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B.Tech. DEGREE EXAMINATION, NOVEMBER 2022
Sixth and Seventh 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. Arduino IDE consists of 2 functions what are they? (A) Build ( ) and loop ( ) (B) Loop ( ), build ( ) and setup ( ) (C) Setup ( ) and build ( ) (D) Setup ( ) and loop ( )	1	1	1	1
2. How many digital pins are there on the UNO board? (A) 14 (B) 12 (C) 16 (D) 20	1	1	1	1
3. ATmega 328P CPU consist of how many general purpose registers (A) 50 (B) 32 (C) 40 (D) 22	1	1	1	1
4. To break the normal sequence of program and execute another program is called (A) Execution unit (B) Control unit (C) ISR (D) Counting unit	1	1	1	1
5. Which of the following memories has more speed in accessing data? (A) SRAM (B) DRAM (C) EEPROM (D) PROM	1	1	1	1
6. Which loop is guaranteed to execute at least one time? (A) Do while (B) For (C) While (D) Switch	1	1	2	1
7. The size of a union is determined by the size of the (A) First member in the union (B) Last member in the union (C) Sum of the sizes of all members (D) Biggest member in the union	1	1	2	1
8. Delay (10000) results in a delay of (A) 100000 seconds (B) 100 seconds (C) 1 seconds (D) 10 seconds	1	1	2	1

9. Which is correct with respect to the size of data types?
   (A) char>int>float (B) float>int>char
   (C) int>char>float (D) float>char>int

10. For $(POS = 0; POS <= 180; POS+ = 1)$ means
   (A) Goes from 0 degrees to 180 in steps of 150 (B) Goes from 0 to 180 in steps of 1
   (C) Goes from 180 to 0 in steps of 1 (D) Goes from 0 to 180 in steps of 3

11. Which company developed I^2C?
   (A) Phillips (B) Intel
   (C) Motorola (D) IBM

12. In I2C typical voltages used are
   (A) 5 V and 90 V (B) 3.3 V and 29 V
   (C) 5 V and 3.3 V (D) 2.5 V and 40 V

13. In I2C if 1024 devices are connected then addressing bit use is
   (A) 10 bit (B) 7 bit
   (C) 5 bit (D) 6 bit

14. SPI device communicates in _____
   (A) Simplex (B) Half duplex
   (C) Full duplex (D) Unidirection

15. An analog signal carries 4 bits in each signal unit. If 1000 signal units are sent per second, then baud rate and bit rate of the signal will be respectively.
   (A) 4000 bands/sec and 1000 bps (B) 2000 bands/sec and 1000 bps
   (C) 1000 bands/sec and 500 bps (D) 1000 bands/sec and 400 bps

16. On RESET, what are the contents of the SREG register?
   (A) ooh (B) ffh
   (C) 1fh (D) 11h

17. Which of the following helps in the generation of waveforms?
   (A) Memory (B) Timer
   (C) Output (D) Input

18. Timer 1 can be load with maximum of
   (A) FFFFH (B) FFH
   (C) FH (D) H

19. Choose the external interrupt in ATmega328p from the following
   (A) EE_READY (B) INTI
   (C) ANA_COMP (D) Timer_OVF

20. In TCCRO prescaler value 001 indicates
   (A) Stop, timer 0 is stopped (B) System clock
   (C) System clock/8 (D) System clock/64

21. Zigbee IEEE standard is — 1 1 4 1
(A) 802.15.4 (B) 802.15.3
(C) 802.15.2 (D) 802.15.1

22. Select GPS module form the list — 1 1 5 1
(A) NEO-6M (B) NE-6A
(C) EO-6W (D) ON-6K

23. Bluetooth is the wireless technology for _____ — 1 1 5 1
(A) Local area network (B) Metropolitan area network
(C) Personal area network (D) Wide area network

24. RFID operating supply voltage is — 1 1 5 1
(A) 20 volt (B) 3.3 volt
(C) 8.7 volt (D) 1 volt

25. In a project the presence of living creature can be detected by — 1 1 5 1
(A) PIR sensor (B) Rain sensor
(C) Red led (D) Yellow light sensor

PART – B (5 × 10 = 50 Marks) — Marks BL CO PO
Answer **ALL** Questions

26. a. Draw and explain PIN diagram of ATmega 328P microcontroller. — 10 3 1 1

(OR)

b. Write short notes on
(i) Serial port — 5
(ii) I/O port — 5 — 4 1 1

27. a. Differentiate various loops used in C with examples. — 10 4 2 1

(OR)

b. Explain various Arduino C data types. — 10 4 2 1

28. a. Explain I^2C with diagram. — 10 4 3 1

(OR)

b. Explain PWM with different modes. — 10 4 3 1

29. a. Explain external interrupt in detail. — 10 4 4 1

(OR)

b. Describe all TIMER modes in TIMER0. — 10 3 4 1

30. a. Draw and explain the interfacing diagram to connect Bluetooth with Arduino and write a C program. — 10 3 2,5,6 1,4,3

(OR)

b. Draw and explain the interfacing diagram to connect GPS module with Arduino and write embedded C program. — 10 3 2,5,6 1,4,3

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