

SSY145 Wireless Networks

Question Bank

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1 For Exam

1.1 Article #02a & #02b – “Whitesides’ Group: Writing a Paper” & “Analyzing the Past to Prepare for the Future: Writing a Literature Review”

1. Which of the following statement is(are) correct about sections of an academic paper according to George M. Whitesides?
 - (a) The abstract should be done at the beginning of writing a paper.
 - (b) The Conclusion section of an academic paper should be written as a list of short phrases or sentences.
 - (c) The results and discussion are usually combined.
 - (d) The main purpose of the Conclusion section is to shortly repeat what is in the Results section.
2. Which of the following statement is(are) correct about constructing an outline of a paper according to George M. Whitesides?
 - (a) An outline should contain significant amount of text to be readable.
 - (b) One should start to construct an outline after finishing a project.
 - (c) The outline should be organized around text.
 - (d) None of the above.
3. Which of the following statement is(are) correct about academic writing style?
 - (a) Complete all comparisons.
 - (b) Use the passive voice whenever possible to make long sentences.
 - (c) The word “this” must always be followed by a noun, so that its reference is explicit.
 - (d) Nouns can be used as adjectives, e.g. reaction product, ATP formation.
4. Which of the following statement is(are) false?
 - (a) The objectives of a paper when it is finished are often the same as those used to justify starting the work, that’s a reason why an outline is important.
 - (b) A paper should be organized in chronological order so that the reader can follow how you arrive at your result.
 - (c) A literature review is author-centric and should be a summary of the relevant articles.
 - (d) A review should identify critical knowledge gaps and thus motivate research to close these gaps.
5. Which of the following statement is(are) correct about the tense in an academic paper?
 - (a) When describing experimental results, use the present tense.

- (b) When attributing a statement or idea to a person, use the past tense.
 - (c) When discussing concepts, use the present tense.
 - (d) None of the above.
6. Which of the following statement is(are) correct about the outline of a paper?
- (a) Once the outline is finished after careful thinking, one should follow the outline and not do significant additional work.
 - (b) The outline should be organized in order of importance.
 - (c) The section headings should be as short as possible to be faster for readers to process.
 - (d) None of the above.
7. Which of the following elements should the Introduction of an article contain in general?
- (a) Background
 - (b) The justification for the objectives of the work.
 - (c) Summary of what the reader should expect as conclusions of the paper.
 - (d) Guidance to the reader.
8. Which of the following statement for the theoretical development of an article is(are) false?
- (a) In contrast to variance theories, process theories use events and states to help explain dynamic phenomena. Thus, in a review, the results of variance and process research are independent elements.
 - (b) Variance theories incorporate dependent variables that cause variation in independent variables.
 - (c) Models and propositions capture relationships between variables and represent theories.
 - (d) Extending current theories is a difficult task and is often the weakest part of a review, so it is the least important part of a review.

1.2 C1 – “Academic Technical Writing”

1. Which of the following is/are acceptable approach(es) to Referencing?
- (a) Quote a paragraph by placing it in quotation marks and acknowledge the source.
 - (b) Take some short fixed phrases from several different sources and put them together with some of your own words.
 - (c) Copy a paragraph making only small changes. For example, replace some words with words with similar meanings.
 - (d) Paraphrase a paragraph: rewrite the paragraph but change the language, organisation and detail, and give your own examples.

2. Which of the following is/are the correct way(s) of using acronyms?
 - (a) Include a table in the Results section.
 - (b) Attach an appendix or index to the report.
 - (c) Define them when their expansions first appear and use them after they have been displayed in full.
 - (d) Use only very well known acronyms to avoid defining them.
3. Which of the following statements about graphics is/are true?
 - (a) Figures and tables must be labeled.
 - (b) A table is needed after every figure in order to explain it.
 - (c) Tables do not need to be labeled.
 - (d) Figures and tables must be referred to in the text.
4. Which of the following is/are correct way(s) of using “THAT”?
 - (a) when you are adding helpful additional material, and use commas
 - (b) when you are including essential material, and do not use commas
 - (c) when you are including essential material, and use commas
 - (d) when you are adding helpful additional material, and do not use commas
5. Which of the following is/are correct about adverbial?
 - (a) Divide a dependent clause from an independent one.
 - (b) Adverbials are dependent phrases or words that describe how, when, or where some action is done.
 - (c) An adverbial generally won't change the subject-verb order in English.
 - (d) All of the choices.
6. Which of the following statements about the use of references is(are) false?
 - (a) Provide expert information/knowledge.
 - (b) Keep you (and your readers) up to date on the latest developments in the field.
 - (c) Give your readers high-quality information and thereby increase their trust in you.
 - (d) None of the choices.
7. Which of the following statements is(are) correct about the IEEE reference list structure?
 - (a) The references are arranged chronologically according to their publication date.
 - (b) The references are arranged in the order of appearance of the text citations.
 - (c) The references are arranged alphabetically with respect to the author's name.
 - (d) None of the choices.

8. Which of the following is/are incorrect about text structure and grammar?
- (a) “Heavy” adverbials are often placed at the beginnings of sentences.
 - (b) “That” is used when a sentence adds helpful additional material.
 - (c) In academic writing, objective writing is recommended than first-person or second person pronouns.
 - (d) In order to use formal expressions, it is required to avoid using contractions.
9. What information is compulsory to be given when commenting data?
- (a) Compare/assess data relative ‘X’.
 - (b) Highlight(s)
 - (c) Location and summary
 - (d) Unexpected results / reliability / validity
10. Which of the following is/are true about academic writing?
- (a) Writer should use more 1st -person pronouns in order to make their statement straightforward.
 - (b) Writer should indent the first line of each paragraph and leaves an empty line between each paragraph.
 - (c) Contraction such as “you’re” should be avoided in formal writing.
 - (d) Every periods within the text could be replaced by semicolons.
11. Which of the following statement is(are) correct about figures and tables in a paper?
- (a) Figures and tables do not have to be labeled if they are referred to in text.
 - (b) Figures and tables do not have to be referred to in text if they are labeled.
 - (c) Figures and tables must be labeled and referred to in text.
 - (d) A paper should only contain text and not figures or tables.
12. Which of the following use of “That” and “Which” is correct?
- (a) “That” should be used when you are adding helpful addition materials, and do not use commas.
 - (b) “That” should be used when you are including essential material, and do not use commas.
 - (c) “Which” should be used when you are adding helpful addition materials, and do not use commas.
 - (d) “Which” should be used when you are adding helpful addition materials, and use commas.
13. According to Kathryn Strong Hansen, if someone asked the questions “Who founded Microsoft?” and “What is the company’s name?”, which of the following sentences is/are correct answers to these two questions?

- (a) The company, which is called Microsoft, is founded by Bill Gates.
- (b) The company that is called Microsoft is founded by Bill Gates.
- (c) The company, which is founded by Bill Gates, is called Microsoft.
- (d) The company that is founded by Bill Gates is called Microsoft.

14. What was said in the lecture Academic Technical Writing?

- (a) Semicolon can be used in some cases but it is optional.
- (b) As long as you mention the original writer's name, you can use this information as a source.
- (c) "That" and "which" are used in the same way.
- (d) The IMRaD structure should be used whenever writing a report.

15. According to Kathryn Strong Hansen, style and language are very important for academic writing. Considering formality, conciseness and objectivity, which of the following sentences is the best?

- (a) It was noted that, after having been tested, the medicine was ineffective.
- (b) We noted that, after testing, the medicine was ineffective.
- (c) Tests showed that our medicine was really ineffective.
- (d) Tests showed that the medicine was ineffective.

16. Which of the following statements is/are correct about reference?

- (a) In the reference end list, references should be organized by the order in which they appear in the text.
- (b) One of the reason for using references is providing expert information/knowledge.
- (c) References can give your readers high-quality information and thereby increase their trust in you.
- (d) Referencing has two parts: in the text and in the reference list.

17. Which of the following is/are correct in the academic technical writing?

- (a) Writing papers from the Introduction section is the most efficient way.
- (b) In an outline, the Conclusion section is just the summary of the paper.
- (c) Tables and equations can be used to compress the information and make the paper shorter and more readable.
- (d) A review succeeds when it helps other scholars to make sense of the accumulated knowledge on a topic.

1.3 Article #04 – “Evolution of LTE toward IMT-Advanced”

1. Which of the following statement(s) is(are) false about LTE-advanced?
 - (a) Carrier aggregation capable terminal receives only the primary component carrier, this increases the terminal's power consumption. **correct**
 - (b) Transmission bandwidth can extended by means of carrier aggregation. **correct**
 - (c) Discrete fourier transform spread OFDM is used in the uplink. **correct**
 - (d) In cross-carrier scheduling, the scheduling decision is transmitted to the terminal on the same component carrier of corresponding data.
2. Which of the following statement(s) is(are) correct about LTE-advanced?
 - (a) In inband relaying the donor-relay link operate on a different frequency.
 - (b) In outband relaying the donor-relay link operate on the same frequency.
 - (c) Network densification is one possible method to increase overall network capacity.
 - (d) For better network performance, separate carrier should be used for closed subscriber group(CSG) cells.
3. Suppose you have a mobile device supporting LTE Release 10 and you are in a city with LTE Release 8 base stations. Which of the following scenarios are possible?
 - (a) Mobile device will fail to connect to the base station.
 - (b) Mobile device will connect to base station and operate normally.
 - (c) Mobile device will connect to base station only if it is an Apple device.
 - (d) The base station will update itself to LTE Release 10 since the mobile device is LTE Release 10.
4. Which of the following statement(s) is(are) true regarding heterogeneous deployments ?
 - (a) Support for heterogeneous deployments includes carrier aggregation.
 - (b) Heterogeneous deployment is possible with LTE Release 8.
 - (c) In heterogeneous deployment the best cell for downlink is the one with lowest path loss.
 - (d) Cell association strategy can lead to different uplink and downlink coverage area.
5. Which of the following statement(s) is(are) true regarding LTE Release 10 enhancements?
 - (a) Carrier aggregation provides increased data rates by coalescing noncontiguous bandwidths. **data rate = symbol rate x bits per symbol, symbol rate = 2xBW, bits per symbol = based on constillation qbsk = 2 bit**
 - (b) Heterogeneous deployment provides increased data rates by allowing hierarchical cell structure.
 - (c) In Heterogeneous deployment the pico cells are always wirelessly connected to macro cell basestation.

- (d) Relaying increases coverage while Heterogeneous deployment increases data rate.
6. How does LTE Release 10 achieve backward compatibility with LTE Release 8 for carrier aggregation?
- (a) Carrier aggregation in LTE Release 10 is not compatible with LTE Release 8.
 - (b) Each component carrier has LTE Release 8 structure, and hence, carrier aggregation is backward compatible.
 - (c) Carrier aggregation is already available in LTE Release 8. So there are no compatibility issues.
 - (d) A special software update is needed for LTE Release 8 terminals to support carrier aggregation capable LTE Release 10 devices.
7. Which of the following is an LTE Release 10 enhancement?
- (a) Possibility to have control signals for different cell layers separated in frequency or time.
 - (b) Support for 4-layer spatially multiplexed downlink transmission using multiple antennas. **wrong**
 - (c) Capability to have an aggregated transmission bandwidth of 200 MHz. **wrong**
 - (d) None of these choices.

1.4 C2 – “Basic Principles of Wireless Networks”

1. In order to greatly reduce the effect of delay spread, which of the following is/are being used at the receiver side?
- (a) Power adaptation
 - (b) Spread spectrum
 - (c) Equalization at the receiver
 - (d) Multicarrier modulation
2. Which of the following is/are false about diversity?
- (a) Independent signal paths have a high probability of experiencing deep fades simultaneously.
 - (b) The output SNR with Selection Combining improves linearly with the number of diversity branches.
 - (c) Independent fading paths can be achieved by separating the signal in time, frequency, space, and polarization, etc.
 - (d) To realize diversity, the same information should be sent over dependently fading radio.
3. Which property/properties can be used to modulate information on a signal?

- (a) Amplitude
- (b) Phase
- (c) Frequency
- (d) Amplitude and phase together

4. Which of the following is/are the issue(s) of multicarrier modulation (OFDM not included)?

- (a) It requires reliable feedback channel and accurate channel estimation.
- (b) Large bandwidth penalty.
- (c) Expensive.
- (d) Total data rate is changed for N subcarriers with rate R/N .

5. Which of the following statements is/are true about the Cyclic Prefix of an OFDM symbol?

- (a) The length of the cyclic prefix should not be longer than the delay spread of the channel.
- (b) A longer cyclic prefix length introduces losses in data rate.
- (c) The cyclic prefix is a fixed set of symbols known by both the transmitter and receiver.
- (d) The cyclic prefix tricks the receiver that the signal is periodic, thus providing a circular convolution.

6. Which of the following is/are false for modeling path loss?

- (a) Maxwell's equations are complex and impractical.
- (b) Free space path loss model is close to reality.
- (c) Ray tracing models require site-specific information.
- (d) Simplified power falloff models are good for high-level analysis.

7. A channel introduces a lot of amplitude noise but almost no phase noise. Which of the following constellations is(are) suitable for this channel?

- (a) QPSK
- (b) 32-QAM
- (c) 16-PSK
- (d) 8-QAM

8. Which of the following is/are true about flat fading countermeasures?

- (a) Independent signal paths are likely to experience deep fades simultaneously, therefore the diversity combining techniques are ineffective. wrong
- (b) Channel coding techniques make a trade-off between improving bit error rate and maintaining data rate.

- (c) The basic principle of interleaving in channel coding is to spread the burst errors over many codewords.
- (d) Automatic Repeat Request (ARQ) is a power efficient technique. **wrong**

9. Which of the following characteristics can be issues of multicarrier modulation (OFDM not included)?

- (a) Large bandwidth penalty.
- (b) Very high quality (expensive) low pass filters.
- (c) More ISI when a large number of narrowband carriers are sent.
- (d) None of the above.

10. Which of the following is/are true about the diversity combining technique Selection Combining?

- (a) All branches are coherently combined with equal weights.
- (b) All branches are coherently combined with weights which depend on the branch SNR.
- (c) Picks the branch with the highest SNR.
- (d) None of the above.

11. which one of the following factors does not affect small scale fading?

- (a) Transmission bandwidth of the signal
- (b) Multipath propagation
- (c) Power density of the base station
- (d) Speed of mobile

12. Which of the following belong(s) to large scale fading?

- (a) Path loss
- (b) Shadowing
- (c) Multipath fading
- (d) All of the above.

13. What is true regarding Orthogonal Frequency-Division Multiplexing (OFDM) and Multicarrier Modulation? **shit question**

- (a) The delay spread must be larger than the guard band to avoid ISI between symbols.
- (b) OFDM divides a wideband signal into multiple smaller narrowband subcarriers to avoid frequency-selective fading.
- (c) One downside with OFDM is that it is not very spectrum efficient.
- (d) The cyclic prefix is used to eliminate the Inter Symbol Interference (ISI).

14. Which of the following statement is/are correct about adaptive techniques?

- (a) Implementing adaptive modulation will increase transmitter and receiver complexity.
- (b) Adaptive modulation can be utilized without good feedback channel. wrong, need feedback
- (c) Adaptive modulation has potential for large increase in spectral efficiency, this improvement comes at the expense of increased signal bandwidth or a lower data rate.
- (d) There are three types of Automatic Repeat Request, including Stop-and-Wait, Go-Back-N, and Selective-Repeat.

15. Which of the following is/are correct in Lecture 3?

- (a) There is Doppler effects in fast fading, and it is a time variant system.
- (b) The key point for MIMO to improve the performance is separating the signal in frequency dimension.
- (c) Channel coding is a linear approach to reduce error probability.
- (d) In OFDM, the delay spread should not be greater than guard band duration, otherwise, there will be ISI.

1.5 Review questions of Lecture #03 – “Basic Principles of Wireless Networks”

Part I:

1. Explain the difference between path loss and shadowing? What is the impact of shadowing on cell design?
2. What is flat fading and how is it different from AWGN? Why is Rayleigh good statistical model for flat fading?
3. How exactly does multi-path fading lead to frequency-selectivity and ISI in a broadband channel?
4. How exactly does mobility lead to time-selectivity in the channel?
5. What are the basic link performance measures? Explain each.

Part II:

1. Interleaving is one way to create diversity in fading channels. Explain briefly how interleaving helps to create diversity.
2. There are several sources of interference in wireless networks: inter-symbol interference (AWGN channels due to poor pulse-shaping; multi-path frequency-selective channels), inter-cell interference, intra-cell interference (CDMA), and inter-carrier interference (in OFDM). Briefly explain why each of these interference phenomena arise. How do techniques like pulse-shaping, spread spectrum/Rake, equalizers and OFDM deal with the ISI problem?

3. The cyclic prefix in multicarrier modulation serves as a time gap (a guard interval) between consecutive data blocks. Why is cyclic prefix used instead of a simpler guard interval?
4. Name two channel-related irreducible probability of error phenomena, and briefly describe the nature of each one. What is their relationship with the coherence bandwidth and Doppler spread of the channel?

