# Dr.MAHALINGAM COLLEGE OF ENGINEERING AND TECHNOLOGY

## DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING

# TECHFORUM

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## SPOT LINE

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# SAIL (Steel Authority of India Ltd.)

## Placement Trends

- Mechanical, Electrical, Instrumentation and Chemical Engineers with 65% marks and clear the gate exam are eligible
- The upper age limit is 28 years
- Last Date for application submission every year **16th Jan**
- Selection process comprises of two written test

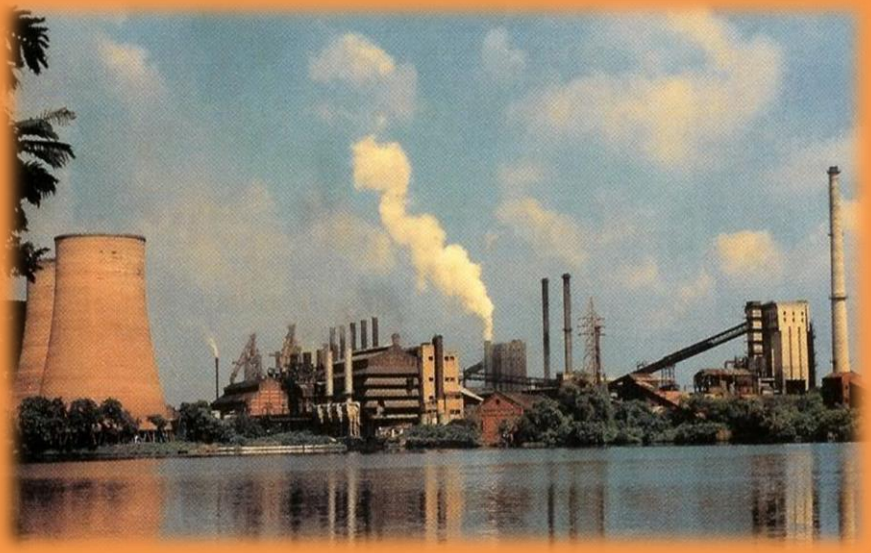
Steel Authority of India Limited (SAIL) is the leading steel-making company in India. It is a fully integrated iron and steel maker, producing both basic and special steels for domestic construction, engineering, power, railway, automotive and defense industries and for sale in export markets. SAIL is also among the five Maharatnas of the country's Central Public Sector Enterprises.

SAIL manufactures and sells a broad range of steel products, including hot and cold rolled sheets and coils, galvanized sheets, electrical sheets, structural, railway products, plates, bars and rods, stainless steel and other alloy steels. SAIL produces iron and steel at five integrated plants and three special steel plants, located principally in the eastern and central regions of India and situated close to domestic sources of raw materials, including the Company's iron ore, limestone and dolomite mines. The company has the distinction of being India’s second largest producer of iron ore and of having the country’s second largest mines network. SAIL a competitive edge in terms of captive availability of iron ore, limestone, and dolomite which are inputs for steel making. SAIL's wide ranges of long and flat steel products are much in demand in the domestic as well as the international market.

# Key Points

- 37 Branch Sales Offices spread across the four regions, 25 Departmental Warehouses, 42 Consignment Agents and 27 Customer Contact Offices.
- An ISO 9001:2000 certified
- Total number of dealers over 2000
- Website:

  http://sail.shine.com/jobs/51/



SAIL's International Trade Division ( ITD), in New Delhi- an ISO 9001:2000 accredited unit of CMO, undertakes exports of Mild Steel products and Pig Iron from SAIL's five integrated steel plants. With technical and managerial expertise and know-how in steel making gained over four decades, SAIL's Consultancy Division (SAILCON) at New Delhi offers services and consultancy to clients world-wide. SAIL has a well-equipped Research and Development Centre for Iron and Steel (RDCIS) at Ranchi which helps to produce quality steel and develop new technologies for the steel industry. Besides, SAIL has its own in-house Centre for Engineering and Technology (CET), Management Training Institute (MTI) and Safety Organization at Ranchi. Their captive mines are under the control of the Raw Materials Division in Kolkata. The Environment Management Division and Growth Division of SAIL operate from their headquarters in Kolkata. Almost all their plants and major units are ISO Certified.

# ONGC (Oil and Natural Gas Corporation)

## Placement Trends

- Recruits through gate exam
- Mechanical, Electrical, Instrumentation and Chemical Engineers with 65% marks and clear gate exam are eligible
- The upper age limit is 28 years
- Selection process comprises of written test
- Short listed candidates from written test will have to appear for Group Discussion and Personal Interview

ONGC (Oil and Natural Gas Corporation Limited) is India's leading oil & gas exploration company. ONGC has produced more than 600 million metric tonnes of crude oil and supplied more than 200 billion cubic meters of gas since its inception. Today, ONGC is India's highest profit making corporate. It has a share of 77 percent in India's crude oil production and 81 per cent in India's natural gas production.

The origins of ONGC can be traced to the Industrial Policy Statement of 1948, which called for the development of petroleum industry in India. Until 1955, private oil companies such as Assam Oil Company at Digboi, Oil India Ltd (a 50% joint venture between Government of India and Burmah Oil Company) at Naharkatiya and Moran in Assam, and Indo-Stanvac Petroleum project (a joint venture between Government of India and Standard Vacuum Oil Company of USA) at West Bengal, were engaged in exploration work. The vast sedimentary tract in other parts of India and adjoining offshore were largely unexplored. In 1955, Government of India decided to develop the oil and natural gas resources in the various regions of the country as part of the Public Sector development. To achieve this objective an Oil and Natural Gas Directorate was set up in1955, as a subordinate office under the then Ministry of Natural Resources and Scientific Research.

The Industrial Policy Resolution of 1956 placed mineral oil industry among the schedule 'A' industries. In August 1956, to ensure efficient functioning of the Oil and Natural Gas Directorate, the Directorate was raised to the status of a commission with enhanced powers.

## Achievements of ONGC

- Judged as Asia's best Oil & Gas company, as per a recent survey conducted by US-based magazine 'Global Finance'
- Ranked as the 2nd biggest E&P company (and 1st in terms of profits), as per the Platts Energy Business Technology (EBT) Survey 2004.
- Leads the list of Indian companies listed in Forbes 400 Global Corporates and Financial Times Global 500 by Market Capitalization.
- Only fully-integrated petroleum company in India, operating along the entire hydrocarbon value chain.
- Holds largest share of hydrocarbon acreages in India.

October 1959, the Commission was converted into a statutory body by an act of the Indian Parliament, which enhanced powers of the commission further. In 1960s, ONGC found new resources in Assam and established new oil province in Cambay basin (Gujarat). In early 1970s went offshore and discovered a giant oil field in the form of Bombay High. After liberalization in 1991, ONGC was re-organized as a limited Company under the Company's Act, 1956 in February 1994. Today, ONGC has grown into a full-fledged horizontally integrated petroleum company. Recently, ONGC has made six new discoveries, at Vasai West (oil and gas) in Western Offshore, GS-49 (gas) and GS-KW (oil and gas) in Krishna-Godavari Offshore, Chinnewala Tibba (gas) in Rajasthan, and Laipling-gaon (oil and gas) and Banamali (oil),both in Assam.

ONGC has a fully owned subsidiary, ONGC Videsh Ltd (OVL) that looks for exploration opportunities in other parts of the world.

THE PARAMOUNT CRITIQUE

ARTICLE SUBMITTED BY:D.DHIVYA

VISIT :en.wikipedia.org/wiki/fathometer

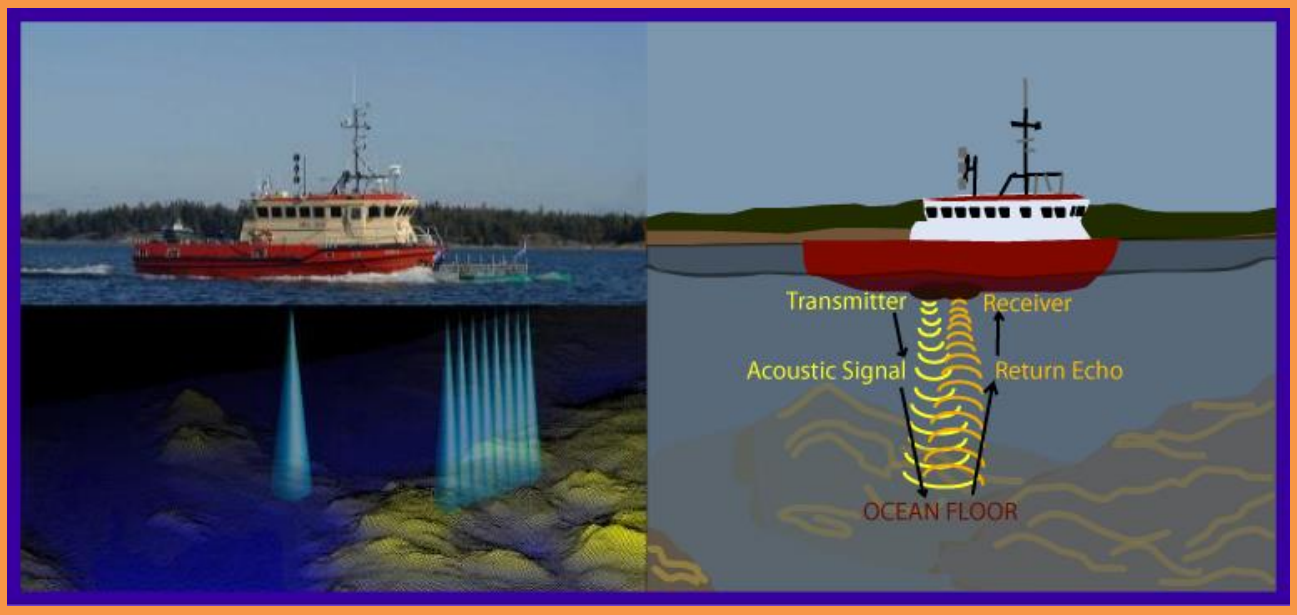
# FATHOMETER

**Echo sounding** is the technique of using sound pulses to find the depth of water. The interval from the emission of a pulse to reception of its echo is recorded, and the depth calculated from the known speed of propagation of sound through water. This information is then typically used for navigation purposes or in order to obtain depths for charting purposes. Echo sounding can also refer to hydro acoustic "echo sounders" defined as active sound in water (sonar) used to study fish. Hydro acoustic assessments have traditionally employed mobile surveys from boats to evaluate fish biomass and spatial distributions. Conversely, fixed-location techniques use stationary transducers to monitor passing fish.

The word *sounding* is used for all types of depth measurements, including those that don't use sound, and is unrelated in origin to the word *sound* in the sense of noise or tones. Echo sounding is a more rapid method of measuring depth than the previous technique of lowering a sounding line until it touched bottom

# TECHNIQUE

Distance is measured by multiplying half the time from the signal's outgoing pulse to its return by the speed of sound in the water, which is approximately 1.5 kilometres per second. For precise applications of echo sounding, such as Hydrography, the speed of sound must also be measured typically by deploying a Sound Velocity Probe into the water. Echo sounding is effectively a special purpose application of sonar used to locate the bottom. Since a traditional pre-SI unit of water depth was the fathom, an instrument used for determining water depth is sometimes called a fathometer




Most charted ocean depths use an average or standard sound speed. Where greater accuracy is required average and even seasonal standards may be applied to ocean regions. For high accuracy depths, usually restricted to special purpose or scientific surveys, a sensor may be lowered to measure the temperature, pressure and salinity. These factors are used to calculate the actual sound speed in the local water column. This latter technique is regularly used by US Office of Coast Survey for navigational surveys of US coastal waters. See NOAA Field Procedures Manual, Office of Coast Survey

# COMMON USE

As well as an aid to navigation (larger vessels will have at least a simple depth sounder), echo sounding is commonly used for fishing. Variations in elevation often represent places where fish congregate. Schools of fish will also register. A fish finder is an echo sounding device used by both recreational and commercial fishers.

# HYDROGRAPHY

In areas where detailed bathymetry is required, a precise echo sounder may be used for the work of Hydrography. There are many considerations when evaluating such a system, not limited to the vertical accuracy, resolution, acoustic beam width of the transmit/receive beam and the acoustic frequency of the transducer.

Most hydrographic operations use a 200 kHz transducer, which is suitable for inshore work up to 100 metres in depth. Deeper water requires a lower frequency transducer as the acoustic signal of lower frequencies is less susceptible to attenuation in the water column. Commonly used frequencies for deep water sounding are 33 kHz and 24 kHz.

The beamwidth of the transducer is also a consideration for the hydrographer, as to obtain the best resolution of the data gathered a narrow beamwidth is preferable. This is especially important when sounding in deep water, as the resulting footprint of the acoustic pulse can be very large once it reaches a distant sea floor.

In addition to the single beam echo sounder, there are echo sounders that are capable of receiving many returns "pings". These systems are detailed further in the section called multibeam echosounder

# TECHNICAL QUESTIONS

1. The units whose sizes cannot be chosen independently are called
   a) Derived units b) Fundamental units
   c) Absolute d) Auxiliary fundamental
2. A passive network has
   a) No voltage source but current source
   b) No current source but voltage source
   c) No voltage source or current source
   d) None of the above
3. Zener diode is used as a
   a) Current regulator b) Voltage booster
   c) Voltage regulator d) Power regulator
4. Octal to binary conversion $(376)_8 = (\quad)_{16}$
5. The grey code is also called as
6. Absorption law
   a) A+AB=A
   b) A+AB=A+B
   c) A(A+B)=AB
7. 2's complement of $(1001)_2$
   a) 0010 b) 0110
   c) 1110 d) 0111

8. Identify the circuit

a) Voltage dependent current source b) Current dependent voltage source

c) Current dependent current source d) Voltage dependent voltage source

9. In the circuit shown, the value of current is

a) 1 A b) 2 A

c) 3 A d) 4 A

10. The voltage V in the given figure is

a) 10 V b) 15 V

c) 5 V d) 50 V

11. If a d.c series motor is operated on a.c supply, it

(a) Will not start at all
(b) Will start & run with poor efficiency & power factor
(c) Will get damaged due to burning of its winding
(d) Will run at excessively high speed

12. A universal motor is one which has

(a) Constant speed
(b) Constant output
(c) Capability to operate on both a.c & d.c
(d) Maximum efficiency

13. The inductive reactance of a transformer depends on

(a) Electromotive force
(b) Magnetomotive force
(c) Magnetic flux
(d) Leakage flux

14. The speed of single phase induction motor can be controlled by

(a) Varying the applied voltage to the starter winding
(b) Varying the no. of poles on the stator
(c) Either (a) or (b)
(d) None

15. Transformer action requires

(a) Constant magnetic flux
(b) Increasing magnetic flux
(c) Alternating magnetic flux
(d) Alternating electric flux

16. _____ thermometer cannot measure sub-zero (< 0° C temperature,

A. Mercury in glass B. Bimetallic C. Vapor pressure D. Resistance

17. A mercury barometer measures the _____ pressure.

A. atmospheric B. gauge C. vacuum D. absolute

18. What is the cutoff frequency of this low-pass filter?

A. 4.8 kHz B. 3.8 kHz C. 2.8 kHz D. 1.8 kHz

19. What is the frequency of this 555 astable multivibrator?

A. 278 Hz B. 178 Hz C. 78 Hz D. 8 Hz

20. The C-B configuration is used to provide which type of gain?

A. voltage B. current C. resistance D. power

QUESTIONS BY: D.NIVETHAA

# GENERAL APTITUDE QUESTIONS

QUESTIONS

BY

V.SABARISH

1. 4 5 13 40 104 ?

(1) 229 (2) 308

(3) 315 (4)241

(5) None of these

2. 8 9 13 22 ? 63

(I) 31 (2) 41

(3) 36 (4) 38

(5) None of these

3. 7 6 10 27 104 ?

(1) 520 (2) 420

(3) 515 (4) 525

(5) None of these

4. 3 7 15 ? 63 127

(1) 35 (2) 37

(3) 33 (4) 29

(5) None of these

5. Mr. Baljit purchased 100 pieces or' an article at the rate of Rs 480 per piece. He then listed the price so as to gain a profit of25%. While selling the articles he offered a discount of 5%. What is the percentage of profit earned m the deal 7

(1) 20.00 (2) 15.00

(3) 15.79 (4) 18.75

(5) None of these

6. The number formed by interchanging the positions of digits of a two digit number is less than the original number by 72. What is the original two digit number?

(1) 80 (2) 91

(3) 81 (4) 19

7. Present ages of Leela and Shivani are in the ratio of 4: 5 respectively. Three years hence this ratio becomes 5: 6. What is the difference between their present ages?

(I) 5 years (2) 6 years

(3) 4 years (4) 3 years

8. Perimeter of a circle is equal to the perimeter of a square whose area is 484 $cm^4$. What is the radius on the circle?

(1) 22 cms.
(2) 14 cms.
(3) 7 cms.
(4) None of these

9. Mr. Rajesh spent 20% of his monthly income on grocery and household expenses. Out of the remaining he spent 25% on children's education. 20% on transport and 15% on entertainment. He is left with an amount of Rs. 14,400 after incurring above expenses. What was his monthly income?

(1) Rs 45.000 (2)Rs 24.000

(3)Rs 36.000 (4)Rs 32,000

10. (0.2 x 3.5 x 8) + (0.7 x 1.8 x 12) =?

(1) 20.72 (2) 27.02

(3) 21.99 (4) 25.34

(5) None of these

# DO YOU KNOW?

## LCD (liquid crystal display)

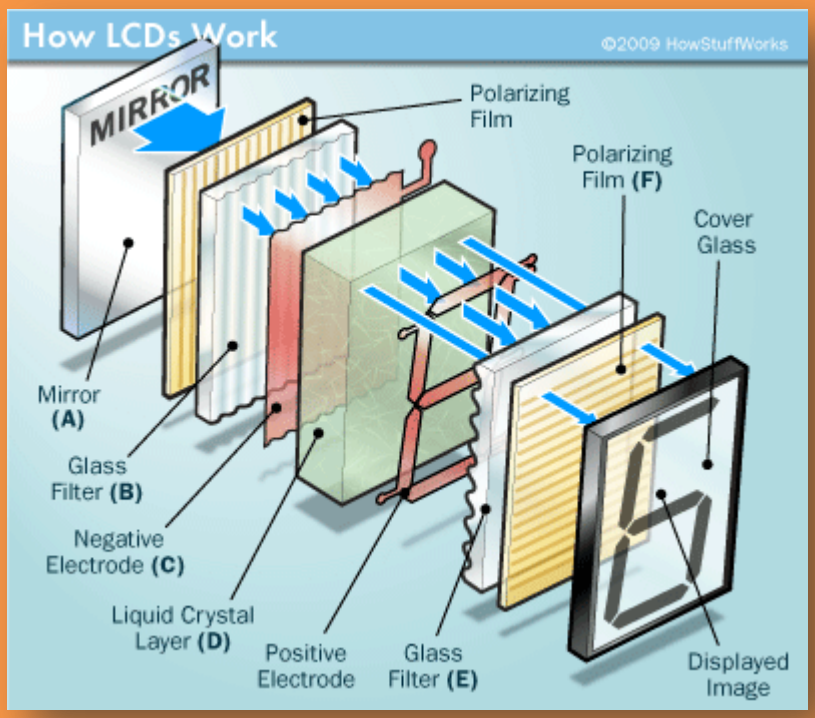
We probably use items containing an **LCD** (**liquid crystal display**) every day. They are all around us in laptop computers, clocks and watches, microwave ovens, CD players and many other electronic devices. LCDs are common because they offer some real advantages over other display technologies.

## LIQUID CRYSTAL

The name "liquid crystal" sounds like a contradiction. We think of a crystal as a solid material like quartz, usually as hard as rock, and a liquid is obviously different. How could any material combine the two?

There are three common states of matter: solid, liquid or gaseous**.** Solids act the way they do because their molecules always maintain their orientation and stay in the same position with respect to one another. The molecules in liquids are just the opposite: They can change their orientation and move anywhere in the liquid. But there are some substances that can exist in an odd state that is sort of like a liquid and sort of like a solid. When they are in this state, their molecules tend to maintain their orientation, like the molecules in a solid, but also move around to different positions, like the molecules in a liquid. This means that liquid crystals are neither a solid nor a liquid. That's how they ended up with their seemingly contradictory name. So, do liquid crystals act like solids or liquids or something else? It turns out that liquid crystals are closer to a liquid state than a solid. It takes a fair amount of heat to change a suitable substance from a solid into a liquid crystal, and it only takes a little more heat to turn that same liquid crystal into a real liquid. This explains why liquid crystals are very sensitive to temperature and why they are used to make thermometers and mood rings. It also explains why a laptop computer display may act funny in cold weather or during a hot day at the beach.

# HOW IT WORKS




Ferroelectric liquid crystals (FLCs) use liquid crystal substances that have chiral molecules in a smectic C type of arrangement because the spiral nature of these molecules allows the microsecond switching response time that make FLCs particularly suited to advanced displays. Surface-stabilized ferroelectric liquid crystals (SSFLCs) apply controlled pressure through the use of a glass plate, suppressing the spiral of the molecules to make the switching even more rapid.

# CREATING AN LCD

There's more to building an LCD than simply creating a sheet of liquid crystals. The combination of four facts makes LCDs possible:

- Light can be polarized.
- Liquid crystals can transmit and change polarized light.
- The structure of liquid crystals can be changed by electric current.
- There are transparent substances that can conduct electricity.

An LCD is a device that uses these four facts in a surprising way.

To create an LCD, you take two pieces of polarized glass. A special polymer that creates microscopic grooves in the surface is rubbed on the side of the glass that does not have the polarizing film on it. The grooves must be in the same direction as the polarizing film. You then add a coating of nematic liquid crystals to one of the filters. The grooves will cause the first layer of molecules to align with the filter's orientation. Then add the second piece of glass with the polarizing film at a right angle to the first piece. Each successive layer of TN molecules will gradually twist until the uppermost layer is at a 90-degree angle to the bottom, matching the polarized glass filters.

As light strikes the first filter, it is polarized. The molecules in each layer then guide the light they receive to the next layer. As the light passes through the liquid crystal layers, the molecules also change the light's plane of vibration to match their own angle. When the light reaches the far side of the liquid crystal substance, it vibrates at the same angle as the final layer of molecules. If the final layer is matched up with the second polarized glass filter, then the light will pass through. If we apply an electric charge to liquid crystal molecules, they untwist. When they straighten out, they change the angle of the light passing through them so that it no longer matches the angle of the top polarizing filter. Consequently, no light can pass through that area of the LCD, which makes that area darker than the surrounding areas.

Building a simple LCD is easier than you think. Your start with the sandwich of glass and liquid crystals described above and add two transparent electrodes to it. For example, imagine that you want to create the simplest possible LCD with just a single rectangular electrode on it. The layers would look like this: The LCD needed to do this job is very basic. It has a mirror (**A**) in back, which makes it reflective. Then, we add a piece of glass (**B**) with a polarizing film on the bottom side, and a common electrode plane (**C**) made of indium-tin oxide on top.

ARTICLE SUBMITTED BY:S.THIRUNAAVUKKARASU

FOR MORE REFERENCE VISIT:en.wikipedia.org/wiki/liquidcrystal

A common electrode plane covers the entire area of the LCD. Above that is the layer of liquid crystal substance (**D**). Next comes another piece of glass (**E**) with an electrode in the shape of the rectangle on the bottom and, on top, another polarizing film (**F**), at a right angle to the first one. The electrode is hooked up to a power source like a battery. When there is no current, light entering through the front of the LCD will simply hit the mirror and bounce right back out. But when the battery supplies current to the electrodes, the liquid crystals between the common-plane electrode and the electrode shaped like a rectangle untwist and block the light in that region from passing through. That makes the LCD show the rectangle as a black area.

## EDITORIAL BOARD