Society for Promotion of Excellence in Electronics Discipline

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SPEED e- NEWSLETTER

Main Article

Top 10 Technologies that will change the Electronics world

CHANGE, OF COURSE, is a constant in everywhere. "Be the change that you wish to see in the world." — **Mahatma Gandhi**

Here are 10 technologies that will change the consumer electronics landscape this year.

1. Motion processing

Motion processors harness micro-electro-mechanical system sensors to ascertain not only the orientation of a device, but also its heading and absolute location in three-dimensional space. Fusing the data streams from accelerometers, gyroscopes, magnetometers (compasses) and altimeters (barometric pressure sensors) allows almost anything to be tracked. Gestures thus can control hardware (from game consoles to vehicle navigation systems) or inform software (from security protocols to location-based services).

2. GPU compute

In general-purpose computing on graphics processing units, or "GPU compute," certain computations traditionally handled by a system CPU or application processor are offloaded to the GPU. The addition of programmable pipelines, schedulers and floating-point precision to the graphics rendering pipeline enables GPU-compute technology.

3. Ubiquitous Android

Google Android will be to the next decade what Microsoft Windows was to the 1990s. It will be the software platform that will enable many of the most interesting and diverse devices to emerge in electronics. For decades, the industry has sought a common base of free, open-source software. The 1980s saw the quest for a unified Unix for computers. More recently, the search was for a single version of mobile and embedded Linux to power everything from mainstream smartphones, tablets and connected TVs to systems on the factory floor. Google's Android has come closer than anything in the past to fulfilling the dream. As ARM-based processors strengthen their processing punch, Android will emerge as an operating system for notebooks and PCs.

4. The ARMing of Win8

Designed with touchscreens in mind and capable of supporting mouse, keyboard or stylus input, Windows 8 is the first version of Microsoft's popular operating system to support ARM as well as X86 processors. The OS sports an interface based on Microsoft's typography-based design language, Metro, created for use in Windows Phone 7. The user interface consists of a ribbon of updating tiles—offering apps from e-mail to social networking, calendars to contact lists. Metro's look and feel has also been applied to Internet Explorer 10, the HTML5 browser to go with Microsoft's new OS.

Continued on page 2…….

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Forthcoming Events/Activities of SPEED

Intercollegiate Electronics Quiz Competition

(For FYBSc/SYBSc – Electronics & Computer Science students)

Date: Thursday, February 9, 2012

Place: Department of Electronic Science, Symbiosis College, Pune

Last date of Registration of teams/college: 31st January 2012

Contact: Prof. (Mrs) Kishori Kasat (98223 98435), kishori.kasat@gmail.com

Top 10 Technologies that will change the Electronics world ……..

"*We love those subjects which we understand and later work on it.*"

-N. M. Kulkarni

5. Touch-free HMIs

Touch-based human-machine interfaces took the electronics market by storm in 2011, but touch-free interfaces are growing fast. Touch-free human interfaces debuted commercially, whose infrared emitters and detectors can recognize human gestures made in midair. Microsoft is slated to introduce a family of IR-based human-gesture interfaces for mobile devices based on the Canesta IR chip's use of pixel-level time-of-flight calculations to deduce the distance to any object in a scene, regardless of lighting, occlusion by other objects or blending-of objects with the background. Texas Instruments recently announced an alternative touch-free interface solution that leverages its LightCrafter digital light processor (DLP).

6. Talkative intelligent agents

Siri, the cloud-based intelligent agent that executes verbal commands, can directly answer queries in a naturally conversational way that could marginalize search engines. Siri's cloud-based natural language understanding (NLU) capabilities combine voice recognition technology from Nuance Communications with voice command capability for Apple apps and query-handling technology from WolframAlpha. Users issue voice commands to dial the phone, send text messages, post calendar items, set reminders, get directions, send e-mails, check the weather forecast, find out the latest stock prices, set wakeup alarms, browse the address book, take notes or play music selections.

7. Graphene as the new silicon

Carbon nanotubes and planar graphene sheets are poised to revolutionize electronics, eventually displacing most of the metal and silicon in electronic devices—and, in the process, enabling faster, lighter and lower-power products.Today, this new material is only being used where it is sorely needed, such as to replace the increasingly rare and expensive indium-tin oxide in flat-panel displays. Nanotube inks can be deposited with inkjet printers to pattern transparent electrode arrays for displays or even solar cells. And since carbon circuitry can be printed at low temperatures, applications that require flexible substrates, like OLEDs, are turning to carbon-based inks, whose electron mobility is10 times greater than that of the organic materials used today. Graphene deposited in planar sheets could eventually replace metal interconnects, semiconductors and insulating oxides. IBM recently showed a 2-GHz transistor using graphene, and Texas Instruments showed progress on growing graphene across whole wafers.

8. Embedded vision

Embedded vision merges embedded systems with computer vision. Efforts are under way to bring in computer vision, via digital processing and intelligent algorithms, to interpret meaning in images or video. Powerful, low-cost, and energy-efficient processors are key enablers of the technology. Microsoft's Xbox Kinect hands-free game controller uses embedded vision to track players' movements. Rapid proliferation of embedded vision solutions is envisioned in the next few years for a wealth of applications. Embedded vision-based safety systems in cars could dramatically reduce the number of vehicle accidents.

9. Home health hubs

Home health hubs concentrate the data streaming from various sensing systems in patients' homes. A single wireless router connects cloud resources to environmental sensors (for temperature, humidity and air-quality), medical sensors (such as in blood-pressure monitors, glucose meters, weight scales and pulse oximeters) and wearable sensors that can invoke a personal emergency response system (PERS). Many homes today are connected to the Internet with a Wi-Fi router, but home health hubs cannot have dead spots; thus they require a more secure layer of wireless connectivity.

10. Location-based services

Location-based services are accessible via mobile devices through mobile networks. At the LBS base level, positioning-technology vendors provide hardware or software solutions for determining the user's location. Assisted GPS (A-GPS) is used to improve the startup performance, or time-to-first-fix, of a satellite-based positioning system and is used extensively with GPS-capable cell phones. A-GPS acquires and stores information about the location of satellites via the cellular network and uses proximity to cell towers to calculate position when GPS signals are not available.

(source: EEtimes.com)

- Dr. N. M. Kulkarni

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Events/Activities of SPEED

Principal Dr. Sheth and Dr. D. P. Mehendale, HoD
Project competition for F.Y./S.Y./ T.Y. B.Sc.(Electronic Science) at S. P. College Pune .

SPEED Memberships Details

Membership Type	Fees (Rs.)
1. Patron Members	10,000
2. Life Members	2,000
3. Ordinary members	500 (per year)
4. Student	200 (per year)

Membership drive Months – December 2011 & January 2012

"Let us work towards Excellence in Electronics for the betterment of society"
-N. M. Kulkarni

One day workshop was conducted at Arts, Science and commerce college at Rahuri on 4th February 2012 on Restructuring of SYBSC (Electronic Science) Instrumentation syllabus.

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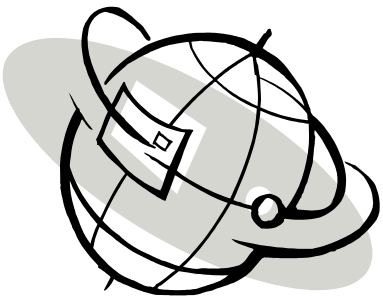

One day workshop on Revision of syllabus for T.Y. B.Sc.(Electronic Science) paper II: Microcontrollers at T. C. College, Baramati on 14th Jan 2012

Inter-collegiate project competition at. N. Wadia college on 23rd December 2011. Dr. P. K. Bhadane, Prof. J.V. Khedkar, Dr. P. B. Buchade, Prof. Makkad, Prof. Diwate, Prof. Nerkar were present at inaugural session.

History of Bluetooth:

Bluetooth got its name from tenth century king of Denmark Harald Bluetooth. He was responsible for spreading Christianity across Scandinavia. Effectively he united these nations in one religion and created good communication between its people. Swedish firm Erickson (Erriecsson) developed a device connecting two devices without wire. They wanted to name it. So they dug into history and choose the device's name after the king Bluetooth.

There is one more story around Bluetooth. This Danish king and Viking was very brave and he united and controlled Denmark and Norway. His original name was Harald Blatand. If the Danish name Blatand is translated in English it is Bluetooth. He got his name from very dark hair unusual for Vikings.

So the name Blatand which means dark complexion. He also had inclination towards eating Blueberries. He used to eat them a lot. (Like in India tobacco chewers have red teeth.)His teeth became stained with Blue color. So he had unique set of molars. Hence he must have been nicknamed Bluetooth.

What is Bluetooth device?

Bluetooth is the name of the new technology that is now commercially available to change the way the computers or machines work and communicate. Keyboard, printer, mouse, monitor etc.are connected by cables to computers. These cables are a big source of problems. If there are many cable connections, then they are bane of it rather than boon. Bluetooth is basically a cable replacement technology. Now days it is extensively used with mobile phones.

How it Works?

Bluetooth today is a standard for a small radio chip to be connected to a commu nicating device to replace a cable. Two such chips are attached to communicating and receiving devices. The information from one device is transmitted to other device and vice versa at a special frequency band of 2.4 GHz -2.5GHz with a power of 10 mW. This gives a range of about 10 meters. 100 mW may give a range of 100 meters. This does not require any license .

The Bluetooth system operates in unlicensed Industrial-Scientific-Medical(ISM) band of 2.4-2.5 GHz with a channel spacing of 1 MHz and a two level FSK modulation (logic 0 corresponding to 1070Hz and logic 1 corresponding to 1270Hz). Multiple users (about 80) can share the Bluetooth system by using FHSS (Frequency Hopping Spread Spectrum). This means 80 mobiles can transfer data (picture or song) at a rate of 1Mbps simultaneously without cable.

Prof. R.K.Nerakar, N.Wadia College, Pune.

Answers of Cross-Word Puzzle of Jan. 2012

Semiconductor physics

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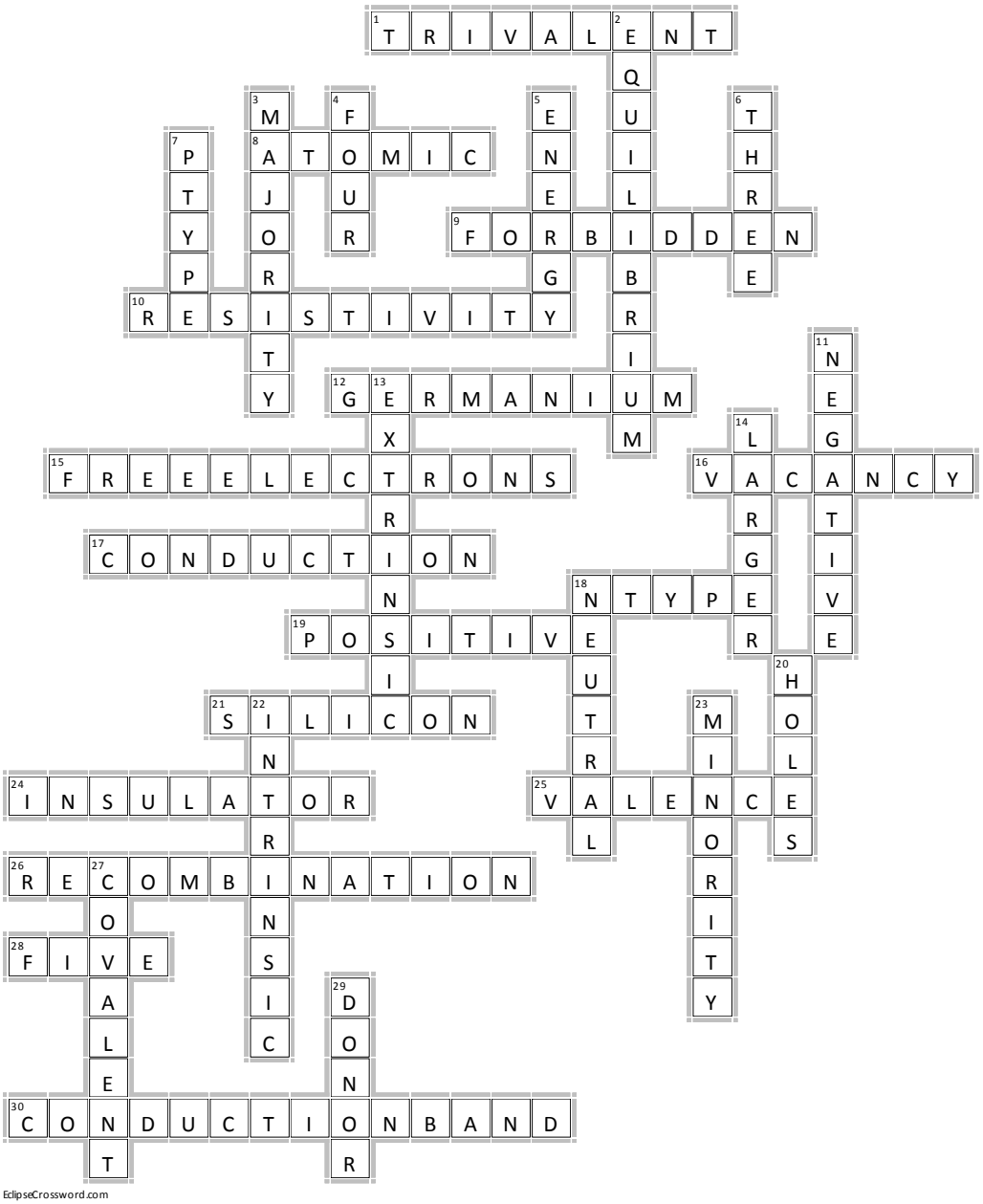
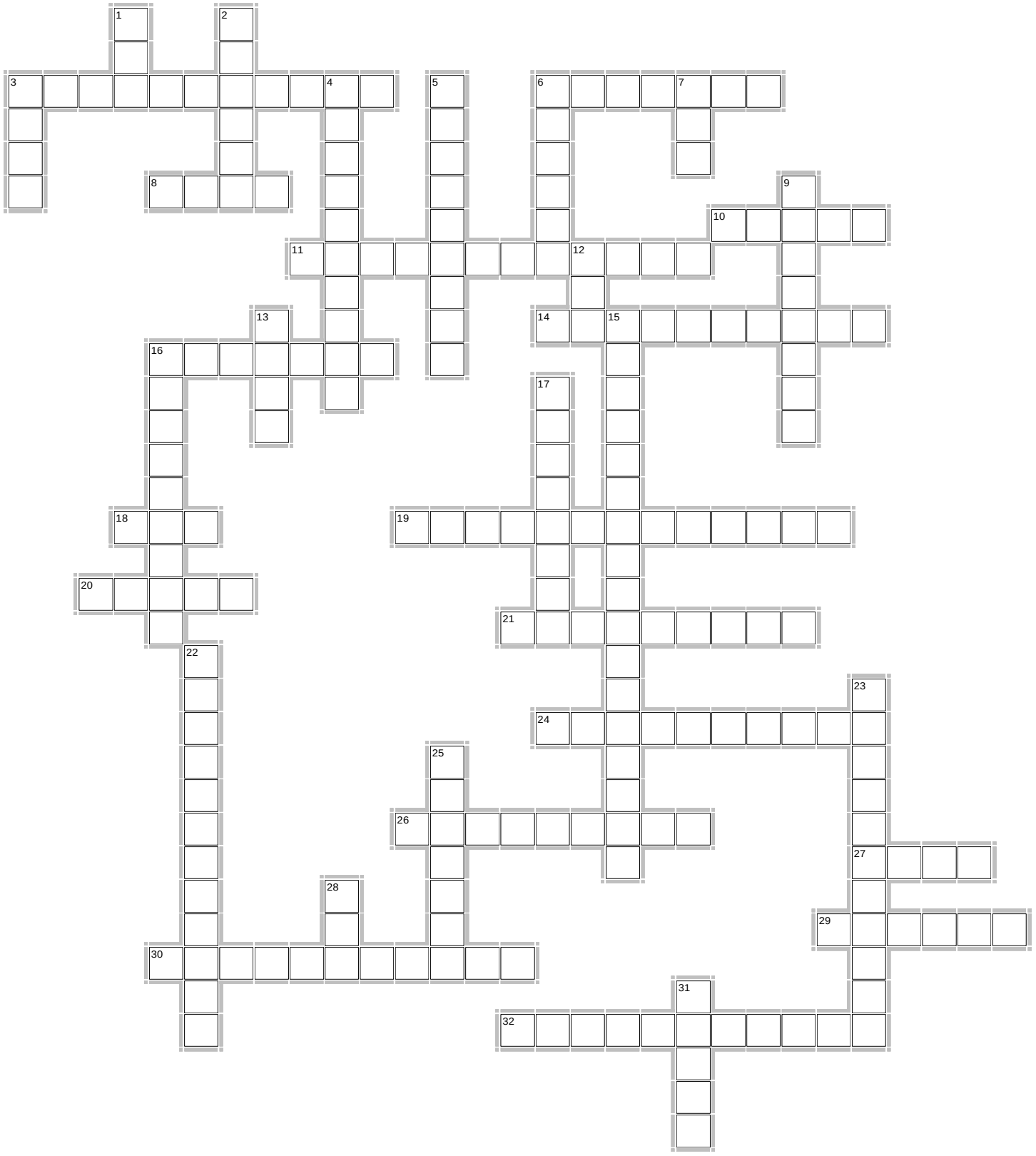
Get connected to SPEED.

We will be on the Web shortly



Student's corner: CROSS WORD PUZZLE

Crossword on CRO



Student's corner: CROSS WORD PUZZLE

Across

3. A CRO to an Engineer is what a ____ is to a physician. (11)
6. The screen of CRT is coated with ____ (7)
8. For viewing two cycles of the input signal, sweep generator frequency in a CRO must be ____ the signal frequency (4)
10. In CRO, ____ generator produces saw tooth voltage waveform used for horizontal deflection of the electron beam (5)
11. A ___ oscilloscope is one which has a continuously running time base generator (12)
14. The deflection sensitivity of a CRT is defined as the vertical deflection of the beam per unit ____ voltage (10)
16. A DMM provides output in ____ form suitable for further processing or recording (7)
18. This displays an input signal versus another signal or versus time (3)
19. This deflection is used in radar indicators and TV picture tubes (13)
20. In CRO, ____ knob is used for sharp focus of the trace on CRO screen (5)
21. In CRO, ____ control knob is used for correct brightness of the trace on the CRO screen (9)
24. In CRO, ____ amplifier is fed with a saw tooth voltage which is then applied to the X Deflection plates of CRT (10)
26. ___patterns are formed when two sine waves are applied simultaneously to the vertical and horizontal deflecting plates of a CRO (9)
27. In CRO, the voltage applied across X deflection plates of CRT is a ____ voltage (4)
29. In CRT, focusing and accelerating ___ are used for producing a narrow and sharply focused beam of electrons (6)
30. This is placed surrounding the cathode in Electron gun (11)
32. In CRO, the signal to be observed is applied across ___ plates (11)

Down

1. This can be considered as the heart of CRO (3)
2. CRT is specially constructed vacuum tube which acts as _____l indicator of electrical voltage (6)
3. Production of a steady continuous display of a signal waveform on the oscilloscope screen is due to proper ___ between the signal and the sweep generator (4)
4. CRO indicates ____ value of AC Voltage (10)
5. These are emitted from cathode (9)
6. CRO is an ____ measuring instrument (6)
7. This is basically a digital voltmeter (3)
9. In CRO, _____ amplifier amplifies the signal waveform to be viewed (8)
12. CRO gives an ___ to the electronic engineer to "see" what is happening inside the circuit itself (3)
13. CRO usually displays the vertical input waveform as a function of ____ (4)
15. This delivers different waveforms whose frequencies are adjustable over a wide range (17)
16. A ____ CRO has two vertical input circuits (9)
17. CRT uses ____ gun for producing a beam of electrons (8)
22. An ____ can display and also measure many electrical quantities like AC/DC voltage, time, Phase relationships, frequency and a wide range of waveform characteristics like rise time, fall time and overshoot etc. (12)
23. This consists of a heater or filament, cathode, control grid, pre-accelerating anode, focusing anode and accelerating anode (11)
25. In CRO, ____ circuit produces trigger pulses to start horizontal sweep (7)
28. CRO provides ___ dimensional visual display of the signal wave shape on a screen. (3)
31. Cathode Ray Tube is the ____ of an oscilloscope (5)

CRO - Prof. Hemant Y. Satpute