

1. For an AC circuit, match the quantities (in column 1) and units (in column 2) below:

| Column 1           | Column 2 |
|--------------------|----------|
| (a) Real power     | (i) VAR  |
| (b) Reactive power | (ii) VA  |
| (c) Apparent power | (iii) W  |

2. The colour coding of earth, live and neutral wires respectively is  
(A) Green, red, black  
(B) Red, green, black  
(C) Red, black, green  
(D) None of above
3. The third pin of a 3-pin plug is provided so as to \_\_\_\_\_  
(A) provide an earth connection  
(B) provide a 3-phase supply, when required  
(C) provide a spare phase when required  
(D) prevent the plug from being reversed in the socket
4. A resistor is colour-coded with four bands, the first one being brown, second black, third red, and fourth gold. If the resistor is connected across a 10 V DC source, then the current flowing through the resistor is  
(A) 1 mA  
(B) 10 mA  
(C) 100 mA  
(D) None of the above
5. For using a transistor as an amplifier, in which region should it be operated  
(A) Cutoff region  
(B) Saturation region  
(C) Active region  
(D) Any of the above
6. Which type of conversion takes place when music is played from a computer  
(A) ADC  
(B) AAC  
(C) DAC  
(D) DDC
7. What is the duty cycle of a signal if the pulse width is 8 ms and frequency is 50 Hz:  
(A) 20%  
(B) 30%  
(C) 40%  
(D) 60%

8. The number of pulses required for one complete rotation of the shaft of the stepper motor is equal to the
- (A) number of internal teeth on its rotor
  - (B) number of internal teeth on its stator
  - (C) number of internal teeth on its rotor and stator
  - (D) number of external teeth on its stator

9. What will be the output of the following Arduino code:

```
#define X 10;
void setup() {
    X=0;
    Serial.begin(9600);
    Serial.print(X);
}
void loop() {
    //Do nothing...
}
```

- (A) 0xAB
- (B) 0
- (C) Error
- (D) None of the above

10. What will be the output of the following Arduino code:

```
void main() {
    int a = 0;
    double d = 10.21;
    printf("%lu", sizeof(a + d)); }
void loop() {}
```

- (A) 10.21
- (B) 4
- (C) 8
- (D) None of the above

11. What type of signal does the AnalogWrite() function on an Arduino output:

- (A) Pulse code modulated signal
- (B) Frequency modulated signal
- (C) Pulse width modulated signal
- (D) Pulse amplitude modulated signal

12. The SD.h library in Arduino is used to communicate with \_\_\_\_\_.

13. A stencil operation, which depends on the transfer of resist to the copper clad laminate surface using a stencil image of the circuit design, is called:

- (A) Screen printing

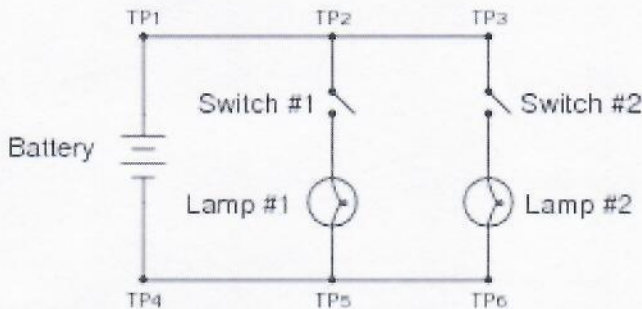
- (B) Photo printing
- (C) Ultra-violet printing
- (D) Photo pattern printing

14. If the trace width on a PCB is 10 mil, what is it in mm? \_\_\_\_\_ mm

15. Which of the statements given below is/are true:

- (A) Between two points that are electrically common to each other, there is guaranteed to be zero voltage.
- (B) If zero voltage is measured between two points, those points must be electrically common to each other.
- (C) Between two points that are not electrically common to each other, there is guaranteed to be voltage.
- (D) If voltage is measured between two points, those points must not be electrically common to each other.

16. The circuit shown below has a problem. Switch #1 is able to control Lamp #1, but Lamp #2 never comes on no matter what is done with Switch #2.



Which of the following is/are possible fault(s) in this circuit?

- (A) Battery is dead
- (B) Switch #2 failed open
- (C) Switch #2 failed shorted
- (D) Open wire between test points 5 and 6 (between TP5 and TP6)

17. An open collector output requires:

- (A) an output resistor
- (B) a pull-down resistor
- (C) a pull-up resistor
- (D) no resistor

18. The derivative control action is typically used when controlling \_\_\_\_\_, but rarely used when controlling \_\_\_\_\_.

- (A) Temperature, Flow
- (B) Flow, Level
- (C) Level, Temperature
- (D) Level, Flow

19. Which of the following flowmeter type(s) cannot measure bidirectional flow:

- (A) Ultrasonic flowmeter
- (B) Electromagnetic flowmeter
- (C) Turbine flowmeter
- (D) Coriolis mass flowmeter

20. When the reading of a pH meter changes from 5 to 7, the hydrogen ion concentration of the solution is:

- (A) Doubled
- (B) Decreased 100 times
- (C) Halved
- (D) Increased 100 times