal to that direction

D. the velocity vector may be found by differentiating the stream function

E. all the above

Answer: Option **E**

Career Options & Job Updates

ADVERTISEMENT NO. 23/2016

Union Public Service Commission Invites Online Recruitment Applications (Ora*) For Recruitment by Selection To The Following Posts:

(By using the website http://www.upsconline.nic.in)

VACANCY DETAILS

09. (Vacancy No. 16122309624) One Assistant Executive Engineer (Civil), Directorate General of Lighthouses & Lightships, Ministry of Shipping (UR-01). The post is suitable for Physically Challenged Persons with disability viz. Orthopedically Handicapped/Locomotors Disability/Cerebral Palsy with One Leg affected (Right or Left) (OL). The post is permanent. Pay Scale: PB-3, Rs. 15600-39100 + Grade Pay ` 5400. Revised pay structure as per 7th CPC - Level 10 (pay in pay matrix 56100-177500). General Central Service –Group 'A' Gazette Non-Ministerial. Age: 35 yrs. QUALIFICATIONS: ESSENTIAL: (A) EDUCATIONAL: Degree in Civil Engineering from a recognized University or equivalent.* [*Section A & B of the Institution of Engineers (India)]. (B) EXPERIENCE: Two years' experience in a supervisory capacity in design, maintenance and construction of structural and reinforced concrete works. DESIRABLE: Experience in General Administration, maintenance and operation of Lighthouses and other aids to Marine Navigation. DUTIES: To carryout construction, improvement and maintenance of Lighthouses and other navigational aids. HQ: Noida (U.P.), but liable to serve anywhere in India along the Indian coast including Andaman & Nicobar Islands and Lakshadweep Islands.

IMPORTANT
CLOSING DATE FOR SUBMISSION OF ONLINE RECRUITMENT APPLICATION (ORA) THROUGH ORA WEBSITE IS **23:59 HRS ON 12.01.2017.**
THE LAST DATE FOR PRINTING OF COMPLETELY SUBMITTED ONLINE APPLICATION IS UPTO **23:59 HRS ON 13.01.2017.**
DATE FOR DETERMINING THE ELIGIBILITY OF ALL CANDIDATES IN EVERY RESPECT SHALL BE THE PRESCRIBED CLOSING DATE FOR SUBMISISON OF ONLINE RECRUITMENT APPLICATION (ORA). THE APPLICANTS ARE ADVISED TO FILL IN ALL THEIR PARTICULARS IN THE ONLINE RECRUITMENT APPLICATION CAREFULLY AS SUBMISSION OF WRONG INFORMATION MAY LEAD TO REJECTION THROUGH COMPUTER BASED SHORTLISTING APART FROM DEBARMENT BY THE COMMISSION.
DATE FOR THE INTERVIEW ON WHICH THE SHORTLISTED CANDIDATE IS REQUIRED TO BRING THE PRINTOUT OF HIS/HER ONLINE APPLICATION ALONGWITH OTHER DOCUMENTS AT UPSC SHALL BE INTIMATED SEPARATELY.

GATE -2017 SCHEDULE

Date & Day	Session No.	Time (IST)	Test Paper Code
4th February 2017 (Saturday)	1	09:00 - 12.00 Hrs. (Forenoon)	ME, AR, TF
	2	14:00 - 17:00 Hrs. (Afternoon)	ME, AG, GG
5th February 2017 (Sunday)	3	09:00 - 12.00 Hrs. (Forenoon)	EC, BT, CY, EY, PI
	4	14:00 - 17:00 Hrs. (Afternoon)	EC, AE, MA, MT, PE, PH
11th February 2017 (Saturday)	5	09:00 - 12.00 Hrs. (Forenoon)	CS, EE
	6	14:00 - 17:00 Hrs. (Afternoon)	CS, EE
12th February 2017 (Sunday)	7	09:00 - 12.00 Hrs. (Forenoon)	CE, CH, MN
	8	14:00 - 17:00 Hrs. (Afternoon)	CE, IN, XE, XL

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GAIL will be utilizing **Graduate Aptitude Test in Engineering-2017 score (GATE-2017-Score)** for recruitment of Executive Trainees in the above disciplines during the year 2017.

Interested & eligible candidates who wish to apply for the position of Executive Trainee in GAIL will be required to first apply for **GATE-2017** and thereafter appear in **GATE-2017** as per instructions and timelines notified by **GATE-2017** Organizing Institute in one of the following relevant GATE Examination Papers:

Chemical Engineering (CH), Mechanical Engineering (ME), Electrical Engineering (EE), Instrumentation Engineering (IN), Civil Engineering (CE), Computer Science and Information Technology (CS).

Based on the **GATE-2017** score and requirement, candidates will be short-listed for Group Discussions and/or Personal Interview for the position of Executive Trainee in the above disciplines. Candidates will have to separately apply online in GAIL indicating their **GATE-2017** Registration Number through GAIL website **www.gailonline.com** from **21.12.2016 to 20.01.2017.** Candidates may log on to the **"Careers"** section of GAIL website **www.gailonline.com** for viewing detailed advertisement, eligibility requirements, other terms and conditions and instructions.

Website of GATE online Application Processing System (GOAPS) for Enrolment, Application Filling and Application Submission will remain open from 01.09.2016 and will close on 04.10.2016.

For detailed information regarding GATE-2017, interested candidates may log on to http://gate.iitr.ernet.in or website of IISc, Bangalore and IITs (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee)

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INVITES

APPLICATIONS FOR THE POST OF
VIDYUT SAHAYAK (JUNIOR ENGINEER - CIVIL)

1. **Qualification:**

   Full time/ regular B.E. (Civil) / B.Tech (Civil) only from Recognized University with minimum
   - 55% for ST Category Candidates and
   - 60% for UR Category Candidates, in final year/7th and 8th semester, without ATKT.

2. **Age limit: (As on the date of issuance of the advertisement i.e. 17.12.2016)**
   - 35 years for UR candidates.
   - 40 years for ST Candidates
   - Relaxation in upper age limit to other categories shall be given as under:

Category	Relaxation
Female Candidates	05 Years
Ex Armed Force Personnel	10 years
Dependent of Retired Employee of the Company	Upto age of 40 years

   - Maximum age relaxation in upper age limit shall be considered as 45 years.
   - The above relaxation in age is in view of "Yuva Swavlamban" Scheme and as approved by GUVNL.

3. **Period of Engagement:**
   - Two Years as Vidyut Sahayak

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Candidates should have a valid score in GATE 2017 examination in the relevant discipline i.e. **Electrical (EE), Electronics & Communication (EC), Civil (CE) or Computer Science and Engineering (CS)** to be eligible for next stages of selection.

PLEASE NOTE
- For details about GATE 2017 please refer to GATE website **http://www.gate.iitr.ernet.in/**
- For details about the eligibility criteria and selection procedure, visit Career Section at **www.powergridindia.com.**

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SELECTION PROCESS

STEP 1 : All interested and eligible candidates are required to appear for GATE-2017. Candidates will be short listed for Group Discussion and Personal Interview based on the GATE-2017 performance and the requirement. Detailed information regarding GATE-2017 is available on the website: **http://www.gate.iitr.ernet.in**

STEP 2 : Candidates need to apply online for the post of ET-2017 after getting their GATE Registration Number by visiting **www.ntpccareers.net.** The Online application process will commence from 10.01.2017 (Tuesday).

IMPORTANT DATES

Commencement of online application for GATE-2017	01.09.2016
Last date of online application for GATE-2017	04.10.2016
Commencement of online Registration of application by candidates for NTPC	10.01.2017
Last date for online registration of application by candidates for NTPC	31.01.2017

Advt. No. 04/16

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