PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Sem AY: Odd Sem 2019-20

Course Code: ECE 304

Course Name: MOBILE COMMUNICATION

Programme & Sem: B.Tech (ECE) & VII DE

Date: 30.09.2019

Time: 9.30AM to 10.30AM

Max Marks: 40

Weightage: 20%

Instructions:

   (i)   *Read Questions carefully*

   (ii)   *All questions are compulsory*

Part A

Answer both the Questions. Each Question carries four marks.   (2Qx4M=8M)

1. Draw basic cellular architecture and explain each block in brief. (C.O.NO.1)[Acknowledge]

2. Identify in the given figure which co-channel location is incorrect. Justify your choice with suitable reason. (Note: A=A1=A2=A3 as they are co-channels)   (C.O.NO.1)[Acknowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries five marks.   (4Qx5M=20M)

3. In a popular game show, "Kaun Banega Crorepati", a player asks for option "phone a friend." Soon after which Amitabh Bachchan dials from his cell phone to the friend's landline no. Explain in detail how this call is set up?   (C.O.NO.1)[Comprehension]

4. "All lines in this route are busy, please try again later," we have often heard this when our call could not be connected. As a part of networking team in BSNL, you have to assign channels in the given area to resolve such issues. Explain in detail each of the channel assignment strategy and mention your best recommended strategy for the area.

(C.O.NO.1)[Comprehension]

5. Make a draft plan for enhancing capacity in different scenario:

Sl. No.	Situation	Capacity Enhancement Technique	Brief Explanation of technique
1.	Densely Populated area, heavy traffic		
2.	Reduction of interference		
3.	Tunnels, Remote areas		

(C.O.NO.1)[Comprehension]

6. Explain the process of hand-off with suitable diagram. Mention the type of hand-off in the following situation:Booking doctor's appointment at OPD in Hospital:
Receptionist receives call→Switches over the call to OPD   (C.O.NO.1)[Comprehension]

Part C [Problem Solving Question]

Answer both the Questions. Each Question carries six marks.   (2Qx6M=12M)

7. The movie Robot 2.0 is based on influence of mobile communication on human life. In the movie, with the help of VFX, no. of times it is shown that in a particular area suddenly too many cell phones accumulate and all of them also communicate at the same time. As a movie critic having knowledge of cells, channels available, call blocking probability, interference, capacity, Comment on logical and practical possibility of such scenes with explanation.

(C.O.NO.1)[Comprehension]

8. Bharti Airtel is planning to set up a tower in an area. According to their field survey, their operating system operates with simplex channel of 30 KHz, using 7 cells in a cluster, assigned with 30 MHz spectrum. If 68 voice channels are required in every cell, how many control channels will be available per cluster? Verify if standard ratio of voice channels and control channels maintained in the system.

(C.O.NO.1)[Comprehension]

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

Even Semester: 2019-20

Course Code: ECE 304

Course Name: Mobile Communication

Programme & Sem: B.Tech & VII

Date: 30 September 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [8 Marks] Bloom's Levels			Thought provoking type [14Marks] Bloom's Levels			Problem Solving type [12 Marks]			Total Marks [30]
		Module - 1	K			C			C			
1,2	C.O.1	Module – 1 (Subjective type questions	8									8
3,4,5, 6	C.O.1	Module – 1 (Subjective Type Questions)				5	5	5 5				20
7 8	C.O.1	Module – 1 (Subjective Type Questions)							6 6			12
	Total Marks		8			20			12			40

K =Knowledge Level   C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I here certify that All the questions are set as per the above lines   Trisha

Review, Comments.

1. Marks should be evenly distributed.
2. 1, 2 three not there , Part -B number changed
   Part C - Step marks (Faculty was called
   and the change are done).
3. Steps should be included.
4. Little bit lengthy

Dr. M. Levy
Professor

Annexure- II: Format of Answer Scheme

SCHOOL OF ENGINEERING

SOLUTION

Semester: VII

Course Code :ECE 304

Course Name: Mobile Communication

Date: 30-09-2019

Time: 9:30 AM – 10:30 AM

Max Marks: 40 Marks

Weightage: 20%

Part A   (2Q x 4M = 8 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	Basic architecture of Cellular system block diagram MS, BTS, BSC, MSC, PSTN	1M 3M	5 Mins
2	A3 is incorrect Locating Co channel cells: 2 steps	1 M 3M	5 Mins

Q No	Solution	Scheme of Marking	Max. Time required for each Question
3.	Table 1.3.2 Establishing a call originated by a mobile user to a telephone subscriber Step 1 The mobile user sends a call initiation request along with the desired telephone subscriber number, its own MIN, ESN and SCM to the base station on RCC Step 2 Base station receives this call initiation request and forwards to MSC Step 3 MSC verifies that the mobile user has a valid MIN-ESN pair. It also identifies that the called number belongs to a landline telephone subscriber Step 4 MSC suggests base station to move to an unused voice channel pair to establish two way communications with the mobile user Step 5 MSC connects to the PSTN in order to establish communication with the called party Step 6 Communication begin	5 M	5 min
4.	Explanation about Fixed Channel assignment, Dynamic channel assignment, Hybrid channel assignment Recommendation: FCA complex/HCA	5 M	5 min
5.	<table><tr><td>Sl. No.</td><td>Situation</td><td>Capacity Enhancement Technique</td><td>Brief Explanation of technique</td></tr><tr><td>1.</td><td>Densely Populated area, heavy traffic</td><td>Cell Splitting</td><td></td></tr><tr><td>2.</td><td>Reduction of interference</td><td>Sectorization</td><td></td></tr><tr><td>3.</td><td>Tunnels, Remote areas</td><td>Repeaters</td><td></td></tr></table>	2 M 2 M 1 M	5 min

| 6. | Hand-off explanation with diagram | 4 M | 5 min |
| | Intra-cellular hand-off | 1 M | |

<div align="center">Part C   (2Q x 6M = 12 Marks)</div>

Q No	Solution	Scheme of Marking	Max. Time required for each Question
7.	All cell phones accumulate in a place suddenly→ Limited area and over populated→ no. of channels available is limited, call blocking probability is more→ interference is more→Capacity is less Practically impossible	3M+2M	10 mins

8.	Duplex channel= 60KHz Total channels = 500 Total voice channel= 68*7= 476 Total control channel= 500-476=24 Ratio is correct	1M+1M+2M+1M+1M	10 Mins

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST - 2

Sem & AY: Odd Sem 2019-20

Course Code: ECE 304

Course Name: Mobile Communication

Programme & Sem: B.Tech (EEE)& VII Sem

Date: 18 November 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:
- (i) Read Questions carefully and answer accordingly
- (ii) Scientific and Non- programmable calculators are permitted
- (iii) This question paper contains three pages

Part A [Memory Recall Questions]

Answer the Question. The question carry ten marks. (1Qx10M=10M)

1. (C.O.NO.1,2,3)[Knowledge]

i. All of us in KS03 classroom got tuned into 92.7 Big FM. The multiple access technique used is:
   (a) TDMA   (b) FDMA   (c) CDMA   (d) TDD/FDD

ii. The main advantage of SDMA technique is:
   (a) Frequency Division   (b) Time Slot   (c) Frequency Reuse   (d) Multiplexing

iii. AMPS is the first generation standard that supports analog communication, is an example of:
   (a) FDMA/FDD   (b) TDMA/TDD   (c) CDMA   (d) OFDMA

iv. In Bluetooth, the maximum power saving mode is:
   (a) Active   (b) Hold   (c) Sniff   (d) Park

v. Bluetooth uses _____ spread spectrum technique:
   (a) DSSS   (b) FHSS   (c) CDMA   (d) None of these

vi. Media Access Control is a _____ bit address:
   (a) 46   (b) 24   (c) 40   (d) 48

vii. If Frames: Data Link, then Packet: _____?
   (a) Application   (b) Presentation   (c) Network   (d) Physical

viii. Cyclic Redundancy Check is performed for "hash" which is put into 32 bits _____:
   (a) CGS   (b) FCS   (c) FSC   (d) DGS

ix. The administrator of the network or ISP provides _____ address:
   (a) IP   (b) MAC   (c) IMEI   (d) MIN

x. If IPv4:32bits, then IPv6?
   (a) 132   (b) 120   (c) 128   (d) 192

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries four mark. (3Qx4M=12M)

2. Identify the WPAN technology that is used to connect different devices in the given figure 1. Mention any three features of the technology. (C.O.NO.2)[Comprehension]
3. Draw the frame structure and mention size of each section in bytes/bits. What is the maximum size of a frame? (C.O.NO.3)[Comprehension]
4. The network configuration screen in my computer appeared as in the figure 2 given below. Classify the parts of MAC address and IP address. We know router connects networks, identify the IP address of the router. (C.O.NO.3)[Comprehension]
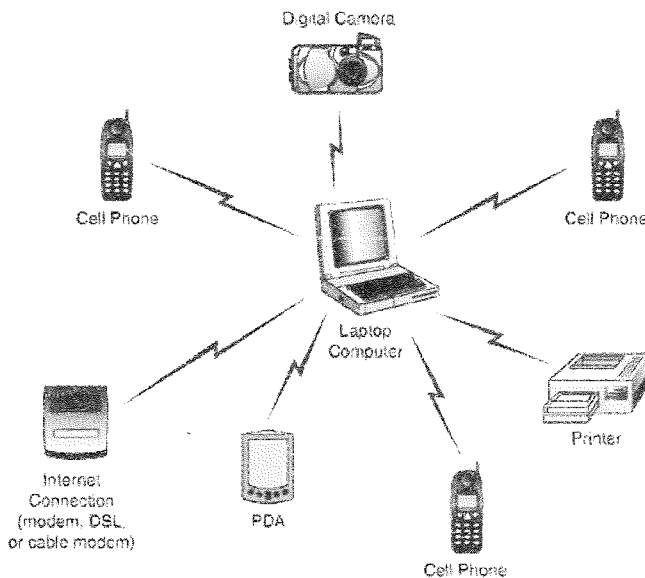
Figure 1
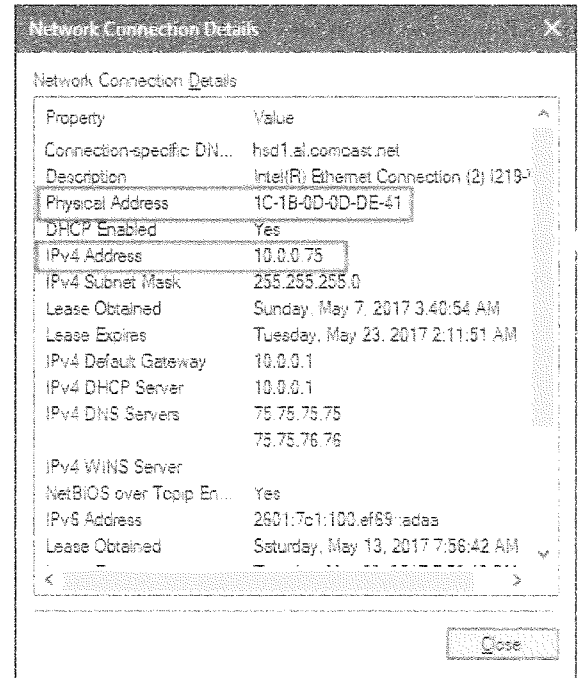
Figure 2

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries six mark. (3Qx6M=18M)

5. List any three features of FHSS technique. Briefly describe all four power saving modes of Bluetooth. (C.O.NO.2)[Comprehension]
6. Draw suitable diagram and distinguish between FDMA and TDMA. In AMPS, spectrum provided to operators is 15MHz and each narrow channel bandwidth is 35 KHz separated by guard band of 10 KHz. Calculate Total no. of channels in the system. (C.O.NO.2)[Comprehension]
7. Draw OSI Model. List any distinguishing features each of Data-Link layer, Network layer, Transport layer and Application layer. (C.O.NO.3)[Comprehension]

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

Even Semester: 2019-20

Course Code: ECE 304

Course Name: Mobile Communication

Programme & Sem: Btech & VII semester

Date: 18 November 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [10 Marks] Bloom's Levels	Thought provoking type [10Marks] Bloom's Levels			Problem Solving type [10 Marks]			Total Marks [30]
		Module - 1	K	C			C			
1-10	C.O.1, CO 2, CO 3	Module – 1,2,3 (10-Objective Type Questions)	10							10
1-2	C.O.1, 2,3	Module – 1,2,3 (Subjective Type Questions)		4	4	4				12
1-2	C.O.1, 2,3	Module – 1,2,3 (Subjective Type Questions)					6	6	6	18

				10			12			18	40
Total Marks											

K =Knowledge Level   C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

Annexure- II: Format of Answer Scheme

SCHOOL OF ENGINEERING

SOLUTION

Semester: VII

Course Code:ECE 304

Course Name: Mobile Communication

Date: 18-11-2019

Time: 9:30 PM – 10:30 PM

Max Marks: 40 Marks

Weightage: 20%

<div align="center">

Part A   (10Q x 1M = 10 Marks)

</div>

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	(b) FDMA	1 M	1 min
2.	(c) Frequency Reuse	1 M	1 min
3.	(a) FDMA/FDD	1 M	1 min
4.	(d) Park	1 M	1 min
5.	(b) FHSS	1 M	1 min
6.	(d) 48	1 M	1 min
7.	(c) Network	1 M	1 min
8.	(b) FCS	1 M	1 min
9.	(a) IP	1 M	1 min

10.	(c) 128	1 M	1 min

Part B (4Q x 3M = 12 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	Identify Bluetooth Any 3 features of bluetooth	[1M+3M]	10 Mins
2.	**Frame Structure** Field Length in Bytes — Ethernet 8 6 6 2 46-1500 4 Preamble | Destination MAC Address | Source MAC Address | Type | Data | FCS	[2M+1M+ 1M]	10 Mins
3.	MAC: Manufacturer ID, NIC No. IP: Network Id, Host Id Gateway IP address	[1.5M+1.5 M+1M]	5mins

Part C   (3Q x 6M = 10 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	Any 3 features of FHSS Four modes: Active, Sniff, Hold, Park (brief explanation)	[3M+3M]	10 Mins
2.	FDMA & TDMA diagram Difference N= 428	[2M+2M+2M]	10mins
3.	OSI Model Data link, Network, Application, Transport layer feature	[2M+1M+1M+1M+1M]	5mins

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester : Odd Semester: 2019 - 20

Course Code: ECE 304

Course Name: MOBILE COMMUNICATION

Program & Sem: B.Tech (ECE) & VII (DE-IV)

Date: 24 December 2019

Time: 9:30 AM to 12:30 PM

Max Marks: 80

Weightage: 40 %

Instructions:

(i) Read the all questions carefully and answer accordingly.
(ii) Scientific and Non- programmable calculators are permitted

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 3 marks.　　　　**(10Qx3M=30M)**

1. Explain the following in brief: MS, BTS and BSC, MSC.　　　　[1M+1M+1M]

(C.O.No.1) [Knowledge]

2. Define the three types of hand-offs.　　　　[1M+1M+1M]

(C.O.No.1) [Knowledge]

3. Given the codes, $C_1 = [1,-1,-1,1]$, $C_2 = [-1,1,1,1]$, $C_3 = [-1,1,1,-1]$, check orthogonality of the codes. Find total no. of users in the system.　　　　[2M+1M] (C.O.No.1) [Knowledge]

4. Which multiple access technique is used in each of the following Generation:

   (a) AMPS　(b) GSM　(c) UMTS　　　　[1M+1M+1M] (C.O.No.2) [Knowledge]

5. Represent FDMA/FDD and TDMA/FDD with the help of diagram and give example for each condition.　　　　[1.5M+1.5M] (C.O.No.2) [Knowledge]

6. IPv4 address is given as: 192.168.0.10. Convert this into 32-bit Binary number.　　　　[1M+1M+1M] (C.O.No.3) [Knowledge]

7. List features of Data Link layer and Network layer　　　　[1.5M+1.5M] (C.O.No.3) [Knowledge]

8. Expand the following abbreviations:

   AMPS, GSM, GPRS, UMTS, LTE, LTE-A　　　　[0.5M×6=3M] (C.O.No.3) [Knowledge]

9. List any three features of Ad-hoc Network.　　　　[3M] (C.O.No.4) [Knowledge]

10. Distinguish between Symmetric and Asymmetric Links with diagram.　　　　[1.5M+1.5M]

(C.O.No.4) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 10 marks.   **(3Qx10M=30M)**

11. Identify the multiple access technique used in LTE. Explain the multiple access technique with the help of block diagram.   [1M+5M+4M] (C.O.No.2) [Comprehension]

12. Ad-hoc networks can be created Anytime, Anywhere. Suppose there are two nodes in the ad-hoc network. Explain the process of communication between them with the help of TCP/IP model with suitable diagram.   [5M+5M] (C.O.No.4) [Comprehension]

13. Election Day results are out. Everyone wants to congratulate the winner. Suppose the cell phone for everyone displays "G" on its top right corner of mobile screen. Identify the technology standard. Draw its architecture and explain each block.

[1M+4M+5M] (C.O.No.3) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each Question carries 5 marks.   **(4Qx5M=20M)**

14. Classify the MANET Routing protocols with examples for each type.   [2M+2M+1M]

(C.O.No.4) [Comprehension]

15. Reliance distributed GSM SIM enabled cell phones at a very reasonable cost to mass people of India. Given the following components: MSS (Mobile Subsystem), BSS (Base Subsystem), NSS (Network Subsystem), OSS (Operation Subsystem), build an architecture to form a network for providing the service and explain each of these components in brief.
.   [3M+2M] (C.O.No.3) [Comprehension]

16. Discuss the features of 4G. Draw a diagram to represent Convergence in 4G

[2M+3M] (C.O.No.3) [Comprehension]

17. Distinguish between Cell Splitting and Cell Sectorization with suitable diagram. [2.5M+2.5M]

(C.O.No.1) [Comprehension]

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO (% age of CO)	Unit/Module Number/Unit /Module Title	Memory recall type [30 marks] Bloom's Levels	Thought provoking type [30 marks] Bloom's Levels	Problem Solving type [20 marks]	Total Marks
			K	C	C	
1	C.O. 1	Module 1	3			3
2	C.O. 1	Module 1	3			3
3	C.O. 1	Module 1	3			3
4	C.O. 2	Module 2	3			3
5	C.O. 2	Module 2	3			3
6	C.O. 3	Module 3	3			3
7	C.O. 3	Module 3	3			3
8	C.O. 3	Module 3	3			3
9	C.O. 4	Module 4	3			3
10	C.O. 4	Module 4	3			3
11	C.O. 3	Module 3		10		10
12	C.O. 4	Module 4		10		10
13	C.O. 2	Module 2		10		10
14	C.O. 3	Module 3			5	5
15	C.O. 1	Module 1			5	5
16	C.O. 4	Module 4			5	5
17	C.O. 3	Module 2			5	5
	Total Marks		30	30	20	80

K =Knowledge Level   C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:
(1) Consider Part A Numbering Change
(2) Very good thought provocation - commendable
(3) Only Compre Level ?
Format of Answer Scheme

SCHOOL OF ENGINEERING

SOLUTION

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Semester: Odd Sem. 2019-20

Course Code: ECE 304

Course Name: MOBILE COMMUNICATION

Program & Sem: B.Tech (ECE) & VII (DE-IV)

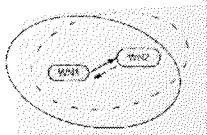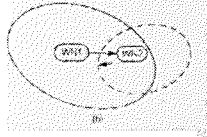**Date**: 24 December 2019

Time: 9:30 AM to 12:30 PM
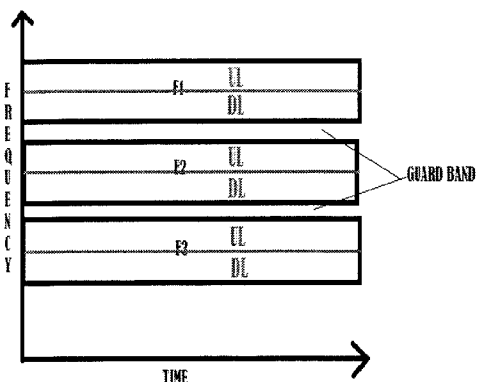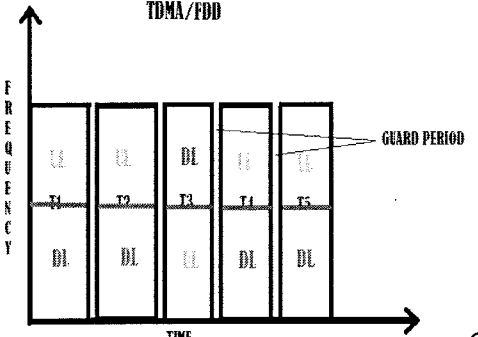
Max Marks: 80

Weightage: 40%
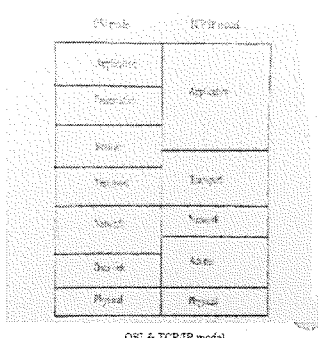
Part A   (10Q x 3M = 30Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Explain MS, BS and MSC	[1M+1M+1M]	5 min
2	Hard hand-off, soft hand-off, softer hand-off, brief explanation	[1M+1M+1M]	5 min
3	C1 and C2 are orthogonal. Total users-2	[2M+1M]	5 min
4	Advanced Mobile phone system, Global system for Mobile communication, Universal Mobile terrestrial system	[1M+1M+1M]	5 min

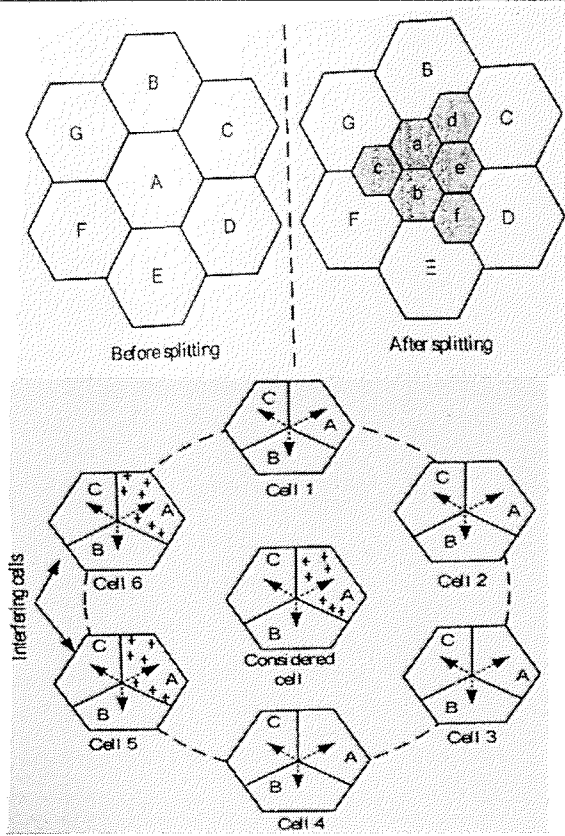|			
5	**FDMA/FDD** AMPS **TDMA/FDD** GSM	[1.5M+1.5M]	10 min
6	192.168.0.10 ↓ 11000000101010000000000000001010	[1M+1M+1M]	10 min
7	Any 2 features of each layer	[1.5M+1.5M]	5 min
8	Advanced Mobile phone system, Global system for Mobile communication, General Packet Radio service, Universal Mobile terrestrial system, Long Term Evolution, Long Term Evolution Advanced	[0.5M×6=3M]	10 min
9	Any 3 features of Ad-hoc network	[3M]	5 min
10	**SYMMETRIC AND ASYMMETRIC LINKS** ○ Symmetric=> Bidirectional (1) Equal transmission capabilities (2) Two nodes in radio range of each other (3) Ad-hoc Networks has only Symmetric links ○ Asymmetric=>Unidirectional (1) No equal transmission capabilities (2) One node not in radio range of another (a) Symmetric links (b) Asymmetric links	[1.5M+1.5M]	10 min

Q No	Solution	Scheme of Marking	Max. Time required for each Question
11	OFDM. Block diagram and explanation	[1M+5M+4M]	15 min
12	**PROTOCOL LAYERS IN WIRELESS AD-HOC NETWORK** ◇ Layered protocol approach: (1) OSI Model- Open system interconnection (2) TCP/IP model- Transmission control protocol and Internet protocol *OSI & TCP/IP model* Explanation of each layer	[5M+5M]	15 min
13	GPRS. Architecture and Explanation	[1M+4M+5M]	15 min

Q No	Solution	Scheme of Marking	Max. Time required for each Question
14	MANET Routing protocols: Proactive, Reactive, Hybrid	[2M+2M+1M]	10 min
15	GSM Architecture and explanation	[3M+2M]	15 min
16	MAGIC, diagram of convergence	[2M+3M]	15 min

| 17 | | [2.5M+2.5M] | 15 min |

Before splitting

After splitting

Cell 1

Cell 6

Cell 2

Considered cell

Cell 5

Cell 3

Cell 4

Interfering cells

Explanation of each