Unit 5 - Week 2

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

- Lecture 06 : Requirements and operating scenarios of 5G
- Lecture 07 : Requirements and operating scenarios of 5G (contd.)
- Lecture 08 : 5G scenarios
- Lecture 09 : Ultra reliable low latency communication
- Lecture 10 : Designing 5G new radio
- Lecture Materials
- Quiz : Assignment 2
- Week 2 Feedback Form

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Tutorial Materials

DOWNLOAD VIDEOS

Text Transcripts

Solutions

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-11, 23:59 IST.

1) 1 Exabyte of data amounts to — 1 point

a. 10^9 bytes
b. 10^{12} bytes
c. 10^{18} bytes
d. 10^{20} bytes

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

2) By the year 2020, the global mobile traffic per subscription per month is predicted to be approximately — 0 points

a. 25.7 GB
b. 257 GB
c. 25.7 TB
d. 257 TB

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

3) Which of the following conditions have to be met in order to support emerging IoT sensor application using future generation mobile networks? — 1 point

a. Long battery life (~ 1 year)
b. High mobility (~ 1400 km/hr)
c. High connection density (~10^7/km^2)
d. All of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
c.

4) Which of the following use case scenarios can be developed as Machine-to-Machine (M2M) communication network? — 1 point

a. Driverless car.
b. Disaster response.
c. HD video streaming.
d. Home appliances

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
b.
d.

5) The monthly aggregate global mobile traffic by the year 2030 (including M2M traffic) has been estimated to be — 1 point

a. 125 EB
b. 1033 EB
c. 5016 EB
d. 22313 EB

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

6) Which among the following are the technology drivers for 5G new radio (NR)? — 1 point

a. Scalable OFDM Numerology
b. MU-MIMO
c. NOMA
d. Low latency slot structure

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
b.
c.
d.

7) $F^{-1}[x(f)]=$ — 1 point

a. $\tilde{x}(t)=\frac{f}{nt}$
b. $\frac{1}{2}[\tilde{x}(t)+\frac{f}{nt}]$
c. $\frac{f}{nt}$
d. $\frac{1}{2}\tilde{x}(t)$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

8) If $x(t)$ is a bandpass signal and $s_l(t)$ is its equivalent lowpass signal model and $s_l(t) = x(t)+jy(t)$, which of the following statements is/are true? — 1 point

$[\hat{x}(t) = \frac{f}{nt} * x(t)$, f$_c$ is the carrier frequency$]$

a. $s_l(t) = [x(t) + j\hat{x}(t)]e^{-j2\pi f_c t}$
b. $x(t) = x(t)\cos(2\pi f_c t) - y(t)\sin(2\pi f_c t)$
c. $\hat{x}(t) = x(t)\sin(2\pi f_c t) + y(t)\cos(2\pi f_c t)$
d. $\hat{x}(t) = Im[s_l(t)e^{j2\pi f_c t}]$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
b.
c.
d.

9) Among the following options, identify the possible application areas of tactile internet. — 1 point

a. Gaming
b. Virtual reality
c. HD streaming
d. Healthcare

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
b.
d.

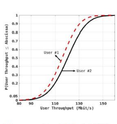
10) The minimum required downlink peak data rate to achieve IMT-2020 is — 1 point

a. 5 Gb/s
b. 10 Gb/s
c. 15 Gb/s
d. 20 Gb/s

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

11) The cumulative distribution function (CDF) plots of downlink user throughput for two users present in an eMBB environment are shown below: — 1 point



If u_1 and u_2 represent the downlink user experienced data rate (5 %-ile point of throughput CDF) for the user 1 and user 2 respectively, choose the correct statement along following options.

a. $u_1 > u_2$
b. $u_1 < u_2$
c. $u_1 = u_2$
d. No such conclusive statement can be made.

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

12) The minimum 5-percentile user spectral efficiency in downlink required to support IMT-2020 for dense urban eMBB test environment is — 1 point

a. 0.12 bits/s/Hz
b. 0.225 bits/s/Hz
c. 0.3 bits/s/Hz
d. 0.045 bits/s/Hz

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

13) The target requirement of uplink user experienced data rate for dense-urban enhanced mobile broadband (eMBB) environment is — 1 point

a. 50 Mbits/s
b. 100 Mbits/s
c. 50 Gbits/s
d. 100 Gbits/s

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

14) For a narrowband signal of communication system — 1 point

a. Bandwidth >> Carrier frequency
b. Bandwidth << Carrier frequency
c. Bandwidth = Carrier frequency
d. None of this is true

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

15) Which of the following is/are the proposed usage scenarios of IMT-2020 and beyond? — 1 point

a. Enhanced mobile broadband
b. Massive machine type communication
c. Ultra reliable low latency communication (URLLC)
d. All of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.