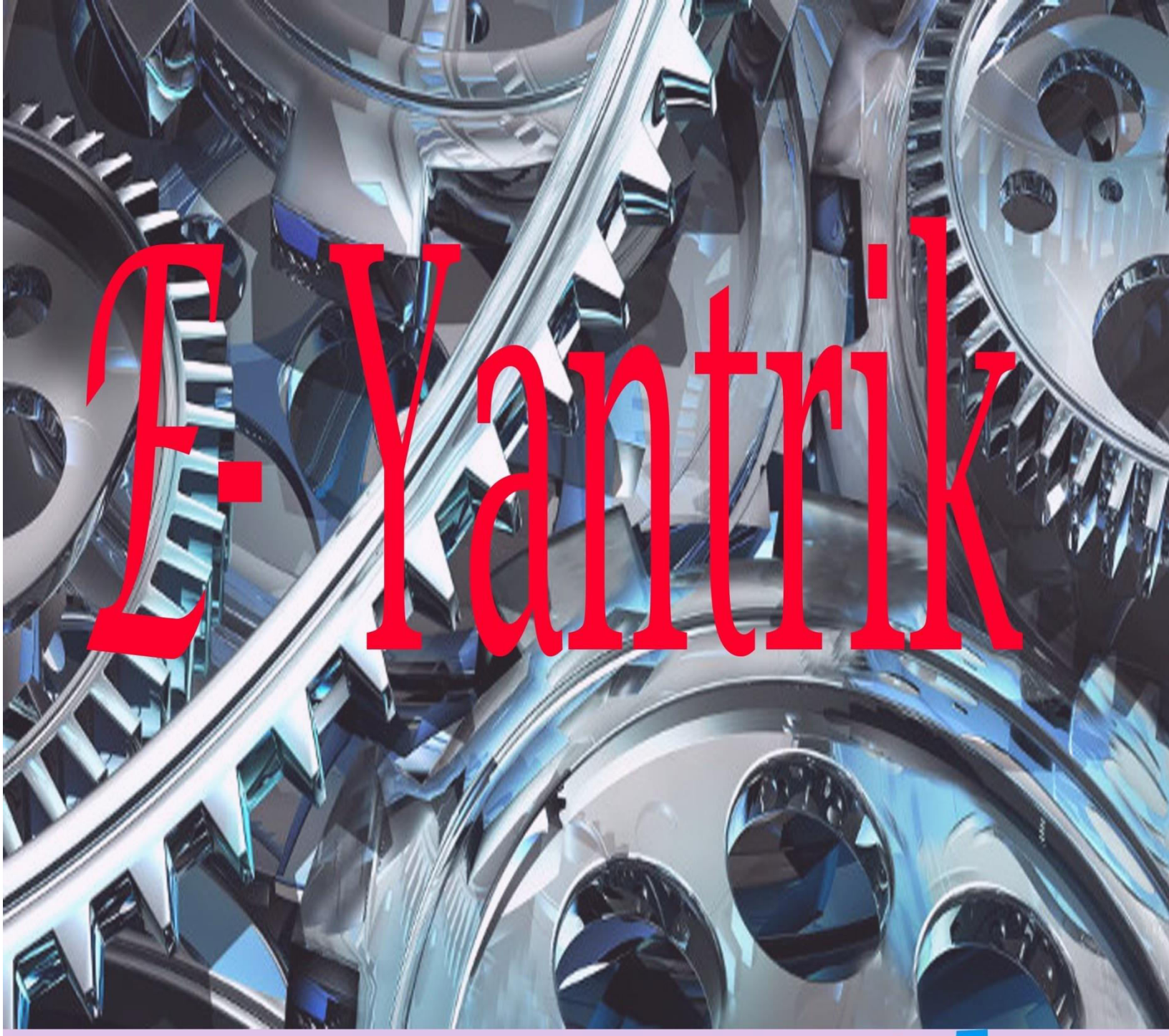


E-Yantrik

Volume: 5

2nd :Issue

GIFT

Student Editors: *Rajesh Kumar Acharya*

Sumit Kumar

Faculty Editor: *Rajeswari Chaini*

Vision of the Department:

To become a centre of excellence, acclaimed globally as a source of knowledge in the field of Mechanical Engineering by producing the professionals of highest grade to excel in the field of Industry and Research, bearing the ability to face the challenges posed by latest technology and competition.

Mission of the Department:

- To impart quality education to the students and enhance their knowledge and skills to make them globally competitive Mechanical Engineers.
- To become a leader in the field of Mechanical Engineering by acquiring and disseminating knowledge, using the best methods of teaching.
- To develop linkages with Industrial and Research organizations, enterprises in India for industry-oriented projects to apply theoretical knowledge to practical problems.
- To develop entrepreneurship skill of the students to make them ready for self-employment.

PEO's of the Department

Program educational objectives of Undergraduate Mechanical Engineering Department are

- PEO-1 : Our graduates will succeed as a mechanical engineer or obtain an advance degree by applying basic principles of engineering and skills to solve complex engineering problems.
- PEO-2 : Our students will be able to carry out Multidisciplinary research using modern tools and adapt to current changes by inculcating habit of lifelong learning.
- PEO-3 : Our Students will be able to work in the field of clean energy for the welfare of the society as responsible citizens with good ethics.

From the HOD'S Pen

Dear Readers,

GreetingsfromDepartmentofMechanicalEngineering!

I am pleased to know that our students are successful in bringing their first issue of magazine E-YANTRIK for this academic year 2017-18. E-YANRIK, the departmental magazine has the prime objective of providing aspiring engineers a wide platform to showcase their technical knowledge and to pen down innovative ideas. This magazine is intended to bring out the hidden literary talents in the students and teachers to inculcate strong technical skills among them. As a half yearly magazine of GIFT, it helps the students to interact and share their ideas with the industry leaders and their peers studying in the college.I congratulate and thank all the students and faculty coordinator who have made untiring efforts to bring out this magazine.

I thank everyone for their valuable contributions to the magazine and hope to receive similar enthusiasm through your precious insight in the fourth coming issues of E-YANTRIK.

Thanks & Regards,

Dr. Nabnit Panigrahi

H. O. D, Mechanical

Gandhi Institute For

Technology, Bhubaneswar

From the Editor's Pen

Dear Readers,

Greetings from Department of Mechanical & Engineering!

I am happy to note that the magazine E-YANTRIK brought out in our college is of good quality and taste. Hearty congratulations to the editorial team. It is a matter of great pleasure for me to go through the wonderful contributions made by the students. This E-YANTRIK is intended to bring out the hidden literary talents in the students and the teachers and to inculcate leadership skills among them. The outside world will come to know about the caliber of the students and the faculty through this magazine.

I extend my thanks to all the contributors for their articles, poems, qutation and Technical quiz for E-YANTRIK.

Thanks & Regards,

Prof. Rajeswari Chaini,

Asst. Prof., Dept. of Mechanical

Editor, E-Yantrik

ACTICAL TARGETING NETWORK TECHNOLOGY: WHAT IT IS AND WHAT YOU NEED TO KNOW

Prof. Swagatika Acharya

To say that data is an important part of our lives in the modern era is something of an understatement. Thanks largely to the digital world that we're now living in, data is everywhere - not only was more data created in the past two years than at any point in history before it combined, but by as soon as 2020 there will be approximately 1.7 new megabytes of information created for every living person on the planet every second.

But data, on its own, is largely meaningless. It's digital noise - a series of 1s and 0s. Getting specific, targeted and critical data into the hands of the people who need it the most at precisely the right moment is of paramount importance when it comes to extracting and utilizing the valuable insight hidden inside. All of this raises a larger issue of security, particularly in terms of military and defense-based environments.

Also commonly referred to as TTNT for short, Tactical Targeting Network Technology is a very specific type of waveform technology that is intended to meet a pressing need for high throughput, anti-jam, low latency and quick net join waveforms for IP connectivity as it relates to the Global Information Grid. Essentially, it's a way to deliver the fastest and most secure ad hoc mesh network that instantly and accurately shares voice, video and data information between two points.

The architecture of the technology itself was based largely on the Joint Airborne Network-Tactical Edge document, also referred to as the JAN-TE, which itself was based on the Time Sensitive Target Networking Technology requirements of the Tactical Data Link Transformation Capability Document.

Despite the fact that TTNT itself has been designed for one specific segment (government and defense), it actually has a wide range of different applications within that space that prove just how valuable it truly is as a concept.

In 2005, for example, the Defense Advanced Research Projects Agency (also referred to as DARPA) successfully demonstrated the core technology by connecting tactical aircraft and ground nodes under a wide range of different circumstances. These included support for various applications that included but were not limited to:

Standard Internet-based communications techniques like email, Internet chat and even providing Internet access for aircraft that were already in the air. The TTNT network process as it relates to hardware begins with a particular user (or craft) entering the network range, at which point it both receives a welcome signal and transmits verification information to the nearest hardware node on the ground. At that point, the user is connected both to the nearest node and other nodes in the area for the transmission and receipt of information. Upon leaving the range, the original user is automatically disconnected and the relevant IP address is deleted from the IP table. All hardware that touches any point of this chain needs to support TTNT

NEW TECHNOLOGY ENABLES NEXT-GEN PORTABLE BATTERY OPERATED IOT DEVICES

Mr. Prakash Kumar jena , 4th year, Mechanical

The Internet of Things, or IoT, is a buzzword of sorts. However, it is one that describes devices, appliances, vehicles and other products that are network connected so that they can exchange data with one another or with a central communications device.

Some common devices include smart thermostats, wearable step counters, and certain wireless home speaker systems. Each “thing” operates independently, such as a garage door opener which works to open and close the garage door--however, it also interoperates with the Internet infrastructure, such as by this same opening device allowing you to control the opening and closing from miles away instead of using the standard opener from the end of your driveway. According to IHS Markit, experts estimate that the Internet of Things will include around 30.7 billion objects by the year 2020.

Developers have taken IoT devices down to some of the smallest sizes imaginable. Think of the “smart watch” for instance that allows users to operate many of the functions of their phone as well as track heart rate and other body systems from a simple watch-sized device.Battery power is vital to operating the IoT-powered devices, but good battery LIFE, or how long the device runs between charges, is the key to helping them succeed in an ever-competitive marketplace. Customers today are looking at battery life as a key differentiator in IoT devices, including smart home products, wearables and wireless devices. A product that lasts longer between charges is likely more desirable. It makes sense, customers want that connected experience without

having to constantly run to recharge. So, this makes clear that for the smallest IoT item batteries need to be smaller AND be able to hold a charge longer. A custom battery product is the best way this can be delivered.

Solid-State Batteries: Solid-state batteries remove the liquid or polymer electrolyte that conducts power within lithium-ion batteries with a solid material. With trial and error, materials have been discovered that are conductive enough to operate even powerful batteries and yet are lighter and smaller than the liquid electrolyte. This advancement allows more power to be stored in a smaller space--one of the biggest challenges of the battery industry as a whole.

PMICs: Power management integrated circuits or PMICs are a type of integrated circuit that manages power requirements of the host system. Most of these circuits include some form of power control. Essentially, the inclusion of a PMIC will reduce the amount of space that must be dedicated to the battery. The more PMICs advance the less power is needed from a battery which leads to smaller products and longer battery life.

Cell Secondary Battery Protection: Lithium-ion batteries can become overcharged, over discharged or suffer from short circuits. The more powerful a battery, the more likely it could overcharge. So, as developers strive to accomplish more with IoT devices, the battery power must be protected.

BLACKHOLE IMAGING TECHNIQUES

Rakesh Jena ,3rd year mechanical

Though scientists had theorized they could image black holes by capturing their silhouettes against their glowing surroundings, the ability to image an object so distant still eluded them. A team formed to take on the challenge, creating a network of telescopes known as the Event Horizon Telescope, or the EHT. They set out to capture an image of a black hole by improving upon a technique that allows for the imaging of far-away objects, known as Very Long Baseline Interferometry, or VLBI.

Telescopes of all types are used to see distant objects. The larger the diameter, or aperture, of the telescope, the greater its ability to gather more light and the higher its resolution (or ability to image fine details). To see details in objects that are far away and appear small and dim from Earth, we need to gather as much light as possible with very high resolution, so we need to use a telescope with a large aperture.

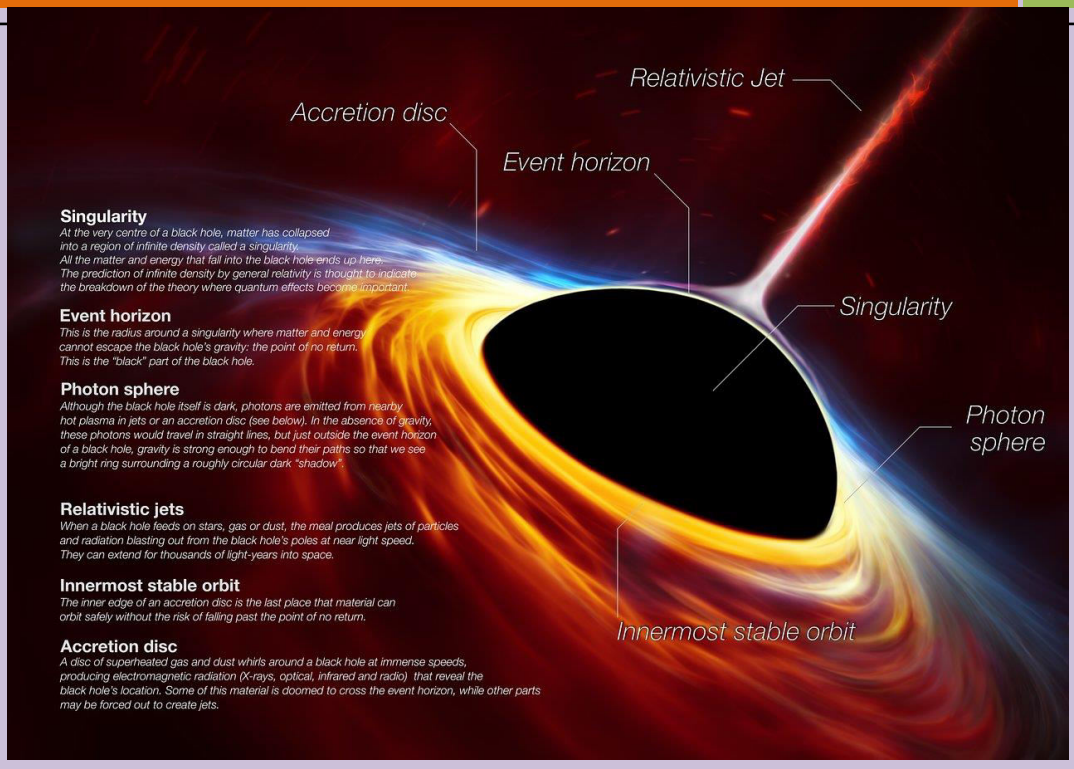
That's why the VLBI technique was essential to capturing the black hole image. VLBI works by creating an array of smaller telescopes that can be synchronized to focus on the same object at the same time and act as a giant virtual telescope. In some cases, the smaller telescopes are also an array of multiple telescopes. This technique has been used to track spacecraft and to image distant cosmic radio sources, such as quasars.

The aperture of a giant virtual telescope such as the Event Horizon Telescope is as large as the distance between the two farthest-apart telescope stations – for the EHT, those two stations are at the South Pole and in Spain, creating an aperture that's nearly the same as the diameter of Earth. Each telescope in the array focuses on the target, in this case the black hole, and collects data from its location on Earth, providing a portion of the EHT's full view. The more telescopes in the array that are widely spaced, the better the image resolution. To test VLBI for imaging a black hole and a number of computer algorithms for sorting and synchronizing data, the Event Horizon Telescope team decided on two targets, each offering unique challenges.

The closest supermassive black hole to Earth, Sagittarius A*, interested the team because it is in our galactic backyard – at the center of our Milky Way galaxy, 26,000 light-years (156 quadrillion miles) away. (An asterisk is the astronomical standard for denoting a black hole.) Though not the only black hole in our galaxy, it is the black hole that appears largest from Earth. But its location in the same galaxy as Earth meant the team would have to look through "pollution" caused by stars and dust to image it, meaning there would be more data to filter out when processing the image. Nevertheless, because of the black hole's local interest and relatively large size, the EHT team chose Sagittarius A* as one of its two targets.

Each telescope used for the EHT had to be highly synchronized with the others to within a fraction of a millimeter using an atomic clock locked onto a GPS time standard. This degree of precision makes the EHT capable of resolving objects about 4,000 times better than the Hubble Space Telescope. As each telescope acquired data from the target black hole, the digitized data and time stamp were recorded on computer disk media. Gathering data for four days around the world gave the team a substantial amount of data to process.

The size and shape of a black hole, which depend on its mass and spin, can be predicted from general relativity equations. General relativity predicts that this silhouette would be roughly circular, but other theories of gravity predict slightly different shapes. The image of M87* shows a circular silhouette, thus lending credibility to Einstein's theory of general relativity near black holes.



ENVIRONMENTAL FACTORS WHEN DESIGNING USER INTERFACE ASSEMBLIES

Biswaranjan tarai,2nd year mechanical

Custom user interface assemblies are also commonly known as keypads or keyboards. However, keypads or keyboards are too narrow for a description of these human-machine interface (HMI) assemblies. End applications with user interfaces range from simple input devices to complex devices with extra capabilities such as displays and interface control electronics.

As a custom user interface designer and manufacturer, Epec reviews the OEM user interface drawings during the quoting process. Some of those drawings show a specific user interface style but the drawings do not state environmental specifications, or state any environmental specifications that are outside of the realistic capabilities for that selected style of user interface. In this article we will review the environmental categories and their impact on choosing user interface styles.

Successful design for OEM applications using user interface assemblies must address the environmental specifications before a user interface style is chosen. Not all user interface styles can meet one or a combination of environmental requirements.

The smart choice of user interface style starts with understanding the user interface style environmental capability and matching styles with requirements. We have seen too many user interface assemblies quoted and design process far along execution when environmental specifications are identified or changed. Environmental requirements must be identified from the beginning.

Each user interface style is a combination of materials and manufacturing techniques that work together as a system. These materials and techniques cannot be adjusted independently for environmental requirements without affecting the user interface assembly's initial or long term performance. Epec has the design experience and staff to handle on OEM's HMI environmental requirements and can assist OEMs in choosing the best user interface style for their application when involved early in the development process.

PNEUMATIC MOTOR

Biswaranjan tarai,4th year Mechanical

A pneumatic motor (air motor) or compressed air engine is a type of motor which does mechanical work by expanding compressed air. Pneumatic motors generally convert the compressed air energy to mechanical work through either linear or rotary motion. Linear motion can come from either a diaphragm or piston actuator, while rotary motion is supplied by either a vane type air motor, piston air motor, air turbine or gear type motor.

Pneumatic motors have existed in many forms over the past two centuries, ranging in size from hand-held motors to engines of up to several hundred horsepower. Some types rely on pistons and cylinders; others on slotted rotors with vanes (vane motors) and others use turbines. Many compressed air engines improve their performance by heating the incoming air or the engine itself. Pneumatic motors have found widespread success in the hand-held tool industry, but are also used stationary in a wide range of industrial applications. Continual

attempts are being made to expand their use to the transportation industry. However, pneumatic motors must overcome inefficiencies before being seen as a viable option in the transportation industry.

In order to achieve linear motion from compressed air, a system of pistons is most commonly used. The compressed air is fed into an air-tight chamber that houses the shaft of the piston. Also inside this chamber a spring is coiled around the shaft of the piston in order to hold the chamber completely open when air is not being pumped into the chamber. As air is fed into the chamber the force on the piston shaft begins to overcome the force being exerted on the spring.

Piston motors are often used in series of two, three, four, five, or six cylinders that are enclosed in a housing. This allows for more power to be delivered by the pistons because several motors are in sync with each other at certain times of their cycle. One application for vane-type air motors is to start large industrial diesel or natural gas engines. Stored energy in the form of compressed air, nitrogen or natural gas enters the sealed motor chamber and exerts pressure against the vanes of a rotor. This causes the rotor to turn at high speed. Because the engine flywheel requires a great deal of torque to start the engine, reduction gears are used. Reduction gears create high torque levels with the lower amounts of energy input. These reduction gears allow for sufficient torque to be generated by the engine flywheel while it is engaged by the pinion gear of the air motor or air starter.

The rotating element is a slotted rotor which is mounted on a drive shaft. Each slot of the rotor is fitted with a freely sliding rectangular vane. vanes are extended to the housing walls using springs, cam action, or air pressure, depending

Historically, many individuals have tried to apply pneumatic motors to the transportation industry. Guy Niger, CEO and founder of Zero Pollution Motors, has pioneered this field since the late 1980s. Recently Engine air has also developed a rotary motor for use in automobiles. Engine air places the motor immediately beside the wheel of the vehicle and uses no intermediate parts to transmit motion which means almost all of the motor's energy is used to rotate the wheel.

SOME FUNNY FACTS

Biswaranjan tarai, 2nd year mechanical dept.

1.For engineers every course apart from engineering is easy.

2. An engineer has the power of getting up at 9.45 am and reaching the class at 10.00 am.

3. T-shirt and jeans are engineer's national dress and Maggi is the national food.

4. A normal person will fix the broken things but an engineer will first break a thing and then he would fix it.

5. An engineer can build a car spaceship and they even can make time machine. However, he just can't build a relationship with a girl.

6. An engineer doesn't care for the rise in price of petrol or gold but he gets mad when cigarette costs Rs.12.0 instead of 10.0

7. An engineer loves to solve a problem. If there is no problem, then he will create one and would start solving it.

8. An engineer can derive any relation just give them the final expression.

9. Are you made of copper(CU) and tellurium(TE), because you're CUTE This is how engineers flirt.

10. An engineers's worst nightmare is lecturer taking the class but not taking the attendance.

11. An engineer can finish his syllabus in one night.

12. An Engineer knows nothing, but only an Engineer knows this.

13. An Engineer will never sleep in night and will never wake up in morning.

14. An Engineer is the most innocent person in front of his parents.

15. Never argue with an engineer because arguing with Engineers is like killing the mosquito on your cheek, you might or might not kill it, but you'll end up slapping yourself.

Technical Quiz

Suman Sekhar Dash,4th year mechanical

1. **In how many categories heat exchangers are classified on the basis of physical state of heat exchanging fluids?**
   a) 1
   b) 2
   c) 3
   d) 4
2. **Which of the following is not associated with heat exchanger?**
   a) Fouling
   b) NTU
   c) Capacity ratio
   d) Mc Adam's correction factor
3. **How is the logarithmic mean temperature difference (LMTD) calculated for heat exchangers?**

   Where,
   ΔT_i= temperature difference between hot and cold fluid at inlet of heat exchanger
   ΔT_e = temperature difference between hot and cold fluid at exit of heat exchanger

   a. $\ln (\Delta T_i - \Delta T_e)$
   b. $\ln (\Delta T_e - \Delta T_i)$
   c. $(\Delta T_i - \Delta T_e) / (\ln (\Delta T_e / \Delta t_i))$
   d. $(\Delta T_i - \Delta T_e) / (\ln (\Delta T_i / \Delta t_e))$
4. **Which of the following is NOT a type of condensation heat transfer process?**

   a. drop-wise condensation
   b. bulk-wise condensation
   c. film-wise condensation
   d. none of the above
5. **In parallel flow heat exchangers,**

   a. the exit temperature of hot fluid is always equal to the exit temperature of cold fluid
   b. the exit temperature of hot fluid is always less than the exit temperature of cold fluid
   c. the exit temperature of hot fluid is always more than the exit temperature of cold fluid
   d. we cannot predict comparison between exit temperatures of hot fluid and cold fluid

6. **When the formation of bubbles becomes very high in pool boiling, then the heat flux**
   a. rises
   b. reduces
   c. remains constant
   d. becomes unpredictable

7. **What is the intensity of radiation (I)?**
   a. rate of heat radiation from a surface per unit area
   b. rate of heat radiation from a surface per unit solid angle
   c. rate of heat radiation from a surface per unit area per unit solid angle
   d. none of the above

8. **What is the correct formula for the intensity of the emitted radiation of a black body (I) in terms of its emissive power (E_b)?**
   a. $I = (E_b)$
   b. $I = \pi (E_b)$
   c. $I = 2 \pi (E_b)$
   d. $I = (1/\pi) (E_b)$

9. **Shape factor is also called as**
   a. view factor
   b. geometry factor
   c. configuration factor
   d. all of the above

10. **When two bodies of areas $A_1$and A_2 are exchanging radiant heat energy, F_{12} is the shape factor of $A_1$with respect to A_2 and F_{21} is the shape factor of A_2 with respect to A_1, then what is the correct relation for reciprocating theorem? Assuming $A_1 > A_2$**
    a. $A_1F_{12} > A_2 F_{21}$
    b. $A_1F_{12} < A_2 F_{21}$
    c. $A_1F_{12} = A_2 F_{21}$
    d. none of the above

Answers

1. C
2. B
3. A
4. B
5. C
6. B
7. A
8. D
9. B
10. C

NEW SMARTPHONES

1. Samsung Galaxy Note 10/10 Plus

Note 10, starting with 8GB of RAM and 256GB of internal storage, starts at $949.99 while the Note 10 Plus with 12GB of RAM and 256GB internal storage starts at $1,099.99. There are also increased RAM and storage options for both devices, but the default base models offer ample RAM and storage for most users. The Note 10 Plus is available now from Samsung and all carriers. T-Mobile also just rolled out a 5G variant, priced at $1,299.99.

2. Apple iPhone 11 Pro/Pro Max

Apple has once again shown it bests all other phones in benchmarking testing with the Apple A13 Bionic chipset. It has a fabulous OLED screen, good-sized battery with a rating of four hours more than last year's iPhone, and new camera hardware (with improved software) to make it a very compelling flagship. It continues to get regular updates (one coming within the first week of release) and iOS apps are still better than comparable Android apps, despite the improvements in Android phones.

Face ID continues to be one of the fastest and most secure methods of maintaining security on your phone, and the version in the iPhone 11 Pro has been improved for better performance. Google may release an alternative with the upcoming Pixel 4, but current ultrasonic fingerprint scanners are not proving very reliable for consistent performance.

3. Google Pixel 4 XL and Pixel 4

The Google Pixel 4 XL has a large 6.3-inch 18:9 display, Snapdragon 855 processor, 6GB of RAM, 64GB, and 128GB integrated storage, dual rear 16MP and 12.2MP cameras, 8MP front-facing camera, IP68 dust and water resistance, a 3,700mAh battery, and dual front stereo speakers. The smaller Pixel 4 has a 5.7-inch display and a smaller 2,800mAh battery while the rest of the specs are the same as the XL model.

GREAT QUOTES

Biswaranjan tarai,4th year,mechanical

- ***"If you can tell stories, create characters, devise incidents, and have sincerity and passion, it doesn't matter a damn how you write."***

  - Somerset Maugham

- ***"And by the way, everything in life is writable about if you have the outgoing guts to do it, and the imagination to improvise. The worst enemy to creativity is self-doubt."***

  - Sylvia Plath

- ***"If the book is true, it will find an audience that is meant to read it."***

  - Wally Lamb

- ***"I went for years not finishing anything. Because, of course, when you finish something you can be judged."***

  - Erica Jong

- ***"Believe in yourself! Have faith in your abilities! Without a humble but reasonable confidence in your own powers, you cannot be successful or happy."***

  - Norman Vincent Peale

- ***"If I waited for perfection, I would never write a word."***

  - Margaret Atwood

The End