E-VIDYUT

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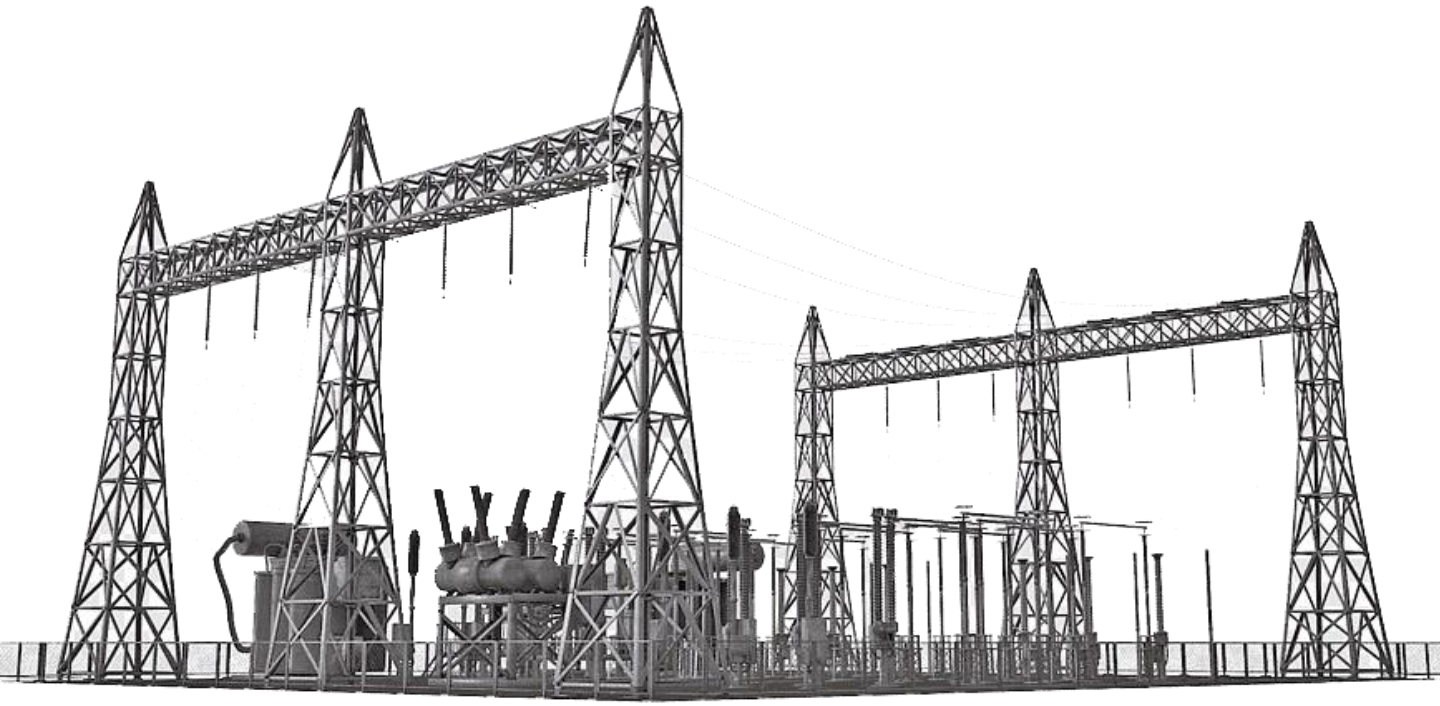

Electrical and Electronics Engineering

Gandhi Institute For Technology, Bhubaneswar

INDEX

Principal Message

Dr. Surya Narayan Patnaik
PRINCIPAL, GIFT, BHUBANESWAR

Providing ample opportunities in engineering education is one of the most fundamental obligations we owe to our students because in RSET we are driven by the belief that every student deserves a high quality education.

E-VIDYUT provides an intersection of great challenge and great opportunity for the students to review their efforts and to analyze their achievements in research and development. Technology is evolving at a dizzying rate and our classrooms may not be designed to keep pace with it. There may be a lot wrong in the style of education but the pages of E-VIDYUT tell the tale of all that have been a part of what is right about the education they get in RSET.

I congratulate the team of students and the faculty for their tireless efforts that have come to fruition in the form of this e-magazine. I wish it all success and hope that this tradition that has been set by the current students will be carried through by the following generation of students to come.

Head of the Department Message

Dr Srikant Kumar Dash
(HOD,EEE)
GIFT, BHUBANESWAR

Nurturing creativity and inspiring innovation are two of the key elements of a successful education, and a college magazine is the perfect amalgamation of both. It harnesses the creative energies of the academic community, and distils the essence of their inspired imagination in the most brilliant way possible. Hence, I am delighted to know that RSET's department magazine "E-VIDYUT" is ready for publication.

I take this opportunity to congratulate the editorial board for bringing out this magazine as per schedule, which in itself is an achievement considering the effort and time required. May all our students soar high in uncharted skies and bring glory to the world and their profession with the wings of education!

Editorial….

Mid-way through editing and designing a pile of articles which I was nose deep in and with the thoughts of the zillion things that 'JUST HAD TO BE DONE'; I pulled at my hair for the very first time. This was the first of many such moments (hours)! Putting a magazine together was no cake walk. I along with my editorial team members have spent sleepless nights to make this magazine stand out.

So here you have "E-VIDYUT", the long awaited magazine. The name of the magazine, "E-VIDYUT" may seem difficult, but it just means "DEEP INSIGHT", a clear vision. This magazine is a platform that exhibits the literary skills and innovative ideas of teachers and students. "E-VIDYUT" presents the hard work and dedication of students and contributions of teachers.

I would like to thank all my editorial team members for helping me pull this through. I express my considerable appreciation to all the authors of the articles in this magazine. These contributions have required a generous amount of time and effort. It is this willingness to share knowledge, concerns and special insights with fellow beings that has made this magazine possible.

Thank you all!!

Prof. Sushree Shataroopa Mohapatra
EEE Dept.

Editorial Board

Student Wing

ASHUTOSH BARIK
3RD Sem, EEE

ANKUR KUMAR SAHU
7TH Sem, EEE

SWETASINGDHA PANDA
7TH Sem

Faculty Wing

Dr. Srikanta Kumar Dash

Prof. Sudhansu Bhusana Pati

Prof. Sweekruti Panda

About Department..

The Department of Electrical and Electronics Engineering was established in the year 2007. It aims at producing qualified engineers in the areas of electrical machine, power electronics, control system, power system, and instrumentation. The field of Electrical and electronics is advancing at a very rapid pace. Power electronics has taken the center stage in every area be it power systems, control systems, power quality, etc. The department is well equipped with a group of highly qualified and dynamic teachers. It boasts of laboratory facility to be one of the best in the state. The students are encouraged and motivated to take up challenging projects. Summer training, industrial visit and projects are carefully planned for the students to remain updated with the technology trend. Seminars and short courses are regularly organized to update the students with the latest in the education and industry trends.

Vision

To create a distinctive culture, that could enable students and faculty members collaboratively approach to advance their knowledge about recent advancements in the core domains of electrical and electronic engineering such as power electronic, smart grids, renewable energy etc., and develop effective, implementable and environment friendly solutions towards solving the energy vs. sustainability crisis for present and future society.

Mission

- To create a culture of research and Innovation through necessary collaboration with the premier institutions to purse career in research.
- To develop a distinctive environment where student, teacher can learn and acquire necessary knowledge and skills through effective collaborations and holistic interactions.
- To create a conducive atmosphere where students and faculty members can engage themselves for developing effective solutions for recent as well as prominent future challenges in divers field of engineering.
- To create a Pool of eco-pruners and entrepreneurs with the ability to address the industry and social needs.

SCIENTIST OF THE QUARTER

Thomas Edison

Thomas Edison began his career selling candy, newspapers and vegetables on the trains running from Port Huron to Detroit. He turned a $50 a week profit by age 13, most of which went to buying equipment for electric and chemical experiments. He became a telegraph operator after he saved three-year-old Jimmie MacKenzie from being struck by a runaway train. Jimmie's father, station agent J. U. MacKenzie of Mount Clemens, Michigan, was so grateful that he trained Edison as a telegraph operator. Edison's first telegraphy job away from Port Huron was at Stratford Junction, Ontario, on the Grand Trunk Railway. He was held responsible for a near collision. He also studied qualitative analysis and conducted chemical experiments on the train until he left the job Edison obtained the exclusive right to sell newspapers on the road, and, with the aid of four assistants, he set in type and printed the *Grand Trunk Herald*, which he sold with his other papers. This began Edison's long streak of entrepreneurial ventures, as he discovered his

talents as a businessman. Ultimately, his entrepreneurship was central to the formation of some 14 companies,including General Electric, still one of the largest publicly traded companies in the world In 1866, at the age of 19, Edison moved to Louisville, Kentucky, where, as an employee of Western Union, he worked the Associated Press bureau news wire. Edison requested the night shift, which allowed him plenty of time to spend at his two favorite pastimes—reading and experimenting. Eventually, the latter pre-occupation cost him his job. One night in 1867, he was working with a lead–acid battery when he spilled sulfuric acid onto the floor. It ran between the floorboards and onto his boss's desk below. The next morning Edison was fired.

FACULTY CORNER

POLYMER MEMORY

Imagine a time when your mobile will be your virtual assistant and will need far more than the 8k and 16k memory that it has today, or a world where laptops require gigabytes of memory because of the impact of convergence on the very nature of computing. How much space would your laptop need to carry all that memory capacity? Not much, if Intel's project with Thin Film Electronics ASA (TFE) of Sweden works according to plan. TFE's idea is to use polymer memory modules rather than silicon-based memory modules, and what's more it's going to use architecture that is quite different from silicon-based modules. Polymer-based memory modules, as against silicon-based ones, promise to revolutionize the storage space and memory capabilities of chips. Coatue's polymer memory cells are about one-quarter the size of conventional silicon cells. And unlike silicon devices, the polymer cells can be stacked that architecture could translate into memory chips with several times the storage capacity of flash memory.

The fundamental idea of all these technologies is the bistable nature possible for of the selected material which is due to their difference in behavior of internal dipoles when electric field is applied. And they retain those states until an electric field of opposite nature is applied. FeRAM works on the basis of the bistable nature of the centre atom of selected crystalline material. A voltage is applied upon the crystal which in turn polarizes the internal dipoles up or down. I.e. actually the difference between these states is the difference in conductivity. Non –Linear FeRAM read capacitor,

i.e., the crystal unit placed in between two electrodes will remain in the direction polarized(state) by the applied electric field until another field capable of polarizing the crystal's central atom to another state is applied.

Dr. Srikanta Kumar Dash

H.O.D

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INTERFEROMETRIC MODULATOR

Wireless communications are an essential and continuously expanding part of modern life. Smart phones presents a number of challenging requirements on the display module, such as low power consumption, video quality speed, and view ability in a broad range of lighting conditions.

The Interferometry Modulator (IMOD) is an electrically switched light modulator comprising a micro-machined cavity that is switched on and off using driver ICs similar to those used to address LCDs. An IMOD based reflective flat panel display can comprise hundreds of thousands of individually addressable IMOD elements. IMOD displays represent one of the largest examples of a micro electro mechanical systems (MEMS) based device. In one state an IMOD reflects light at a specific wavelength and gives pure, bright colors while in a second state it absorbs incident light and appears black to the viewer. As clear as an image on paper, IMOD displays can be viewed in any lighting condition including direct sunlight. Two to three times as bright as other technology The IMOD displays minimize eye strain, and their wide viewing cones are free of the inversion effects that plague polarization-based displays. Qualcomm's new media FLO technology will enable user to watch high performance video on portable device and applications such as this need a display offering superior view ability and less power consumption. The Qualcomm's IMOD display technology will overcome all above mentioned requirements.

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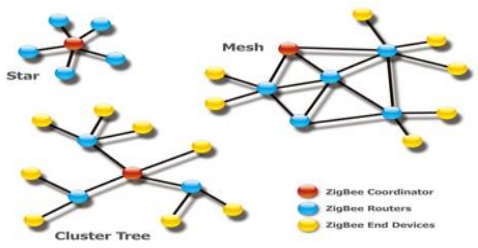
STUDENT CORNER

ZIGBEE TECHNOLOGY

ZigBee is the name of a specification for a suite of high level communication protocols using small, low-power digital radios. The technology is intended to be simpler and cheaper than other WPANs such as Bluetooth. The most capable ZigBee node type is said to require only about 10% of the software of a typical Bluetooth or Wireless Internet node. The estimated cost of the radio for a ZigBee node is about $1.10 to the manufacturer in very high volumes. Most ZigBee solutions require an additional microcontroller driving the price further up at this time. ZigBee is the newest and provides specifications for devices that have low data rates, consume very low power and are thus characterized by long battery life. Other standards like Bluetooth and IrDA address high data rate applications such as voice, video and LAN communications.



The target networks encompass a wide range of devices with low data rates in the Industrial, Scientific and Medical (ISM) radio bands, with building-automation controls like intruder/fire alarms, thermostats and remote (wireless) switches, video/audio remote controls likely to be the most popular applications. So far sensor and control devices have been marketed as proprietary items for want of a standard. With acceptance and implementation of ZigBee, interoperability will be enabled in multi-purpose, self- organizing mesh networks. Now picture a home with entertainment units, security systems including fire alarm, smoke detector and burglar alarm, air-conditioners and kitchen appliances all within whispering distance from each other and imagine a single unit that talks with all the devices, no longer depending on line-of-sight, and traffic no longer being one-way.

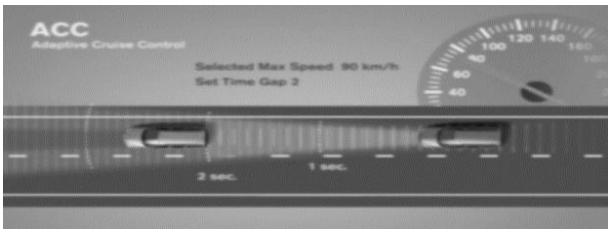
This means that the devices and the control unit would all need a common standard to enable intelligible communication. ZigBee is such a standard for embedded application software.

Swetasingdha Panda
7th Sem, EEE

ADAPTIVE CRUISE CONTROL

An 'Adaptive Cruise Control' (ACC) system developed as the next generation assisted the driver to keep a safe distance from the vehicle in front. This system is now available only in some luxury cars like Mercedes S-class, Jaguar and Volvo trucks the U.S. Department of transportation and Japan's ACAHSR have started developing 'Intelligent Vehicles' that can communicate with each other with the help of a system called 'Co operative Adaptive Cruise Control'

PRINCIPLE OF ACC :ACC works by detecting the distance and speed of the vehicles ahead by using either a Lidar system or a Radar system. The time taken by the transmission and reception is the key of the distance measurement while the shift in frequency of the reflected beam by Doppler Effect is measured to know the speed. According to this, the brake and throttle controls are done to keep the vehicle the vehicle in a safe position with respect to the other. These systems are characterized by a moderately low level of brake and throttle authority. These are predominantly designed for highway applications with rather homogenous traffic behavior.



The second generation of ACC is the Stop and Go Cruise Control (SACC) whose objective is to offer the customer longitudinal support on cruise control at lower speeds down to zero velocity. The SACC can help a driver in situations where all lanes are occupied by vehicles or where it is not possible to set a constant speed or in a frequently stopped and congested traffic. There is a clear distinction between ACC and SACC with respect to stationary targets. The ACC philosophy is that it will be operated in well structured roads with an orderly traffic flow with speed of vehicles around 40km/hour. While SACC system should be able to deal with stationary targets because within its area of operation the system will encounter such objects very frequently.

Saahin Bagh

5TH SEM, EEE

WIRELESS USB

The Universal Serial Bus (USB), with one billion units in the installed base, is the most successful interface in PC history. Projections are for 3.5 billion interfaces shipped by 2006. Benefiting from exceptionally strong industry support from all market segments, USB continues to evolve as new technologies and products come to market. It is already the de facto interconnect for PCs, and has proliferated into consumer electronics (CEand mobile devices as well.

The Wireless USB is the first the high speed Personal Wireless Interconnect. Wireless USB will build on the success of wired USB, bringing USB technology into the wireless future. Usage will be targeted at PCs and PC peripherals, consumer electronics and mobile devices. To maintain the same usage and architecture as wired USB, the Wireless USB specification is being defined as a high-speed host-to-device connection. This will enable an easy migration path for todays wired USB solutions. There are many new features included in the new Universal Serial Bus Specification. The most important one is the super speed data transfer itself.

Then the USB 3.0 can support more devices than the currently using specification which is USB 2.0. The bus power spec has been increased so that a unit load is 150mA (+50% over minimum using USB 2.0). An un configured device can still draw only 1 unit load, but a configured device can draw up to 6 unit loads (900mA, an 80% increase over USB 2.0 at a registered maximum of 500mA). Minimum device operating voltage is dropped from 4.4V to 4V. When operating in Super Speed mode, full-duplex signaling occurs over 2 differential pairs separate from the non-Super Speed differential pair.

K Kartik

5TH Sem, EEE

QUESTIONS CORNER

1. Which of the following is not an expression power?
   a) P=VI
   b) $P=I^2R$
   c) $P=V^2/R$
   d) P=I/R
2. Which of the following statements are true?
   a) Power is proportional to voltage only
   b) Power is proportional to current only
   c) Power is neither proportional to voltage nor to the current
   d) Power is proportional to both the voltage and current
3. A 250V bulb passes a current of 0.3A. Calculate the power in the lamp.
   a) 75W
   b) 50W
   c) 25W
   d) 90W
4. Kilowatt-hour(kWh) is a unit of?
   a) Current
   b) Power
   c) Energy
   d) Resistance
5. A current of 5A flows in a resistor of 2 ohms. Calculate the energy dissipated in 300 seconds in the resistor.
   a) 15kJ
   b) 15000kJ
   c) 1500J
   d) 15J
6. The SI unit of power is?
   a) kW(kilo-watt)
   b) J/s(joules per second)
   c) Ws(watt-second)
   d) J/h(joules per hour
7. Which among the following is a unit for electrical energy?
   a) V(volt)
   b) kWh(kilowatt-hour)
   c) Ohm
   d) C(coloumb)
8. A bulb has a power of 200W. What is the energy dissipated by it in 5 minutes?
   a) 60J
   b) 1000J
   c) 60kJ
   d) 1kJ

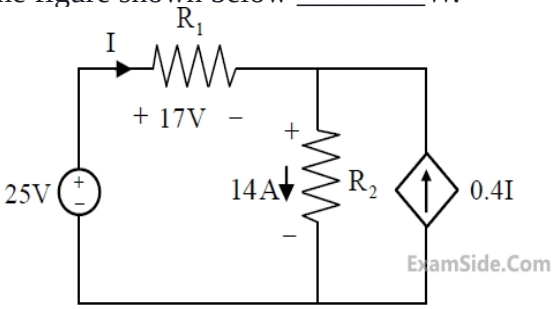
9. Out of the following, which one is not a source of electrical energy?
   a) Solar cell
   b) Battery
   c) Potentiometer
   d) Generator
10. Which among the following is an expression for energy?
   a) V^2It
   b) V^2Rt
   c) V^2t/R
   d) V^2t^2/R
11. A battery converts_____
   a) Electrical energy to chemical energy
   b) Chemical energy to electrical energy
   c) Mechanical energy to electrical energy
   d) Chemical energy to mechanical energy
12. A current of 2A flows in a wire offering a resistance of 10ohm. Calculate the energy dissipated by the wire in 0.5 hours.
   a) 72Wh
   b) 72kJ
   c) 7200J
   d) 72kJh
13. Practically, if 10kJ of energy is supplied to a device, how much energy will the device give back?
   a) Equal to10kJ
   b) Less than 10kJ
   c) More than 10kJ
   d) Zero
14. Materials which easily allow the passage of electric current are known as __.
   a) Insulators
   b) Conductors
   c) Dielectrics
   d) Semi-conductors
15. Delta connection is also known as_____
   a) Y-connection
   b) Mesh connection
   c) Either Y-connection or mesh connection
   d) Neither Y-connection nor mesh connection
16. Nodal analysis is generally used to determine_____
   a) Voltage
   b) Current
   c) Resistance
   d) Power
17. If there are 10 nodes in a circuit, how many equations do we get?
   a) 10
   b) 9
   c) 8
   d) 7
18. Nodal analysis can be applied for_____
   a) Planar networks
   b) Non-planar networks
   c) Both planar and non-planar networks
   d) Neither planar nor non-planar networks
19. The conventional direction of electric field is _____
   a) Positive to negative
   b) Negative to positive
   c) No specific direction
   d) Direction cannot be determined
20. Which, among the following, is the field where electric charge experiences a force?
   a) Electric field
   b) Magnetic field
   c) Gravitational field
   d) Electric, magnetic and gravitational field
21. The insulant between the two plates of a capacitor is called _____
   a) Conductor
   b) Semi-conductor
   c) Dielectric
   d) Superconductor

ANSWERS CORNER

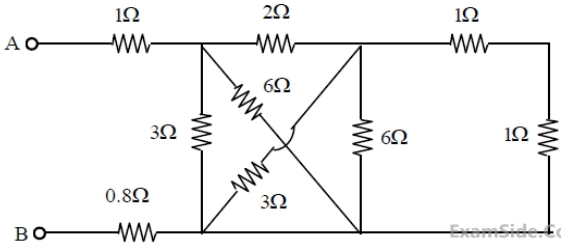
1) D, 2) D, 3) A, 4)C, 5) A, 6)B, 7)B, 8)C, 9)C, 10) C, 11) B
12) B, 13)B, 14) B, 15) B,16) A, 17)B, 18)C, 19)A, 20)A, 21)C

GATE CORNER

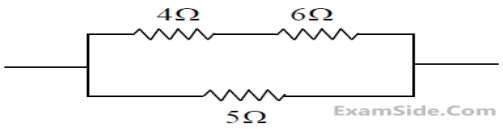
1) The power supplied by the 25 V source in the figure shown below _____W.



2) The equivalent resistance between the terminals A and B is _____ Ω.



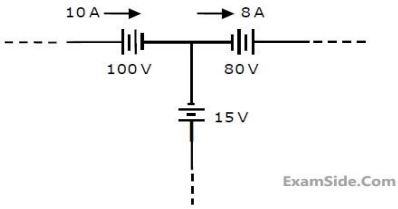
3) In the portion of a circuit shown, if the heat generated in 5 Ω resistance is 10 calories per second then heat generated by the 4 Ω resistance, the calories per second, is _____.



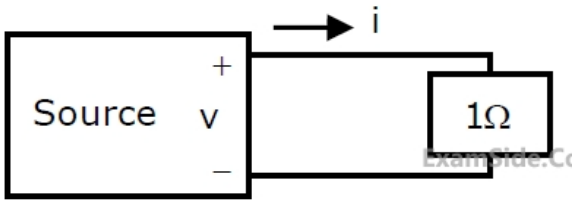
4) Two identical coupled inductors are connected in series. The measured inductances for the two possible series connections are 380 μH and 240 μH. Their mutual inductance in μH is _____.

a) 35
b) 42
c) 89
d) 52

5) The three circuit elements shown in the figure are part of an electric circuit. The total power absorbed by the three circuit elements in watts is _____.



6) As shown in the figure, a 1 Ω resistance is connected across a source that has a load line v + i = 100. The current through the resistance is_____

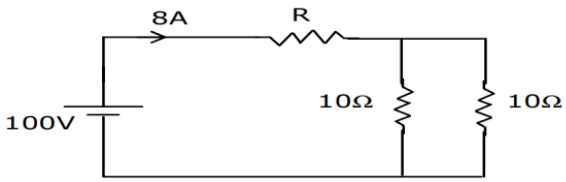


a) 25 A
b) 50 A
c) 100 A
d) 200 A

7) How many 200 W/200 V incandescent lamps connected in series would consume the same total power as a single 100 W/200 V incandescent lamp?

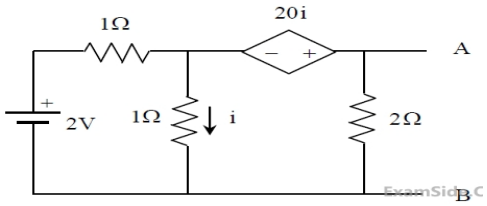
a) NOT POSSIBLE
b) 4
c) 3
d) 2

8) In the figure given below the value of R is



a) 2.5 ohm
b) 5.0 ohm
c) 7.0 ohm
d) 10.0 ohm

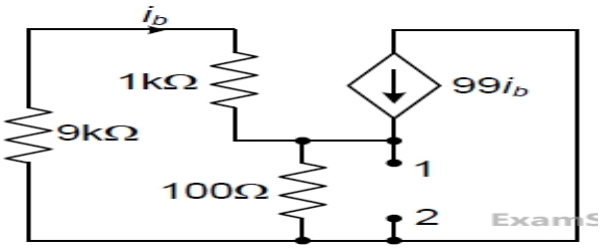
9) For the given circuit the Thevenin equivalent is to be determined. The Thevenin voltage, V_{Th} (in volt), seen from terminal AB is _____.



10) A source vs(t)=Vcos100πtvs(t)=Vcos100πt has an internal impedance of (4 + j3) Ω.If a purely resistive load connected to this source has to extract the maximum power out of the source, its value in Ω should be

a) 3
b) 4
c) 5
d) 7

11) The impedance looking into nodes 1 and 2 in the given circuit is



a) 50 ohm
b) 100ohm
c) 200 ohm
d) 10.1 k ohm

12) A single-phase 100 kVA, 1000 V / 100 V, 50 Hz transformer has a voltage drop of 5% across its series impedance at full load. Of this, 3% is due to resistance. The percentage regulation of the transformer at full load with 0.8 lagging power factor is

a) 4.8
b) 6.8
c) 8.8
d) 10.8

13) A 3-phase, 4-pole, 400 V, 50 Hz squirrel-cage induction motor is operating at a slip of 0.02. The speed of the rotor flux in mechanical rad/sec, sensed by a stationary observer, is closest to

a) 1500
b) 1470
c) 157
d) 154

14) A 4 pole induction machine is working as an induction generator. The generator supply frequency is 60 Hz. The rotor current frequency is 5 Hz. The mechanical speed of the rotor in RPM is

a) 1350
b) 1650
c) 1950
d) 2250

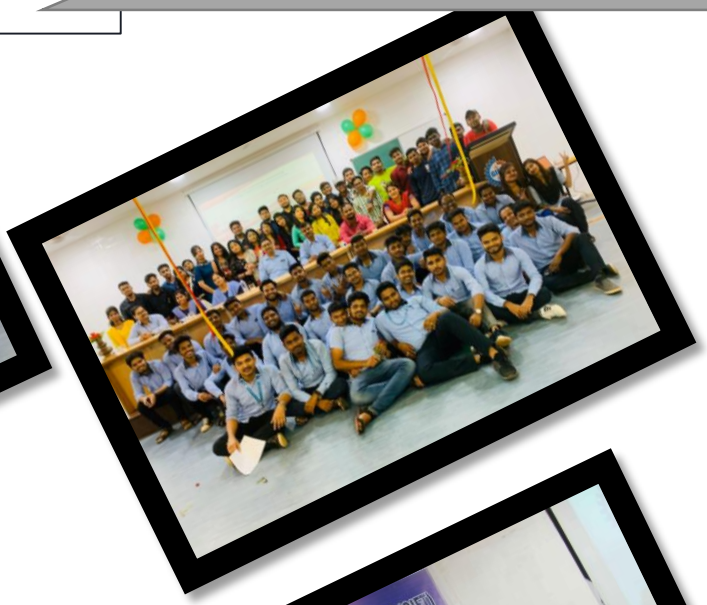
15) In a salient pole synchronous motor, the developed reluctance torque attains the maximum value when the load angle in electrical degrees is

a) 0
b) 45
c) 60
d) 90

ANSWER CORNER

1.	250 w	9.	3.36
2.	3 ohm	10.	5
3.	1.9 & 2.1	11.	50ohm
4.	35	12.	4.8
5.	330	13.	157
6.	50 A	14.	1950
7.	2	15.	45
8.	7.0 ohm		

GALLARY




GANDHI INSTITUTE FOR TECHNOLOGY (GIFT)
Presents
13TH ANNUAL DAY
LELLIHAN 2020
SATURDAY, FEB 29 20

STUDENT ACHIEVEMENT

Sl.No.	Name of the Student	Year of Study	Date/Place of Event	Event	Achievement
01	Shreehari Sahoo	2018-2022	GIFT,BBSR	Annual Day Event-Lelihan 2019	2ND PRIZE IN Mano Action
02	Dular Gope	2016-2020	GIFT,BBSR	Annual Day Event-Lelihan 2019	1st Prize in Quiz
03	Sushil Kumar	2016-2020	GIFT,BBSR	Annual Day Event-Lelihan 2019	2nd Prize in Quiz
04	Sujan Mandal	2016-2020	GIFT,BBSR	Annual Day Event-Lelihan 2019	1st Prize in Guitar
05	Tanmay Kumar Mallick	2018-2022	GIFT,BBSR	Annual Day Event-Lelihan 2019	3rd prize in Painting
06	Chinmaya Kumar Nayak	2018-2022	GIFT,BBSR	Annual Day Event-Lelihan 2019	2nd prize in painting
07	Ritik Roshan Das	2017-2021	GIFT,BBSR	Annual Day Event-Lelihan 2019	2nd Prize in Duet Song
08	Ritesh Borah	2016-2020	GIFT,BBSR	Annual Day Event-Lelihan 2019	1st Prize in Duet Song
09	Prasad Maharana	2017-2021	16.03.2018, IIT kharagpur	IOT`	Consolation prize
10	Kisan Mahapatro	2017-2021	16.03.2018, IIT kharagpur	IOT`	Consolation prize
11	Subhrajit Subudhi	2017-2021	16.03.2018, IIT kharagpur	IOT`	Consolation prize
12	Prasad Maharana	2017-2021	19.10.2019 IIT, BOMBAY	IOT	Consolation prize
13	Kisan Mahapatro	2017-2021	19.10.2019 IIT, BOMBAY	IOT	Consolation prize
14	Kisan Mahapatro	2017-2021	GIFT,BBSR	Annual Sports (Octathlon)2020	2nd Prize in Kho kho
15	Prasad Maharana	2017-2021	GIFT,BBSR	Annual Day Event-Lelihan 2020	1st Prize in Tabla

GLIMPSES @ GLANCE

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