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COVER PAGE

OPERATION AND MAINTENANCE OF COMMUNICATION (789)

Marking Scheme

Class XII - 2018-19

Time: 2 $\frac{1}{2}$ Hours **Total Marks: 50**

General Instructions:

1. *Marking Scheme is divided into two sections: Section-A and Section- B.*
2. ***Section–A:***
   - ***i.*** *Multiple choice question/Fill in the blanks/Direct Questions of 1 mark each. Answer any 10 questions out of the given 12 questions.*
   - ***ii.*** *Very Short Answer of 2 marks each. Answer any 5 questions from the given 7 questions.*
   - ***iii.*** *Short Answer of 3 marks each. Answer any 5 questions from the given 7 questions.*
3. ***Section–B:****Long/Essay type questions of 5 marks each. Answer any 3 questions from the given 5 questions.*
4. *All questions of a particular section must be attempted in the correct order.*
5. *Pleasecheck that this question paper contains 31 questions out of which 23 questions are to be attempted.*
6. *The maximum time allowed is* $2\frac{1}{2}$ *hrs.*
7. *The marking scheme carries only suggested value points for the answers. These are only guidelines and do not constitute the complete answers. The students can have their own expression and if the expression is correct, the marks be awarded accordingly.*

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OPERATION AND MAINTENANCE OF COMMUNICATION (789)

Time: 2 $\frac{1}{2}$ Hours **Total Marks: 50**

Q.NO.	Expected Answer/Value Points	Marks	Total Marks
1	Medium Frequency(b)	1	1
2	In the channel(c)	1	1
3	All of the above (d)	1	1
4	C/N (a)	1	1
5	Narrow Band Interference (a)	1	1
6	Double sided PCB (b)	1	1
7	Fake android apps(b)	1	1
8	75MHz (b)	1	1
9	Carrier Signal in analog and message signal is digital(b)	1	1
10	Wireless fidelity(a)	1	1
11	All of the above(d)	1	1
12	Soft Handoff (a)		
13	1) Avoids mixing of signals 2) Increase the range of communication 3) Wireless communication 4) Reduces the effect of noise 5) Reduces height of antenna	2	2
14	IMEI is short for International Mobile Equipment Identity and is a unique number given to every single mobile phone, typically found behind the battery. IMEI numbers of cellular phones connected to a GSM network are stored in a database (EIR - Equipment Identity Register) containing all valid mobile phone equipment.	2	2

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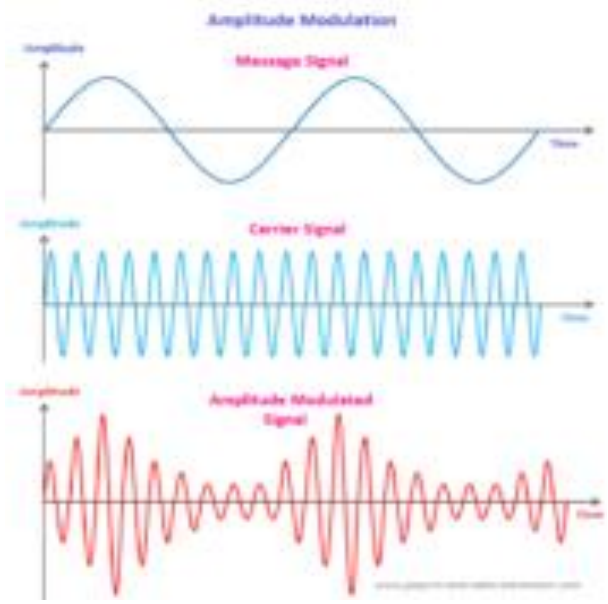
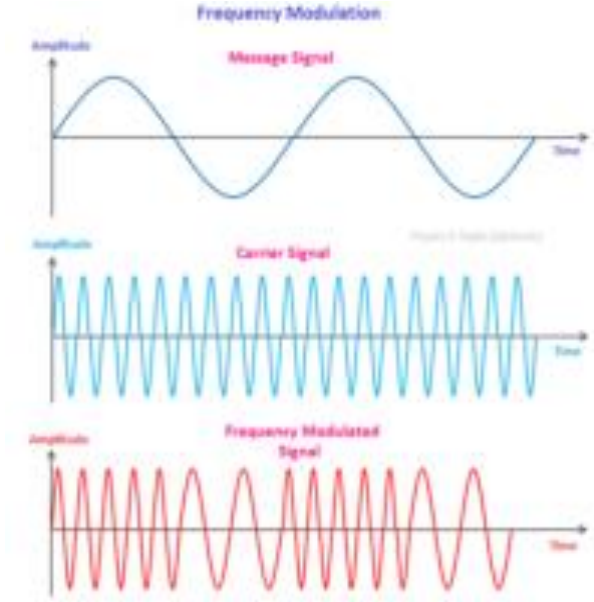
15	**FDMA** I. Stands for frequency division multiple access. II. FDMA is not required synchronization. III. It has less power efficiency. IV. It has divided frequency band into disjoint subband	**TDMA** Stands for time division multiple access. It is required Synchronization. It has more power efficiency. It has divided the time into non overlapping time slot.	2	2
16	 Fig. Amplitude Modulation  Fig. Frequency Modulation		2	2

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17	Tools to repair any smart phone or mobile phone include - soldering iron, soldering station, solder wire, solder paste, liquid flux, paste flux, jumper wire, tweezers, screwdriver, multimeter, dc power supply, ESD-Safe antistatic wrist strap, mat, apron, hand gloves, LCD tester, Battery tester, PCB holder, PCB Cleaner.	**2**	**2**
18	1,Code Division Multiple Access cellular networks provide more bandwidth than Global System for Mobile Communications networks of the same generation. 2. CDMA is more secured.	**2**	**2**
19	The two functions of an antenna are: (1) For transmission of a signal, radiofrequency electrical energy from the transmitter is converted into electromagnetic energy by the antenna and radiated into the surrounding environment (atmosphere, space, water); (2) for reception of a signal, electromagnetic energy impinging on the antenna is converted into radio-frequency electrical energy and fed into the receiver.	**2**	**2**
20	• Unlocking is a relatively simple software "patch" where a user plugs their phone into a computer and runs a small computer program. The technology is straightforward, easy to use and patches the phone very quickly. If you have ever updated an iPhone or Blackberry by plugging it into your computer - the unlocking process is usually not significantly more complex than that simple process (it can also be done with a series of codes that you enter into the phone). • : unlocking is a quick process to allow a phone to use SIM cards from other carriers – and thereby easily use an older phone on another carrier.	**3**	**3**
21	Performance criteria of Cellular system • Capacity – number of subscribers served – Bit rate/ Bandwidth provided • Quality – BER – Delay • Service Probability – coverage – outage probability – Blocking, service denial.	**3**	**3**

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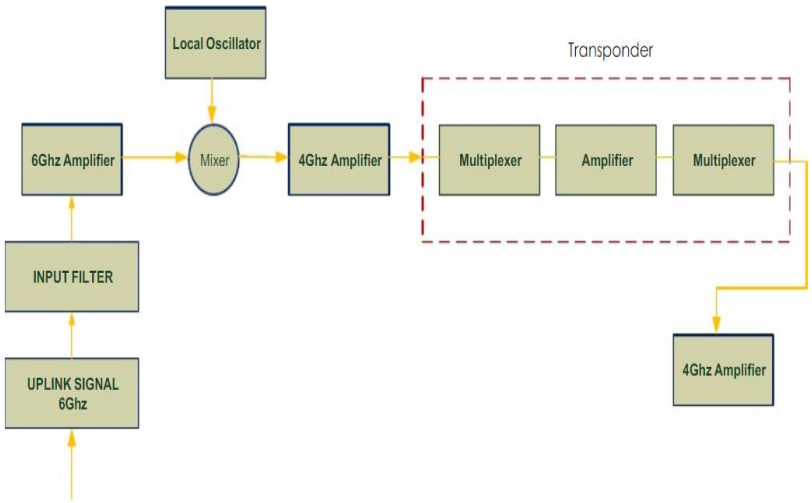
	 A clusters of cells in a cellular network		
22	**Block Diagram of Satellite Communication System**  Function of the each block diagram Uplink Signal- The 6Ghz uplink can be data from TV signal and Telephone lines. Input Signal-Is to make sure that any out of band signals are reduced to acceptable levels so that the amplifier is not overloaded. Mixer & Local Oscillator- Is to convert the uplink frequency to lower frequency (downlink). Transponder- Is the two way communication switching.	**3**	**3**
23	**1.** Learn and get certified **2.** Work to gain some experience **3.** **Estimate the capital required**	3	**3**

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	4. Choose an ideal location **5.** Obtain required licenses **6.** Promote and advertise your business		
24	**Storage** **I.** Take care so that packages are not subjected to impact, vibration or water leakage. **II.** Do not store and use the product under the environment in which moisture condensation may be formed due to rapid changes in temperature. Also, please do not apply load to the products during storage. **III.** When storing, avoid dusty locations or locations with corrosive gases. **IV.** Before opening moisture-proof bag, please make sure that the moisture-proof bag is not broken or scratched. Also check the silica gel in the bag has not absorbed moisture, after the bag is opened. **V.** When using after a long term of storage, use after confirming that terminal discoloration, solder ability deterioration and so on, does not occur.	**3**	**3**
25	Internal noise in communication, i.e. noise which get, generated within the receiver system. Internal noise may be put into the following four categories **I.** Thermal noise or White noise or Johnson noise **II.** Short noise **III.** Transit time noise **IV.** Miscellaneous internal noise	**3**	**3**
26	1. Open menu and select settings. . 2. Select reset. Reset all/master reset and erase all data. 3. Put security code. 4. Click on default security code for all phones 5. Feed security code from your registered phone.\	**3**	**3**
27	1. Be polite 2. Be patient 3. Be technically confident to solve problem. 4. Ask the customer for elaborate explanation of problem 5. Keep yourself updated about up gradation of any device	**5**	**5**
28	**A) Bluetooth** is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.400 to 2.485 GHz from fixed and mobile devices, and building personal area networks (PANs). **B) General Packet Radio Services (GPRS)** is a packet-based wireless communication service that promises data rates from 56 up to 114 Kbps and continuous connection to the Internet	**1** **1**	**5**

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	for mobile phone and computer users. The higher data rates allow users to take part in video conferences and interact with multimedia Web sites and similar applications using mobile handheld devices as well as notebook computers. GPRS is based on Global System for Mobile (GSM) communication and complements existing services such circuit-switchedcellular phone connections and the Short Message Service (SMS). **C)** A subscriber identity module or subscriber identification module (SIM), widely known as a SIM card, is an integrated circuit that is intended to securely store the international mobile subscriber identity (IMSI) number and its related key, which are used to identify and authenticate subscribers on mobile telephony devices (such as mobile phones and computers). **D)** UMTS (Universal Mobile Telecommunications Service) is a third-generation (3G) broadband, packet-based transmission of text, digitized voice, video, and multimedia at data rates up to 2 megabits per second (Mbps). **E)** Infrared radiation (IR), sometimes referred to simply as infrared, is a region of the electromagnetic radiation spectrum where wavelengths range from about 700 nanometers (nm) to 1 millimeter (mm).Infrared waves are longer than those of visible light, but shorter than those of radio waves.		
29	A **very small aperture terminal** (**VSAT**) is a two-way satellite ground station with a dish antenna that is smaller than 3.8 meters. The majority of VSAT antennas range from 75 cm to 1.2 m. Data rates, in most cases, range from 4 kbit/s up to 16 Mbit/s. VSATs access satellites in geosynchronous orbit or geostationary orbit to relay data from small remote Earth stations (terminals) to other terminals (in mesh topology) or master Earth station "hubs" (in star topology). VSATs are used to transmit narrowband data (e.g., point-of-sale transactions using credit cards, polling or RFID data, or SCADA), or broadband data (for the provision of satellite Internet access to remote locations, VoIP or video). VSATs are also used for transportable, on-the-move (utilizing phased array antennas) or mobile maritime communications. VSAT (Very Small Aperture Terminal) is a satellite communications system that serves home and business users. A VSAT end user needs a box that interfaces between the user's computer and an outside antenna with a transceiver. The transceiver receives or sends a signal to a satellite transponder in the sky. The satellite sends and receives signals from an earth station computer that acts as a hub for the system. Each end user is interconnected with the hub station via the satellite in a star topology. For one end user to communicate with another, each transmission has to first go to the hub station which retransmits it via the satellite to the other end user's VSAT. VSAT handles data, voice, and video signals. VSAT is used both by home users who sign up with a large service and by private companies that operate or lease their own VSAT systems. VSAT offers a number of advantages over terrestrial alternatives. For private	**5**	**5**

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	applications, companies can have total control of their own communication system without dependence on other companies. Business and home users also get higher speed reception than if using ordinary telephone service or ISDN.		
31	These layers are used for propagation of EM waves and that EM waves travel basically in any 1 of the three methods discussed below: **a. Ground Wave Propagation** Used for a low-frequency range transmission, mostly less than 1 MHz. This type of propagation employs the use of large antennas order of which is equivalent to the wavelength of the waves and uses the ground or Troposphere for its propagation. Signals over large distances are not sent using this method. It causes severe attenuation which increases with increased frequency of the waves. **b. Sky Wave Propagation** Used for the propagation of EM waves with a frequency range of 3 – 30 MHz. Make use of the ionosphere so called due to the presence of charged ions in the region of about 60 to 300 km from the earth surface. These ions provide a reflecting medium to the radio or communication waves within a particular frequency range. We use this property of the ionosphere for long-distance transmission of the waves without much attenuation and loss of signal strength .Another important point to note is the consideration of the angle of the emission of these waves from the ground. The transmitter emits the EM Waves at a critical angle to ensure total reflection to the ground just like the total internal reflection of optic waves otherwise the waves may escape into space. Skip Distance is the distance between the 2 points between which the wave transmission happens. **c. Space Wave** Used for a line of Sight communication also known as LoS. Space satellite communication and very high-frequency waves use this propagation method. It basically involves sending a signal in a straight line from the transmitter to the receiver. We must ensure that for very large distances, the height of the tower used for transmission is high enough to prevent waves from touching the earth curvature thus preventing attenuation and loss of signal strength.	**5**	**5**

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