

Birla Industrial and Technological Museum
(a unit of National Council of Science Museums)
Aptitude test for the recruitment of Technician A (Electronics)

Time: 60 minutes
Full Marks: 30

Name of the Candidate:

Roll Number:

Date:

Signature of the Candidate	Signature of the Invigilator
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A. Tick the right answer -

20X1 = 20

1. A Zener diode is used as
 - a) an amplifier
 - b) a voltage regulator
 - c) a rectifier
 - d) a multivibrator.

2. The common collector amplifier is also known as
 - a) Collector follower
 - b) Base follower
 - c) Emitter follower
 - d) Source follower

3. The dual of the Boolean expression: $x + y + z$ is
 - a) $x.y + z$
 - b) $x + yz$
 - c) $z' . y' . x'$
 - d) $x.y.z$

4. It is required to construct a counter to count upto 100(decimal). The minimum number of flipflops required to construct the counter is
- a) 8
 - b) 7
 - c) 6
 - d) 5
5. In negative feedback the return ratio is.
- a) 0
 - b) 1
 - c) greater than 0 but less than 1
 - d) greater than 1
6. If the value of α is 0.9, then value of β is
- a) 9
 - b) 0.9
 - c) 900
 - d) 90
7. The amount of useful output power provided by a device is 1.5 W. It is powered by a 48-V supply with 100 mA of current. How much power is wasted in heat?
- a) 1.5 W
 - b) 2.1 W
 - c) 3.3 W
 - d) 6.3 W
8. If $V_{CC} = +18\text{ V}$, voltage-divider resistor R_1 is $4.7\text{ k}\Omega$, and R_2 is $1500\ \Omega$, then the base bias voltage is.
- a) 8.7 V
 - b) 4.35 V
 - c) 2.9 V
 - d) 0.7 V
9. All other factors remaining the same, what is the effect of increasing wire gauge, for example, from AWG 22 to AWG 26?
- a) Impedance will decrease.
 - b) Resistance will increase.
 - c) Inductance will decrease.
 - d) Capacitance will increase

10. What is the relationship between current (I) and voltage (E) in a circuit consisting of a capacitor in series with a resistor?
- a) I and E are in phase across the capacitor.
 - b) I leads E across the resistor.
 - c) E leads I across the capacitor.
 - d) I and E are in phase across the resistor.
11. A transistor has how many junction.
- a) one pn junction
 - b) two pn junctions
 - c) three pn junctions
 - d) four pn junctions
12. When a step-input is given to an op-amp integrator, the output will be
- a) a ramp.
 - b) a sinusoidal wave.
 - c) a rectangular wave.
 - d) a triangular wave with dc bias.
13. If a 2 mV signal produces a 2 V output, what is the voltage gain?
- a) 0.001
 - b) 0.004
 - c) 100
 - d) 1000
14. In a transistor, $I_C = 100 \text{ mA}$ and $I_E = 100.5 \text{ mA}$. The value of β is
- a) 100
 - b) 50
 - c) about 1
 - d) 200
15. For NOR circuit SR flip flop the not allowed condition is .
- a) $S=0, R=0$.
 - b) $S=0, R=1$.
 - c) $S=1, R=1$.
 - d) $S=1, R=0$.

16. Two stages of BJT amplifiers are cascaded by RC coupling. The voltage gain of the first stage is 10 and that of the second stage is 20. The overall gain of the coupled amplifier is

- a) 10×20
- b) $10 + 20$
- c) $(10 + 20)^2$
- d) $(10 \times 20)/2$

17. In which of the following base systems is 254 is not a valid number--

- a) Base 10
- b) Base 5
- c) Base 6
- d) Base 8

18. If firing angle in an SCR circuit is increased, the output

- a) Remains the same
- b) Is increased
- c) Is decreased
- d) None of the above

19. Which one of the following is self-complementing code

- a) Excess 3code
- b) Hamming Code
- c) 8-4-2-1
- d) 7-4-2-1

20. Two multimeters A and B have sensitivities of $10 \text{ k}\Omega/\text{V}$ and $30 \text{ k}\Omega/\text{V}$ respectively. Then

- a) Multimeter A is more sensitive
- b) Multimeter B is more sensitive
- c) Both are equally sensitive
- d) None of the above

B. Write Short note on any two of the following:

2X5= 10

- a. Junction Diode.
- b. Diode Clipper and Clamper.
- c. BJT operating region.
- d. Semiconductors.
- e. Binary Number system.
- f. MOSFET.