

FIRST YEAR KGCE EXAMINATION IN ELECTRONICS & COMMUNICATION ENGINEERING

ELECTRONICS & COMMUNICATION ENGINEERING-1 (TRADE THEORY)

MODEL QUESTION PAPER SET-1

ANSWER KEY

PART - A

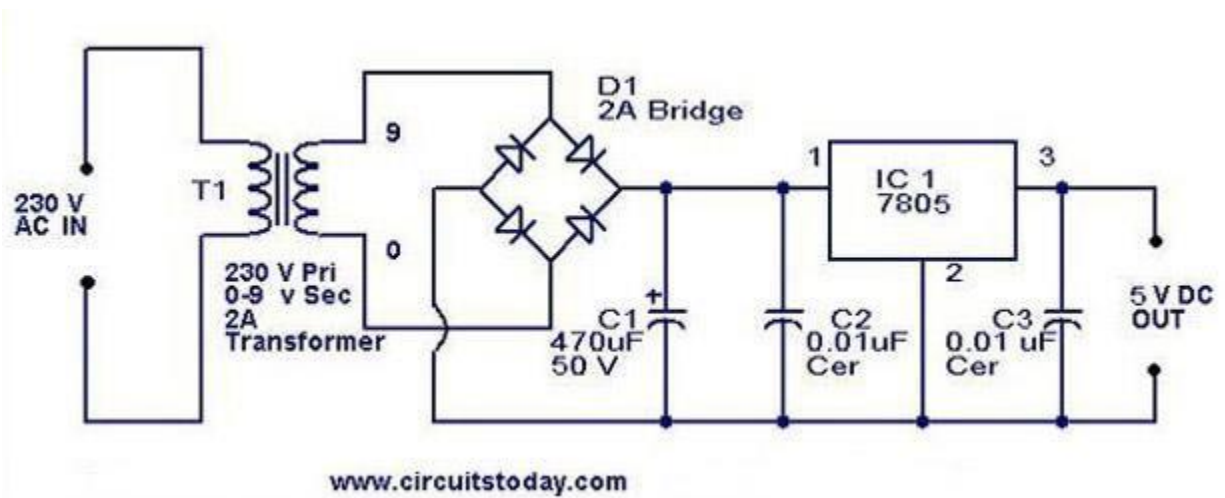
1. b. Voltage
2. c. Capacitor
3. a. Diode
4. b. LoudSpeaker
5. d. NE555
6. c. NOT GATE
7. b. Zener Diode
8. d. 4
9. a. Active
10. c. Multivibrator
11. c. 88MHZ- 108MHz
12. d. 455KHz
13. a. AM
14. b. FM
15. c. Photo Detector
16. b. 1.6 to 4.2 VDC
17. d. LNB
18. a. Organic Light Emitting Diode
19. d. Identify the specific device
20. a. Fusion

PART – B

1. Any 5 points from the table

Sl.No	Parameter	Type of the rectifier		
		Halfwave	Fullwave	Bridge
1.	Number of diodes	1	2	4
2.	V_{dc}	V_m/π	$2V_m/\pi$	$2V_m/\pi$
3.	Peak inverse voltage	V_m	$2V_m$	V_m
4.	Ripple factor	1.21	0.48	0.48
5.	Rectifier efficiency	40.6%	81.2%	81.2%
6.	Transformer Utilization factor	0.287	0.693	0.812
7.	Form factor	1.57	1.11	1.11

2. Circuit diagram – 5 marks



3. NOT GATE – 1 Mark

AND GATE – 2Marks

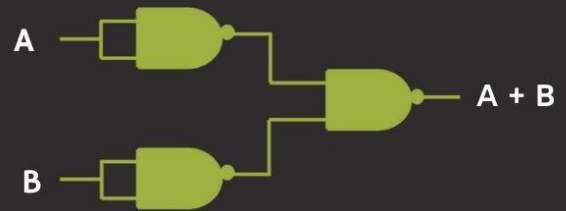
OR GATE - 2 Marks

NAND Gate as Universal Gate

NOT Gate



OR Gate



AND Gate



4. 2.5 Marks for each:

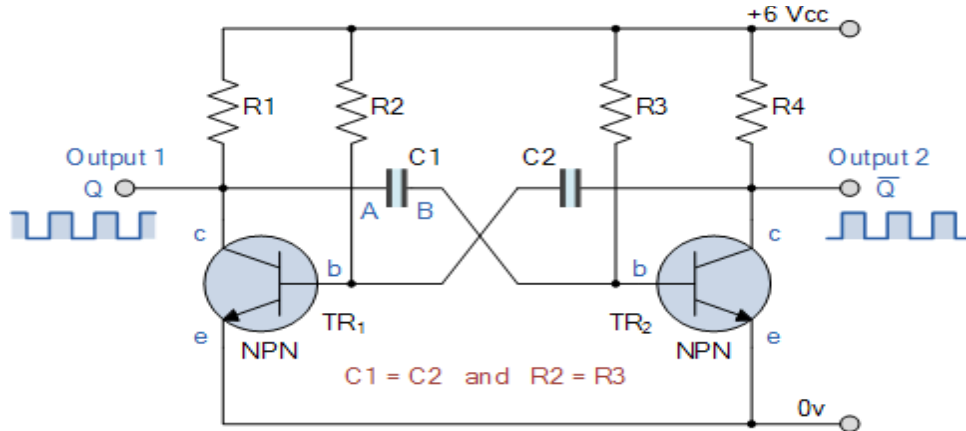
Definitions and Examples /Uses:

(a) Surface-mount technology (SMT), originally called planar mounting, is a method in which the electrical components are mounted directly onto the surface of a printed circuit board (PCB). An electrical component mounted in this manner is referred to as a surface-mount device (SMD). SMD Chips, SMD Capacitors, SMD Transistors,...

(b) An integrated circuit (IC) is a small semiconductor-based electronic device consisting of fabricated transistors, resistors and capacitors. Integrated circuits are the building blocks of most electronic devices and equipment. Eg: IC7805, NE555, Microprocessors,...

5. Circuit diagram - 4 Marks

Wave forms - 1 Mark



6. Minimum 3 Points

(a) Cable TV 2.5 Marks:

Cable television is a system of delivering television programming to consumers via radio frequency (RF) signals transmitted through coaxial cables, or in more recent systems, light pulses through fibre-optic cables. **Cable television** is a system of delivering television programming to consumers via radio frequency (RF) signals transmitted through coaxial cables, or in more recent systems, light pulses through fibre-optic cables. This contrasts with broadcast television (also known as terrestrial television), in which the television signal is transmitted over-the-air by radio waves and received by a television antenna attached to the television; or satellite television, in which the television signal is transmitted over-the-air by radio waves from a communications satellite orbiting the Earth, and received by a satellite dish antenna on the roof. FM radio programming, high-speed Internet, telephone services, and similar non-television services may also be provided through these cables. Analog television was standard in the 20th century, but since the 2000s, cable systems have been upgraded to digital cable operation.

(b) Mobile Communication (2.5 Marks)

1. We understand by **mobile communication** as the use of technology that allows us to communicate with others in different locations without the use of cables. **Mobile communication** makes our life easier, saves time and effort. Learn more in: *CommunicaME: A New Proposal for Facilitating Communication Using NFC*

2. **Communication** between **mobile** devices via wireless networks. Learn more in: *Comparison of Video Coding Standards Used in Mobile Applications*

3. Human **communication** with **mobile** phones. Learn more in: *Rich Ling: An Intellectual Auto-Biography*

4. A form of technology-mediated **communication** that enables the user of a **mobile** device to communicate with someone in a different location, for example, texting from a cell phone and sending email from a WiFi-equipped computer device (e.g., laptop, iPad). Learn more in: *Deaf Adolescents' Textisms*

5. Is characterized by convenience, rapidness, multifunction, and real time access, and reflects the spirit of the moment enabled by wireless and **mobile telecommunication** technologies and devices (Hui-Yi & Ling- Yin, 2010). M-Learning is defined as being just-in-time, situated learning, mediated through digital

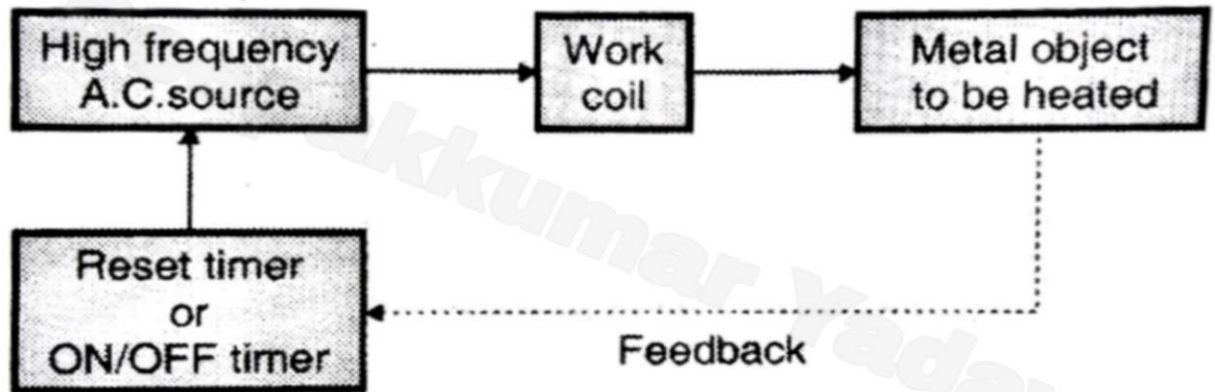
technology in response to the needs of the user (Traxler, 2009). M-learning is different from other forms of technology-supported learning in the way it can mediate and facilitate learning experiences (Peters, 2009). The ability to learn in one's own context when on the move in time and space is arguably the central learning affordance of **mobile** technologies. Learn more in: Mobile Technologies Support Effective Learning

6. **Communication** that takes place through a mediated, cellular capacity. Learn more in: James E. Katz: An Intellectual Biography

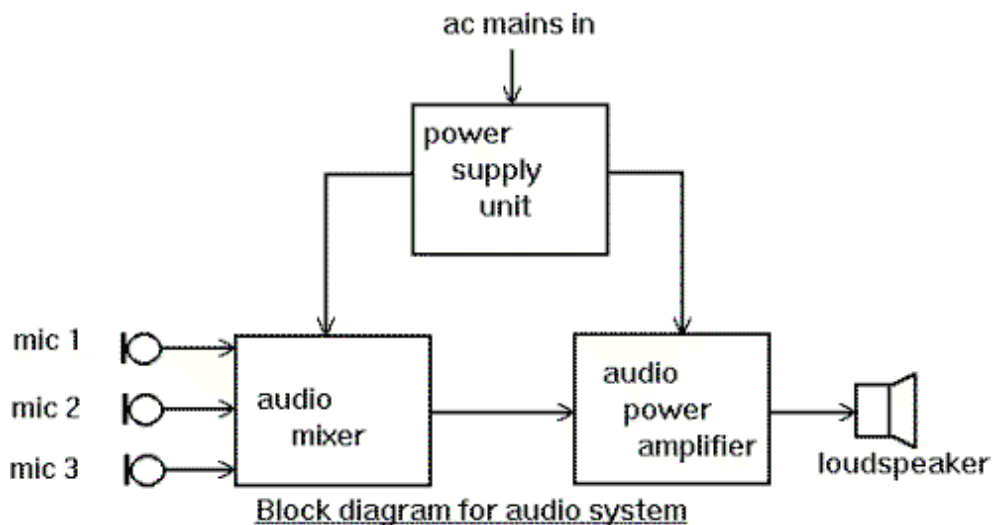
7. It allows us to communicate with others in various locations without use of any physical connection. Learn more in: IoT-Enabled 5G Networks for Secure Communication

8. **Mobile communication** allows broadcast of voice and multimedia data via a workstation or a **mobile** device exclusive of having connected to any physical or fixed connection. **Mobile communication** is growing day by day and has become a must have for every person. **Mobile communication** is the exchange of voice and data using a **communication** facility at the same time without any physical link. Learn more in: Big Data Analytics and IoT in Smart City Applications
Find more terms and definitions using our Dictionary Search.

7. Block diagram – 3 marks
 Description – 2 marks



8. Block diagram – 3 marks
 Description – 2 marks



9. Any 3 points from each: 5 Marks

0th Generation:

- Pre-cell phone mobile telephony technology, such as radio telephones some had in cars before the arrival of cell phones.
- Communication was possible through voice only.
- These mobile telephones were usually mounted in cars or trucks.

1G (1st Generation):

- First-time calling was introduced in mobile systems.
- It used analog signals.
- It used an FDD scheme and typically allocated a bandwidth of 25 Mhz.
- The coverage area was small.
- No roaming support between various operators.
- Low sound quality.
- Speed:- 2.4 kbps.

2G (2nd Generation) :

- Shifted from analog to digital.
- It supported voice and SMS both.
- Supported all 4 sectors of the wireless industry namely Digital cellular, Mobile Data, PCS, WLAN,
- Moderate mobile data service.
- 2G WLAN provided a high data rate & large area coverage.
- Speed:- 64 kbps.

2.5G came after **2G** which used the concept of GPRS. Streaming was also introduced and mail services too. Then came **2.75G** or EDGE which was faster in providing services than 2.5G. It gave faster internet speed up to 128kbps and also used edge connection.

3G (3rd Generation) :

- The Internet system was improved.
- Better system and capacity.
- Offers high-speed wireless internet.
- The connection used was UMTS and WCMA.
- Speed:- 2mbps.

4G (4th Generation) :

- IP-based protocols.
- LTE (Long term evaluation) was mainly for the internet.
- Vo-LTE (Voice over LTE) is for both voice and the internet.
- Freedom and flexibility to select any desired service with reasonable QoS.
- High usability.
- Supports multimedia service at a low transmission cost.
- HD Quality Streaming.
- Speed:-100mbps.

5G (5th Generation): It is yet to come in many countries but here are some notable points about 5G.

- Higher data rates.
- Connectivity will be more fast and more secure,
- Data Latency will be reduced to a great level.
- Massive network capacity.
- It is 30 times faster than 4G.
- There would be more flexibility in the network.

10. Figure -1 Mark and Calculation 1 1.5 Marks for each

Figure for 3 resistors in series In series : $R_t = R_1 + R_2 + R_3$, $R_t = 120+120+120= 360$ Ohm

Figure for 3 resistors in Parallel

In parallel $1/R_t = 1/R_1 + 1/R_2 + 1/R_3$, $R_t = R/3$, $= 120/3 = 40$ Ohm ($R_1=R_2=R_3$, so $R_t = R/3$)

11. Block diagram with contents – 5 Marks

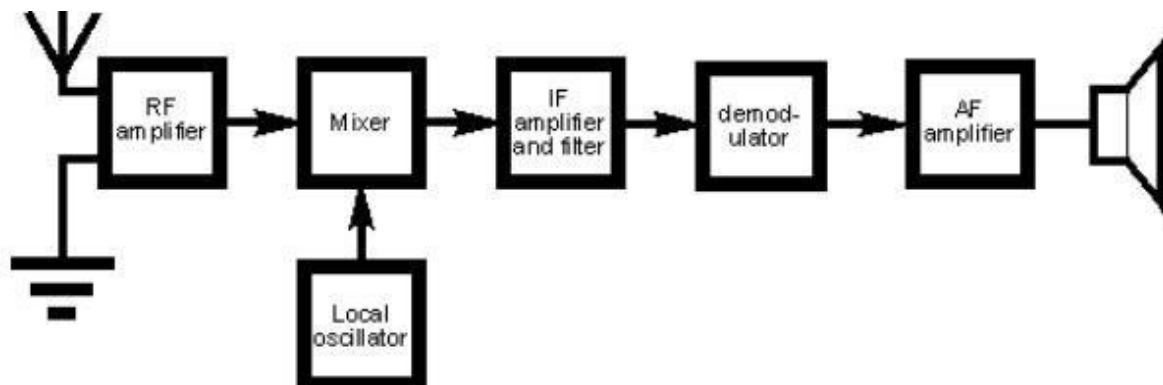


FIG 1.10 Block Diagram of a Basic Superheterodyne Radio Receiver

12. Write any 5 faults and remedies

- 1. LED Light Flickering
- 2. LED Buzzing or Humming Noise
- 3. Too Bright light
- 4. LED Light Too Dim
- 5. LED Light Stopped Working
- 6. LED Flashes on and then Goes off
- 7. LED Dimming Does not work
- 8. LED Strip Showing the Wrong Color
- 9. Recessed LED Light Turns Off after a few Seconds
- 10. Random Turn Off LED Recessed Light
- 11. LED Light Attracts Bugs

- 12. LED Light Overheating
- 13. LED Light Burning Out
- 14. Wrong LED Beam Angle
- 15. Blue Light Pollution of LED
- 16. Using LED Light in an Incandescent Light Fixture
- 17. Using LED Light at an Extra High Current/Wattage
- 18. Low Color Rendering Index
- 19. Wrong LED Driver
- 20. Corn Bulb Protrudes Out of the Lampshade