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INSTRONICS
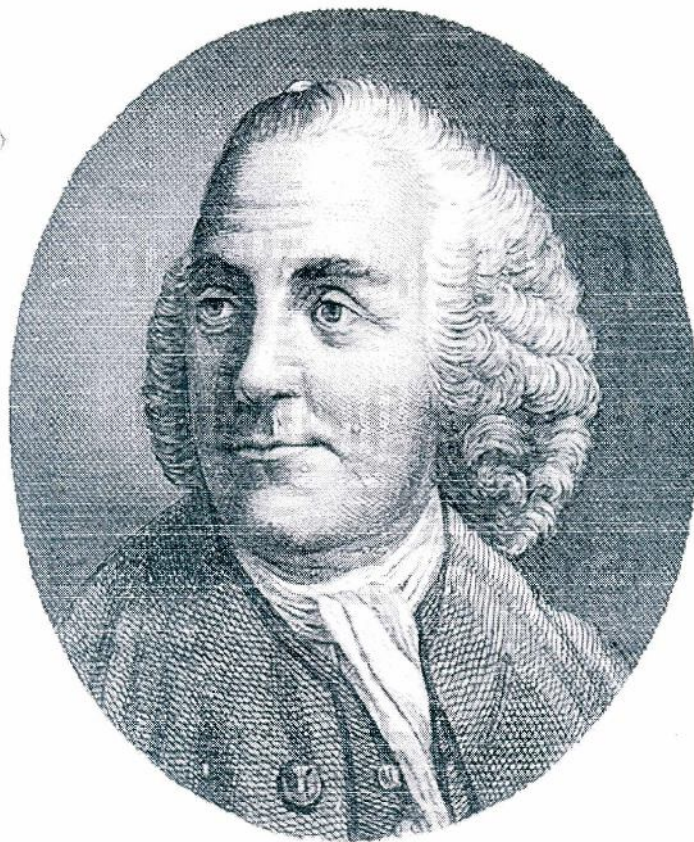
10 M MOUSE

STEREO HYDROPHONE

EDITORS:

The Editors and Publishers of this magazine do their best to verify the information published, but do not take responsibility for the absolute accuracy of the information.

Your comments are welcomed and you can send your newsletters through email to the mail-ID instronicsmagazine@gmail.com

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"Our life is what our thought makes of it
Great thought comes from the heart"

*We thank Our Beloved Principal **Dr.M.Madheswaran***

For his valuable guidance and encouragement in bringing up this

*magazine **"INSTRONICS"** successfully.*

- **EIE ASSOCIATION**

TERMS & DEFINITIONS:

JOULE:
The basic unit of thermal energy.

JOURNAL:
A journal is that part of a rotor that is in contact with or supported by a bearing in which it revolves.

JUNCTION:
The point in a thermocouple where the two dissimilar metals are joined.

KELVIN:
Symbol K. The unit of absolute or thermodynamic temperature scale based upon the Celsius scale with 100 units between the ice point and boiling point of water. $0°C = 273.15K$ (there is no degree (°) symbol used with the Kelvin scale).

KILOWATT (KW):
Equivalent to 1000 watts.

KILOWATT HOUR (KWH):
1000 watthours. Kilovolt amperes (kva): 1000 volt amps.

KINETIC ENERGY:
Energy associated with mass in motion, i.e., $(1/2) rV2$, where r is the density of the moving mass and V is its velocity.

KVA:
Kilovolt amperes (1000-volt amps).

LAMINAR FLOW:
Streamlined flow of a fluid where viscous forces are more significant than inertial forces, generally below a Reynolds number of 2000.

LARGE SCALE INTEGRATION (LSI):
The combining of about 1.000 to 10,000 circuits on a single chip. Typical examples of LSI circuits are memory chips and microprocessor.

LATENT HEAT:
Expressed in British Thermal Units (BTU) per pound. The amount of heat needed (absorbed) to convert a pound of boiling water to a pound of steam.

LINK INTEGRITY TEST:
This test ensures that the Ethernet link is connected properly and that the signals are transmitted correctly. It helps more but it does not guarantee that the link functions perfectly.

LEAST-SQUARES LINE:
The straight line for which the sum of the squares of the residuals (deviations) is minimized.

LIFE CYCLE:
The minimum number of pressure cycles, the transducer can endure and still remain within a specified tolerance.

LIMITS OF ERROR:
A tolerance band for the thermal electric response of thermocouple wire. It is expressed in degrees or percentage defined by ANSI specification MC-96.1 (1975).

By:

Mr.S.Karthik,
Pre-Final Year(MEIEA).

BENJAMIN FRANKLIN

Born : January 17, 1706
Boston, Massachusetts Bay

Died : April 17, 1790
(aged 84)
Philadelphia, Pennsylvania

Nationality : American

Profession :
Scientist,Writer,Politician

Signature :

Benjamin Franklin (January 17, 1706 [O.S. January 6, 1705] – April 17, 1790) was one of the founding fathers of the united states. A noted polymath, Franklin was a leading author, printer, political theorist, politician, postmaster, scientist, musician, inventor, satirist, civic activist, statesman, and diplomat. As a scientist, he was a major figure in the american enlightenment and the history of physics for his discoveries and theories regarding electricity. He invented the lightning rod, bifocals, the Franklin stove, a carriage odometer, and the glass 'armonica'.

Franklin earned the title of "The First American" for his early and indefatigable campaigning for colonial unity; as an author and spokesman in London for several colonies, then as the first United States Ambassador to France, he exemplified the emerging American nation.

Franklin was foundational in defining the American ethos as a marriage of the practical and democratic values of thrift, hard work, education, community spirit, self-governing institutions, and opposition to authoritarianism both political and religious, with the scientific and tolerant values of the enlightenment.

Franklin, always proud of his working class roots, became a successful newspaper editor and printer in Philadelphia, the leading city in the colonies.

He was also partners with William Goddard and Joseph Galloway the three of whom published the pennsylvania chronicle, a newspaper that was known for its revolutionary sentiments and criticisms of the British monarchy in the American colonies.

He became wealthy publishing poor richard's almanack and the pennsylvania gazette. Franklin gained international renown as a scientist for his famous experiments in electricity and for his many inventions, especially the lightning rod. He played a major role in establishing the University of Pennsylvania and was elected the first president of the American Philosophical Society.

Ben Franklin's mother, Abiah Folger, was born into a Puritan family among those that fled to Massachusetts to establish a purified congregationalist christianity in New England, when King Charles I of England began persecuting puritans. They sailed for Boston in 1635. Her father was "the

sort of rebel destined to transform colonial America"; as clerk of the court, he was jailed for disobeying the local magistrate in defense of middle-class shopkeepers and artisans in conflict with wealthy landowners.

Inventions and Scientific Inquiries
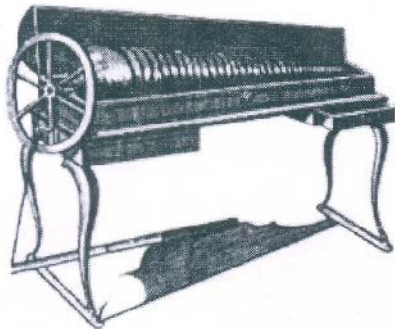
Franklin was a prodigious inventor. Among his many creations were the lightning rod, glass armonica (a glass instrument, not to be confused with the metal harmonica), Franklin stove, bifocal glasses and the flexible urinary catheter.

Franklin never patented his inventions; in his autobiography he wrote, "... as we enjoy great advantages from the inventions of others, we should be glad of an opportunity to serve others by any invention of ours; and this we should do freely and generously."

His inventions also included social innovations, such as paying forward. Franklin's fascination with innovation could be viewed as altruistic; he wrote that his scientific works were to be used for increasing efficiency and human improvement. One such improvement was his effort to expedite news services through his printing presses.

Atlantic Ocean Currents

As deputy postmaster, Franklin became interested in the North Atlantic Ocean circulation patterns. While in England in 1768 he heard a complaint from the colonial board of customs: Why did it take British packet ships carrying mail several weeks longer to reach New York than it took an average merchant ship to reach Newport, Rhode Island – despite the merchantmen having a longer and more complex voyage because they left from London, while the packets left from Falmouth in Cornwall?

Franklin put the question to his cousin Timothy Folger, a Nantucket whaler captain, who told him that merchant ships routinely avoided a strong eastbound mid-ocean current while the mail packet captains sailed dead into it, thus fighting an adverse current of 3 miles per hour (5 km/h). Franklin worked with Folger and other experienced ship captains, learning enough to chart the current and name it the Gulf Stream, by which it is still known today.

Franklin held that office for slightly over three years, longer than any other, and served the constitutional limit of three full terms. Franklin may not have been actively involved in the day-to-day operation of the council toward the end of his time in office.

By:

Mr.N.Yuvaraj,
Pre-Final Year(MEIEA).

BIOMEDICAL SLEEP INDUCER:

Sleeping difficulty, called insomnia, can involve difficulty falling asleep when you first go to bed at night, waking up too early in the morning, and waking up often during the night. The lack of restful sleep can affect your ability to carry out daily responsibilities because you are too tired or have trouble concentrating. All types of insomnia can lead to daytime drowsiness, poor concentration, and the inability to feel refreshed and rested in the morning.

Features of Sleep Inducer:

* Generates a natural electromagnetic-field.

* Makes easier to fall asleep.

* Induces a prolonged and sound sleep without drugs.

* No side effects.

L1 is obtained by winding randomly 600 turns of 0.2 mm. enameled wire on a 6 mm. diameter, 40 mm. long. steel bolts. Secure the winding with insulating tape.
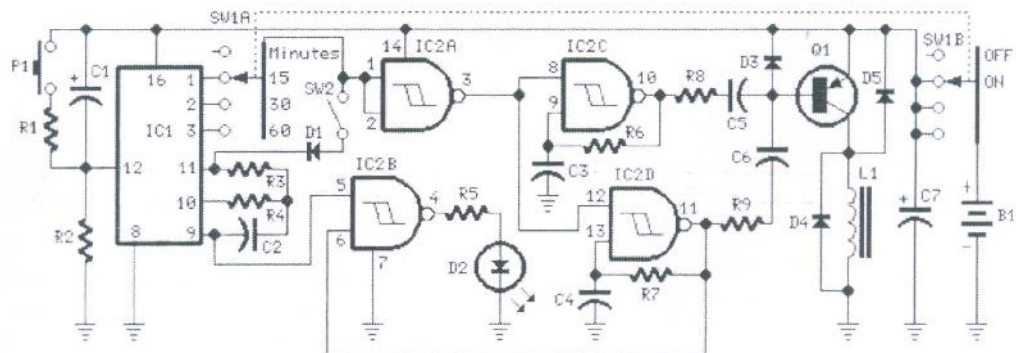

Fig. Circuit Diagram of Biomedical Sleep Inducer.

Magnetic field associated with the Earth is called Geo-magnetic fields. It is essentially dipolar (i.e., it has two poles, the northern and southern magnetic poles) on the Earth's surface. Away from the surface, the field becomes distorted. Many people experience sleeping well in natural surroundings, into a tent or a wooden hut. The fact is due not only to the healthy atmosphere but also from our unconscious ability to perceive natural Earth's magnetic fields. It will generate this type of Geo-magnetic-fields and to perceive them in this manner our brain is surrounded by an ideal environment for a sound sleep.

Mean current drawing is about 7mA, decreasing to less than 4mA during pauses when in Alternate mode operation. Battery can be dramatically increased omitting LED D2 and its associated resistor R5. Plastic box is to be used to enclose the circuit: metal cases can severely limit electromagnetic radiation.

By:

Mr.G.Victor Jhonson,
Pre-Final Year(MEIEA).

OPTO iPAC APP

It used to monitor and control all Opto 22 SNAP I/O points and PAC control variables, tables, and charts from I/O device.

The Opto iPAC app plays an important role for automation engineers and control technicians. In order to quickly access to status and values and the ability to change values. It can be ideal for debugging, responding to alarms and mobile connectivity to remote installations.

Working Principle:

The digital point status will be seen. the digital outputs is turned ON/OFF. Analog point values are viewed and written the values to analog outputs. Then all the tags are viewed and changed. The tag contains control variables, table elements, charts and I/O.

Controller status, firmware version, and strategy data are seen. The current strategy should be stop or run and then start or stop the charts. All Opto 22 devices are automatically discovered on the network and then save the devices that needed to be monitored in the named lists. Create watch lists for the tags that needs to monitored. Search globally for device name, IP address, firmware, strategy, and watch list tags.

It solid-state relays and I/O modules are famous for their reliability. Opto 22 controllers communicate over standard networks using open protocols.

The systems can exchange data with company databases, Allen-Bradley PLC systems, Modbus systems, OPC clients. It installed the app and it automatically discovered the controller on the network. Within a minute it had a watch list with live values.

Requirements:

Opto 22 SNAP PAC System (controllers and I/O: includes older I/O units like mistic I/O or SNAP Ethernet I/O attached to a SNAP PAC controller)

A secured wireless LAN network with access to controller and I/O network. FTP passwords should be added to individual devices using PAC Manager. Wireless versions of PACs and I/O are not required. Compatible with wireless routers and VPNs. Supports port forwarding.

THERMALTAKE'S LEVEL 10 M MOUSE:

This mouse exposes itself to serious gamers and it is designed by designworks USA, the thermaltake level 10 M mouse flaunts its inner componentry.

Design consultancy and BMW group subsidiary designworks USA has been collaborating on projects with PC case and components manufacturer thermaltake on various projects, such as the level 10 concept PC, since 2009.
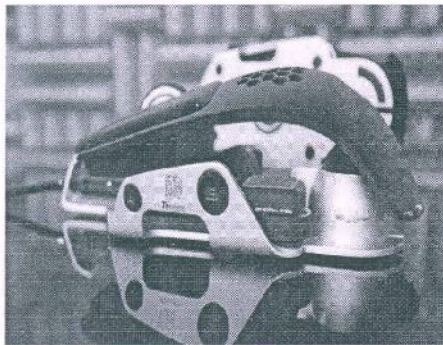
Now the two have teamed up again with thermaltake asking designworks USA to develop a series of design concepts for its upcoming range of level 10 gaming accessories that will be created for its e-sports division.

The first product out of the blocks is the level 10 M mouse that gamers will be able to get their palms on later this year.

While most mice demurely hide their insides under a modest cover of plastic, like the level 10 concept PC the level 10 M moue flaunts its sexy internal workings - although we're not talking exposed circuit boards and electronics here, so the mouse should last longer than a single sweat-inducing session or a couple of days in a dusty study.

The upper hand plate, which almost appears to float above the base on which the guts of the device sit, is height and tilt adjustable with the turn of a screw.

It also features a perforated surface designed to help stop the user's palm getting too hot and sweaty. Judging by the released images, it also appears to be a wired unit with an aluminum chassis.
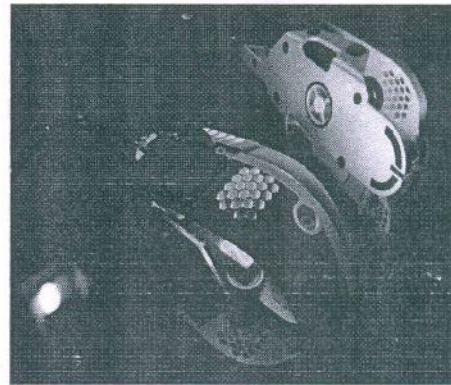
A good mouse proves its ability by pointing and clicking, which you'll be able to do when thermaltake launches the designworks USA-designed level 10 M mouse this northern spring at a price yet to be announced.

By:

Mr.S.Vignesh Kumar,
Pre-Final Year(MEIEA).

THE FOUR BIGGEST MISTAKES IN INSTRUMENTATION:

Mistake #3:

GENERATING GIBBERISH

Noise Ground loops are not the only source of noise that can distort a sensor's readings. Radio Frequency Interference (RFI) is even more common in plants that use walkietalkies, pagers, and wireless networks extensively. RFI also results whenever a current changes, such as when an electromechanical contact or a static discharge generates a spark. The sources of RFI noise must be eliminated or at least kept away from the plant's instrumentation if at all possible. Replacing electromechanical equipment with solidstate devices will eliminate arc-generated RFI. It may be sufficient to simply relocate switch boxes and relays to instrument-free areas of the plant.

If all else fails, it may be possible to passively shield the source of the interference or the instruments being subjected to it. Ignoring the problem is not an option, especially when the source of the noise is ordinary house current. At 60 Hz, house current oscillates slowly enough to have an appreciable effect on some processes. Consider the steel rolling application again.

A 60 Hz noise superimposed on the output of the thickness gauge will pass through the controller and induce a 60 Hz oscillation in the roller pressure. If the sheet exits the rollers with a velocity of six feet per second, those oscillations will appear as bumps in the sheet appearing every tenth of an inch. Whether those flaws are appreciable or not will depend on the amplitude of the original noise signal, the inertia of the rollers, and the tuning of the controller. PID controllers tuned to provide appreciable derivative action are particularly susceptible to the effects of measurement noise. They tend to react aggressively to every blip in the measurement signal to quickly suppress deviations from the setpoint. If a blip turns out to be nothing but noise, the controller will take unwarranted corrective actions and make matters worse.

Filtering is not always possible to eliminate noise sources altogether. It is often necessary to filter the raw sensor data by averaging several samples together or by ignoring any changes less than some small percentage. Many digital instruments, like ABB's FSM 4000 flowmeter, come equipped with built-in filters. It is a mistake to think that number crunching alone can fix all measurement noise problems.

Filtering tends to increase the time required to detect a change in the measured value and can even introduce spurious information into the signal. Worse still, it can mask the actual behavior of the process if it is overdone. It is generally more cost-effective in the long run to install sensors correctly and minimize the sources of interference than to rely strictly on mathematics to separate the data from the noise. When constructing a control loop, data filters should be applied in the final stages of the project, just before loop tuning.
(Cont'd...)

By:

Mr.S.Mohammed Javeeth,
Pre-Final Year(MEIEA).

STEREO HYDROPHONE

A stereo hydrophone system can be used to hear the sounds surrounding your submerged ROV. It will not only be able to hear what is going on around ROV, but should be able to hear what direction a sound is coming from.

This system, it construct two separate hydrophones and hook them both up to a pair of stereo headphones. The hydrophones are mounted on the ROV in a manner that simulates the positioning of human ears, but adjusted for the speed of sound in water.

Step 1: Construct two mono hydrophones. Indicated use of a 1.5 volt battery for the microphone supply. For better sound, try using three 1.5 volt batteries in series (for 4.5 volts total), or even a 9 volt.
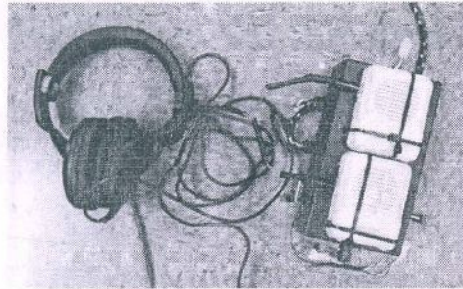

Step 2: Position the two Hydrophones on the ROV so that they reproduce sound as if it were hearing in ears. In order to do this, it need to take into account the difference between the speed of sound in air (approximately 350 m/s) and the speed of sound in water (approximately 1500 m/s).

Step 3: Purchase or construct a dual-mono to stereo "Y" adapter. The basic wiring of such an adapter. It can easily be constructed with two 1/8" male mono plugs, one 1/8" female stereo jack, some wire, and a little soldering.

Step 4: Plug the two mono plugs of the Y adapter into the headphone sockets of the two hydrophone amplifiers. Plug the stereo headphones into the stereo jack of the Y adapter, and slowly and carefully turn on the amplifiers.
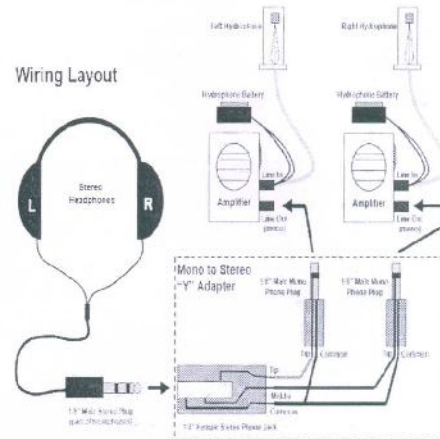
Step 5: Check that the left and right channels are correct. Tap one hydrophone and then the other and make sure that the left hydrophone shows up in the left ear, and the right hydrophone in the right ear. If it is reversed, simply switch the plugs on the Y adapter from one amplifier to the other.

It was once thought that the oceans were a silent place. A hydrophone picks up acoustic signals and then transfers the sounds into a receiver that allows hearing them.

By:

Ms.A.Priyanga,
Final Year(MEIEA).

COMPANY PROFILE:

Technical Center India(TCI) is second largest software development facility of Delphi.

TCI, works at the cutting edge of Embedded Software for electronic control systems such as petrol and diesel engine controllers, antilock brakes, radios, instrument clusters, mobile multimedia, forewarn systems, remote keyless entry and air control systems.

Software competency at this center is complemented with the development of additional skill sets that include systems development, mechanical analysis, electrical analysis, manufacturing test software development and medical electronics. The center also plays a critical role in providing embedded software systems for many of Delphi's fastest growing product lines such as diesel common rail engine management systems and advanced mobile multimedia systems.

TCI, has the largest Mechanical analysis group in Delphi. The Mechanical Engineering and Analysis (MEA) competency performs a wide variety of engineering analysis like stress, vibration and dynamics, injection mold flow and thermal analysis to assist in the mechanical design of components and systems.

Several types of structural analysis for products such as plastic snaps, circuit board deflection, and solder joints can be performed. The analysis tools can analyze a given boundary value problem, where a part is subjected to certain constraints and loaded, for various parameters of interest such as displacements, stresses and strains.

The mechanical analysis team at TCI is now an integral part of product design process of Delphi. To complement our analysis work, it has established Lab with test equipments like vibration shaker, microscope, thermal chamber, thermal imaging camera, strain gauge system, perform tests for compliance with product reliability specifications.

Fuel handling product engineering competency is involved in design and development of fuel pump modules for two wheelers and four wheelers, for Indian and global automotive applications. This competency is also responsible for Re-engineering and competitive analysis of fuel pump modules. In addition they also perform testing and validation of products to ensure life and reliability. Delphi ensures a higher degree of support and customer satisfaction by having a closer proximity to the Indian and Asia Pacific Automotive customers.

TCI has tie-ups with Indian Institute of Science, Bangalore.The current research areas are mechanical analysis, DSP(Digital Signal Processing) etc. TCI also has tie-ups with selected few institutions for student projects in wireless (DSP, Speech recognition), web based technology applications and business process workflow areas.

By:

**Mr.C.S.Muraleedharan,
Second Year(MEIEA).**

INTRODUCTION OF INTOOLS:

In tools is at the heart of all instrumentation software requirements. Automation of preparation of all instrumentation engineering documents like Instrument Index, I/O List, Instrument Specifications, Instrument calculations, Instrument pneumatic and process hookups, Instrument plot plan, Instrument logic diagrams, Instrument system engineering can be achieved through the use of Instrumentation software tools.

In tools have at their backend a database which validates, accepts, stores and organizes data presented to it through a front end which runs a user interface, typically a form. This data can then be retrieved, linked and manipulated using a set of queries. Finally the data can be presented in different formats using reporting software.

Instrumentation engineering involves interfaces with most of the other disciplines for preparation of various documents and in tools ensure that these interfaces are correctly coordinated while maintaining segregation and discipline.

MODULES:

A review of Instrumentation modules, their interfaces with other disciplines and it achieves desired functionality.

INSTRUMENT INDEX:

Instrument Tag number, PID number, Service, Line number, Location and System are some of the major fields in intools. The Tag number, PID number and the Line number are read out directly from the P&ID. Location and System have to be interpreted from legends and Service had to be inferred from the P&ID. P&ID's can be static drawings or they could be Smart. With static drawings for each Tag number, Location, System and Service have to be manually entered into the database. P&ID numbers and Line numbers have to enter into a linked table once and then these fields can be selected from a drop-down list for entry corresponding to a tag number.

Smart P&ID's have a database associated with them. Therefore Tag numbers, PID numbers, Line numbers, Location and System once populated in the P&ID's can be used by In tools by linking to this database. Only Service corresponding to a tag has to be manually entered.

I/O LIST:

Relevant fields like tag number, loop number etc. will be directly incorporated from the corresponding fields in the Instrument Index. These requirements can be populated in linked tables and will be updated in the I/O list automatically when the corresponding field is selected in the Instrument Index. Instrument specifications are prepared on the basis of process data, project specific information and knowledge base.

PROCESS DATA:

Which includes normal, maximum and minimum process parameters (flow, pressure, temperature etc) are required to select the of size the instrument.The flow rates are required to size the flow meters. Allowable pressure drop is used to size differential pressure type instruments. Temperature and pressure

is required to select specific requirements of the instrument. These requirements once specified should not be changed since instrument specific requirement, sizing etc. are based on these inputs. In tools ensure this by a concept called work-flow.

SPECIFIC INFORMATION:

It includes specific requirements of the intools which is common to all tags for instruments of a particular type (e.g. the requirement of integral digital indicator, area classification etc.). In tools provides two options to ensure that this information is not be entered repeatedly Instrument Specification Templates are standard templates prepared for each instrument type with information common to all tags updated prior to preparation of specifications. Once specified each instrument tag specification generated will be automatically updated with this data.

Instrument browser provides spread-sheet type views of fields in specifications with provision to copy one of more fields of a tag to one or more tags. Knowledge base is the instrument specific knowledge to be updated for each tag.

INSTRUMENT AND JUNCTION BOX PLOT PLAN:

It locates instruments and junction boxes in the overall plot plan. This aids the process of grouping of signals into junction boxes. It can be generated on the basis of co-ordinates provided by plant models or can be manually located using P&ID's and piping isometrics. Junction box termination details group's tags into junction boxes for multipair cables based on its location, signal type and destination. Location of each tag has to be determined either from a model or piping isometrics.

The maximum number of signals in each junction box depends on the selection of standard cable types. Provision has also kept for spares in each cable. In tools aid the process of grouping by ensuring that once the signal type and destination of a junction box is assigned only tags with the same signal type and destination are available for assignment. The number of signals already assigned to each junction box is readily visible.

CABLE SCHEDULE:

Cable schedule is automatically generated once all tags have been assigned to junction boxes. The length of each branch cable and main cable are updated based on the distance of the instruments from the assigned junction boxes and that of the junction box from the final destination respectively in the Instrument Plot Plan.

Intools can be installed for various objectives and design a specific module for each process.

By:

Mr.P.Senthil Kumar,
Lect.\EIE.

1		8					4	
	6		3					2
5								
11						12		
		7						
	10							
			9					

1 I	N	8 S	T	R	U	M	E	4 N	T
	6 P	T	3 M	E	T	E	R	U	
5 D	I	A	C				T	2 M	
11 A	T	N		S	S	A	12 M	A	E
N	O	7 D	E	K	A		T	G	
G	T	A					I	G	
L	10 E	R	R	O	R		N	E	
E		D	9 C	E	L	L		G	R

SHORTCUT FORMULAS FOR APPS:

1. $1+2+3+4\ldots+n = n(n+1)/2$

2. $1^2+2^2+3^2\ldots+n^2 = n(n+1)(2n+1)/6$

3. $1^3+2^3\ldots+n^3 = [n^2(n+1)^2]/4$

4. $1+3+5\ldots 2n-1 = n^2$

5. Every prime number greater than 3 canbe written using the formula $(6k+1)$ or $(6k-1)$.

6. Number of factors present in a number is given as $(p+1)(q+1)(r+1)\ldots$

7. Where $N=(a^p)+(b^q)+(c^r)\ldots$

8. Where a, b, c are prime numbers and p, q, r are positive numbers.

9. In the same way sum of all factors$=[(a^{(p+1)}/(a-1)][(b^{(q+1)}/(b-1)]\ldots$

10. If there is P volume of pure liquid initially in each operation and Q volume is taken out and replaced by Q volume of water then at the end of n such operations, the concentration k is given as $K = [(P-Q)/P]^n$.

11. If successive increase in percentage is given p%, q%, r% then effective % increase is given as $[(100+p)/100][(100+q)/100][(100+r)/100]-1]*100$.

12. If an article is sold such that a article has a profit of p% on one and loss of p% on other then we have the net result to be loss and the loss percent is $(p^2)/100$.

13. In a party each members shakes hand with other member. If total number of Hand shakes were N then Number of members in party = larger nearest whole squared number to N. E.g.: N=210, larger nearest square to 210 is 225. So members $= (225)^{1/2} = 15$.

14. If a person goes at X km/hr in forward direction and returns back at Y km/hr then the average speed is $2XY/(X+Y)$.

15. If a person traveling between two points reaches p hours late traveling at u kmph and reaches early traveling at v kmph, the distance between two points is $[vu(p-q)]/(v-u)$.

16. If we have a term of this sort "Apple" the number of possible arrangements possible are 5!/2!

17. Number of ways of selecting one or more items from n given items is $(2^n)-1$.

18. If we are given problems based on number of squares possible all together then we have a generalized short cut method of doing it.

19. Eg: given a chess board (8*8) how many squares can be formed the solution is $(8^2) + (7^2) + (6^2) + (1^2)$.

20. If a problem is given with some sequence (2, 4, 6...) and (3, 6, 9..) along with just 2 operations possible the answer is the number of square terms.

21. In calendars the first day of the year after the leap year will be in this manner. If Jan 1 of 2006 was on Sunday then Jan 1 of 2005 will be on Saturday and that of Jan 1 of 2004 will be on Thursday this is because 2004 is a leap year so there is an extra gap of one.

22. Given a circular track and both the riders ride in the same direction then the first time they meet is given as L / (a-b) for opposite direction it is L / (a+b)Where L is the length of the track and a. b the speed of riders.

23. If A can complete a work in a days and B can complete it in b days then A and B working together can complete it in ab / (a+b).

24. If A can complete a work in a days and B can complete it in b days and C can complete it in c days then all working together can complete it in abc / (ab+bc+ca).

25. If two trains start at the same time from two points A and B towards each other and after crossing they take x and y hrs to reach B and A respectively then (A speed): (B speed)=$[(x)^{1/2}]$: $[(y)^{1/2}]$.

26. If Length of a rectangle is increased by 11% and Breadth is increased by 12% then The Percentage increase in Area is $I_1 + I_2 + [(I_1 * I_2) / 100]$.

27. If Length of a rectangle is decreased by D1% and Breadth is decreased by D2% then Percentage increase or decrease in Area is   D1-D2+[(D1*D2) / 100]

28. If A is R% more than B, the Percentage B less than A is (100*R)/(100+R)

29. If A is R% less than B, the Percentage B more than A is (100*R)/(100-R)

30. How many numbers are divisible by n between A and B. Solution is (A / n) – (B / n)

31. 30.Let the present population of a town be P with an annual increase of R% then:

32. Population after n years =   P (1+R/100)n

33. Population n years ago =   P / (1+R/100)n

34. If the price of a commodity increases by R% then the reduction in consumption so as not to increase the expenditure is (100*R) / (100+R)

35. If the price of a commodity decreases by R% then the increase in consumption so as not to decrease the expenditure is (100*R) / (100+R)

36. If a number divisible by D1 leaves a remainder R1, Then the same number when divided by D2 the remainder will be the remainder got in scomputing R 1 / D2.

By:

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