***Quiz Questions on IEEE 802.22 WRAN (last)***

1) IEEE 802.22 uses CR technology using

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| a) | Unlicensed Spectrum | b) | Licensed Spectrum | c) | TVWS |

2) IEEE 802.22 standard uses the frequency band

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| a) | UHF/ VHF band | b) | Mm wave band | c) | EHF band |

3) IEEE 802.22 standard is ideally suited for applications

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| a) | Rural Broadband | b) | Cellular Broadband | c) | Long-distance communication |

4) The maximum range of operation of 802.22 standard is (cell radius)

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| a) | 17-33 km | b) | >50 km | c) | 50-100 km |

5) The TVWS in WRAN 802.22 has approximate bandwidth and total number of channels in use

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| a) | ~280 MHz & 47 TV channels | b) | ~150 MHz & 30 channels | c) | 500 MHz & 48 channels |

6) What are the unique features provided for CR based operation of WRAN system?

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| i) Spectrum sensing  ii) Spectrum management  iii) intra-system co-existence  iv) Geo-location  v) Security |

7) The network topology used in WRAN system

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| a) | Point-to-multipoint | b) | Multipoint-to-point | c) | Point-to-point |

8) What is the value of maximum EIRP + cell radius for WRAN

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| Maximum EIRP = 4Watts, Cell Radius = 10-100 km |

9) Nature of antennas used in WRAN system:

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| i) | Base Station | Sectorized or omnidirectional |
| ii) | Subscriber side Rx/ Tx Antenna | Directional Antenna |
| iii) | Sensing Antenna | Omnidirectional with horizontal polarisation (TV) + Vertical Polarization (wireless microphone) |

10) What kind of geo-location facility provided in WRAN?

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| a) GPS based geolocation  b) Terrestrial geolocation (Triangulation) |

11) **802.22 PHY features**:

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| a) | Which is the transport mechanism in PHY? |
|  | OFDM |
| b) | Which are the modulations supported in PHY layer? |
|  | QPSK, 16-QAM and 64-QAM |
| c) | What kind of FECs are used//recommended in PHY layer? |
|  | Conv.Codes (Mandatory), LDPC, shortened block Turbo codes are optional. |
| d) | How many pilots are used in PHY of WRAN? |
|  | There are 4 pilots, pilot symbols are inserted once every 7 sub-carriers. There are altogether 28 sub-carriers in each OFDM symbol. |

12) What are the desired parameters to be fulfilled by spectrum sensing system?

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| a) Detection probability > 0.9  b) False alarm probability < 0.1  c) receiver sensitivity:  1. - 116 dBm for digital TV  2. - 94 dBm for analog TV  3. - 107 dBm for wireless microphone  d) Channel detection time: 2 second |