

25. Which of the following is not RFID type? 1 1 5 9
- (A) Ultra-low frequency (B) Low frequency
(C) Ultra high frequency (D) High frequency

PART – B (5 × 10 = 50 Marks)

Answer ALL Questions

- | | Marks | BL | CO | PO |
|---|-------|----|----|----|
| 26. a. Describe the architecture of ATmega 328P with neat diagram. | 10 | 3 | 1 | 3 |
| (OR) | | | | |
| b. Elaborate the types of interrupts and its features in detail of the ATmega 328P Arduino. | 10 | 3 | 1 | 3 |
| 27. a. Describe the five steps involved in programming in detail with suitable example. | 10 | 3 | 2 | 2 |
| (OR) | | | | |
| b. Write short notes on | (2.5) | 1 | 2 | 3 |
| (i) Structures | (2.5) | 1 | | |
| (ii) Unions | (2.5) | 2 | | |
| (iii) Data storage | (2.5) | | | |
| (iv) Libraries | (2.5) | | | |
| 28. a. Explain the working principle of the interfacing device RS232 with appropriate circuit and sample code. | 10 | 3 | 3 | 3 |
| (OR) | | | | |
| b. Write a sketch for the communication process between the master Arduino board and slave Arduino device in I ² C protocol. | 10 | 4 | 3 | 5 |
| 29. a. Sketch a code for Arduino uno to blink the ON-BOARD LED with 60% duty cycle and total time period of 1000 ms. | 10 | 3 | 4 | 2 |
| (OR) | | | | |
| b.i In Arduino uno board, can the digital pin 13 be used as either input or output? Justify. | 4 | 3 | 4 | 2 |
| ii. Explain the timer modes of operation of Arduino. | 6 | 4 | 4 | 1 |
| 30. a. Write a code to transmit data between two Arduino boards using simple, low-cost, wireless modules and explain the circuit arrangement. | 10 | 4 | 5 | 11 |
| (OR) | | | | |
| b. Write a code to interface a DC motor using H-bridge and controlled by a slide switch. | 10 | 4 | 5 | 4 |

Reg. No.

B.Tech. DEGREE EXAMINATION, MAY 2022

Fifth and Sixth Semester

18ECO108J – EMBEDDED SYSTEM DESIGN USING ARDUINO

(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:

- (i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
- (ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours

Max. Marks: 75

PART – A (25 × 1 = 25 Marks)

Answer ALL Questions

- | | Marks | BL | CO | PO |
|---|-------|----|----|----|
| 1. How many 16 bit general purpose registers are there in ATMEGA 328P? | 1 | 1 | 1 | 3 |
| (A) 2 (B) 1
(C) 3 (D) 4 | | | | |
| 2. Which of the following equation can generate maximum delay? | 1 | 2 | 1 | 3 |
| (A) $\frac{f}{2}$ (B) $\frac{f}{32}$
(C) $\frac{f}{4}$ (D) $\frac{f}{8}$ | | | | |
| 3. ATMEGA 328P has _____ levels of pipelining. | 1 | 2 | 1 | 3 |
| (A) 2 (B) 1
(C) 3 (D) 4 | | | | |
| 4. After every arithmetic operation _____ is updated. | 1 | 1 | 1 | 3 |
| (A) Status register (B) Instruction register
(C) ALU (D) STACK | | | | |
| 5. A program written with the IDE for Arduino is called | 1 | 1 | 1 | 3 |
| (A) IDE source (B) Cryptography
(C) Source code (D) Sketch | | | | |
| 6. (i) if (ptr1 < ptr){
.....
}
(ii) if (ptr > 10){
.....} | 1 | 2 | 2 | 3 |
| (A) (i) and (ii) are acceptable (B) (i) is acceptable, (ii) not acceptable
(C) (i) and (ii) are not acceptable (D) (i) is not acceptable, (ii) is acceptable | | | | |

7. The statement: `ptr=buffer;` simply initializes PTR to point to buffer and copies the _____ of buffer into the _____ of PTR. 1 2 2 2
 (A) L VALUE, R VALUE (B) R VALUE, L VALUE
 (C) L VALUE, L VALUE (D) R VALUE, R VALUE
8. The general syntax for a structure is 1 1 2 2
 (A) `Struct structtag {` (B) `Structure tag struct {`
 `Structure member list;` `Structure member list};`
 `}`
 (C) `Structure member list {` (D) `Structure memberlist structreu`
 `Struct structure tag;};` `tag {`
 `Struct;};`
9. A union acts like _____ that is capable of holding a _____ type of data. 1 1 2 3
 (A) Large buffer, pre-defined (B) Register, pre-defined
 (C) Small buffer, pre-defined (D) Small buffer, int
10. $j = 5 + k * 2$, where $k = 4$ and the ASTERISK(*) is the multiplication factor. The value of "j" is 1 2 2 3
 (A) 13 (B) 18
 (C) 26 (D) 36
11. This function sets the serial communications speed 1 1 3 3
 (A) `Serial.Read` (B) `Serial.Begin (speed)`
 (C) `Serial. Write` (D) `Serial.Print (VAL, FORMAT)`
12. The _____ is used to measure the performance of the analog communication system. 1 2 3 3
 (A) SNR(signal to noise ratio) (B) Output power
 (C) Output voltage (D) Output current
13. Find the correct step order of SPI 1 2 3 5
 1. master outputs the clock signal
 2. master switches the ss/cs pin to low voltage state, which activates the slave
 3. master send data, one bit at a time. ALON MOSI line. Slave reads as received
 4. If a response is needed, slave returns one bit at a time to master along MISO line. The master reads the bits as received
 (A) 3,1,4,2 (B) 2,1,3,4
 (C) 1,2,3,4 (D) 4,3,2,1
14. I^2C protocol, if the slave device has successfully received the previous sequence it will _____ the SDA line, down to the condition called _____. 1 1 3 5
 (A) Not pull, acknowledge (B) Pull, not acknowledge
 (C) Not pull, not acknowledge (D) Pull, acknowledge

15. What statement is used to send out an analog data in IO PIN using Arduino IDE? 1 1 3 3
 (A) Analog read (PIN) (B) Analog write (PIN)
 (C) Analog reference (TYPE) (D) Analog write (PIN, VALUE)
16. To read a signal on an external pin, we will need to write a _____ to the data direction bit _____ 1 2 4 1
 (A) Logic high, DDXN (B) Logic low, DDXN
 (C) Logic low, PORTXN (D) Logic high, PORTX
17. The function "delay (1000)" pauses the program _____ and returns _____ 1 2 4 1
 (A) 1000 milliseconds, nothing (B) 1000 seconds, nothing
 (C) 1000 milliseconds, low (D) 1000 milliseconds, high
18. If the logic levels of clock prescale bits are 101, then divide factor is _____ 1 1 4 1
 (A) 256 (B) 64
 (C) 32 (D) 128
19. The standard frequency of PWM signal used in Arduino board is approximately _____ 1 1 4 2
 (A) 490 KHz (B) 490 Hz
 (C) 940 KHz (D) 940 Hz
20. The syntax of `PINMODE()` function is 1 2 4 2
 (A) `PINMODE (PIN)` (B) `PIN MODE (MODE)`
 (C) `PINMODE (MODE, PIN)` (D) `PINMODE (PIN, MODE)`
21. How many bits does access code have in Bluetooth frame format? 1 2 5 4
 (A) 64 bits (B) 72 bits
 (C) 128 bits (D) 1024 bits
22. The NEO-6M GPS can track upto _____ satellites on _____ channels to achieve the highest level of sensitivity in real time. 1 1 5 11
 (A) 22, 40 (B) 50, 20
 (C) 22, 50 (D) 18, 50
23. _____ data tell the GPS receiver about, where each GPS satellite should be at anytime throughout the day and shows the orbital informations. 1 2 5 11
 (A) Pseudorandom code (B) Ephemeris
 (C) Almanac (D) Random
24. Infrared light is _____ radiation with wavelengths _____ than those of visible light. 1 1 5 9
 (A) Magnetic, longer (B) Electromagnetic, longer
 (C) Electromagnetic, shorter (D) Magnetic, shorter