NATIONAL OPEN UNIVERSITY OF NIGERIA,

PLOT 91, CADASTRAL ZONE, UNIVERSITY VILLAGE, JABI – ABUJA

FACULTY OF SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

2021_2 EXAMINATION

COURSE CODE: CIT891
COURSE CREDIT: 3
COURSE TITLE: ADVANCED MULTIMEDIA TECHNOLOGIES
TIME ALLOWED: $2^1/_2$ HOURS
INSTRUCTION: ANSWER QUESTION ONE (1) AND ANY OTHER FOUR (4) QUESTIONS

1. **Question One**
   a. i. Briefly describe the concept of Multimedia Workstation **1Mark**
      ii. Give at least two (2) examples of the Multimedia Workstation. **1 Mark**
   b. Write a short note on Video Subsystem. **6 Marks**
   c. Sketch a block diagram representing the Predictive Coding Scheme. **4 Marks**
   d. Audio data is typically presented in one of three forms. List these forms and define what each means. **6 Marks**
   e. If $x(n)=x_R(n)+jx_I(n)$ is a complex sequence whose Fourier transform is given as $X(\omega)=X_R(\omega)+jX_I(\omega)$, determine the value of $X_R(\omega)$ in terms of sine and cosine functions **4 Marks (Total = 22 marks)**
2. **Question Two**
   a. Mention briefly elucidate on each the three (3) common home TV distribution standards in Multimedia Technologies. **6 Marks**
   b. Using a detailed graph sketch, illustrate what happens when an original signal assumed to be a 6kHz sinewave is sampled at a rate of 8 kilo samples per second. **6 Marks**
3. **Question Three**
   a. Explain with detailed illustration, the additive colour mixing. **7 Marks**
   b. Briefly state and elucidate on any two (2) properties of a colour source. **5 Marks**
4. **Question Four**
   a. State the Nyquist Theorem. **2 Marks**
   b. Using a simplified block diagram discuss the design principle of a signal Decoder. **10 Marks**
5. **Question Five**
   a. Give a comprehensive analysis of Transform Coding **6 Marks**
   b. Write short notes on the following: **6 Marks**
      i. Image enhancement:
      ii. Image restoration
      iii. Image segmentation
6. **Question Six**
   a. Given image f(x, y) and a spatial filter h(x, y) for which convolution with the image results in some form of degradation, derive an expression that denotes general image degradation. (**8 Marks**
   b. Using a detailed block diagram, illustrate Schematic diagram of an MPEG decoder. (**4 Marks)**