



FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY
DEPARTMENT OF INFORMATION AND MEDIA TECHNOLOGY

FIRST SEMESTER 2019/2020 EXAMINATION

COURSE CODE: IMT411
COURSE TITLE: Green IT
CREDIT UNITS: 3
TIME ALLOWED: 2Hours
COURSE LECTURER(S): Mr. H. A. Zubairu
NUMBER OF QUESTIONS: 6
NUMBER OF PAGES: 2(INCLUDING THIS PAGE)

INSTRUCTIONS

- Answer any four (4) questions
- Do **not** use red pen
- Please use a clear handwriting
- This exam is closed book, closed notes, closed laptop and closed cell phone
- Please use non-programmable calculators only

1(a) The Organization for Economic Co-operation and Development (OECD) proposed a green IT framework consisting of three analytical levels. List them. (2 marks)
(b) Explain any three practical measures you can adopt to reduce PC energy consumption (3 marks)
(c) The need to go green is also focusing on greening data storage. Explain the following concepts as it relates to data storage and environmental sustainability (10 marks)

- i. Thin provisioning (TP)
- ii. Data de-duplication
- iii. Tiering
- iv. Dematerialization
- v. Green washing

2(a) State any four reasons why the world need to Go Green? (2 marks)
(b) With the aid of clear and descriptive diagram, explain the 3R's of green IT (5 marks)
(c) According to US Environmental Protection Agency, what are the general recommendations for designing suitable packaging to minimize carbon footprint and enhance environmental sustainability? (6 marks)
(d) List any four EPEAT (Electronic Product Environmental Assessment Tool) guideline to assess the greenness of IT devices with respect to its manufacturing (2 marks)

3(a) what are some programming methods used to achieve computational efficiency? (8 marks)
(b) The P- State is given as $P = CV^2f$. State the meaning and the unit of each parameter (4 marks)
(c) As a software developer, given the current reality of power consumption, what tools would be the most useful in developing energy-efficient software for effective performance and reduction of carbon footprint? (3 marks)

4(a) What does an Idle software connotes? Give two example (3 marks)
(b) Explain how each of the following software attributes bring about environmental, social, as well as economic benefits.

- i. Modifiability and Reusability (3 marks)
- ii. Performance and Dependability (3 marks)
- iii. Usability and Accessibility (3 marks)
- iv. Sustainable software (3 marks)

5(a) Highlight the reason(s) that is fuelling the growth for data center capacity? (4 marks)
(b) Why do you think there is an increasing demand for green data storage? (2 marks)
(c) List the different power states of a hard disk and state their relationships (3 marks)
(d) Describe common energy management techniques for hard disks geared toward carbon footprint reduction (6 marks)

6(a) Common techniques for managing energy consumption at the system level include the following: i. RAID with power awareness ii. Power-aware data layout iii. HSM iv. Storage virtualization v. Cloud storage. Briefly describe and compare them (15 Marks)

Good Luck!!!!