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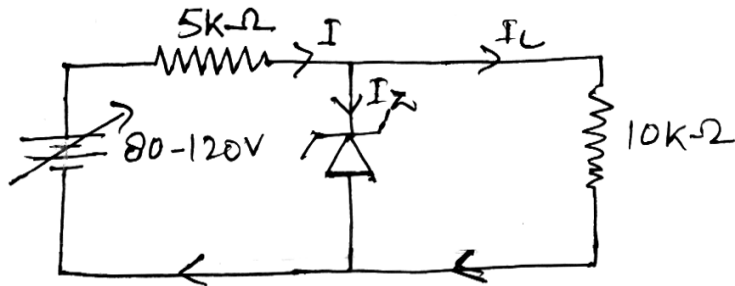
Ph.D. Entrance Examination, 2024

ELECTRONICS

Maximum Marks : 50

Note : Each question carrying 2 marks.

Q. 1. For the circuit shown in fig, the maximum and minimum value of zener diode current is :



- (a) 1 mA, 2 mA
- (b) 9 mA, 1 mA
- (c) 1 mA, 9 mA
- (d) None of above

Q. 2. Efficiency of solar cell is :

- (a) $\eta = (I_0 + I_L) \left(\frac{V_m^2}{V_m + V_T} \right) \cdot \frac{1}{P_{in}}$
- (b) $\eta = (I_0 + I_L) \left(\frac{V_m}{V_m + V_T} \right) \cdot \frac{1}{P_{in}}$
- (c) $\eta = (I_0 + I_L) \left(\frac{V_m + V_T}{V_m^2} \right) \cdot \frac{1}{P_{in}}$
- (d) None of the above

Q. 3. Photomasking :

- (a) Controls the depth of diffusion
- (b) Is used to process to remove selected regions of silicon oxide
- (c) Reduces the size of the circuit elements
- (d) None of the above

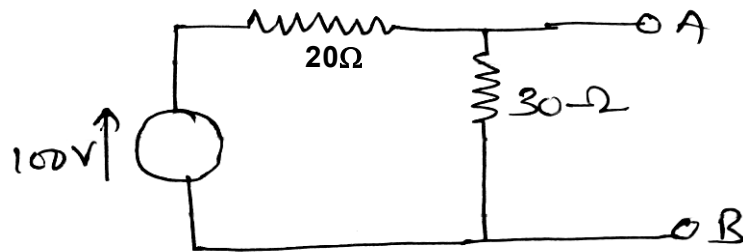
Q. 4. Light sensitive integrated circuit that captures images by converting photons to electron is :

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- (a) CMOS
- (b) CCD
- (c) XRD
- (d) SEM

Q. 5. Find the thevenin voltage and thevenin resistance of the two terminal network shown in given

figure :



- (a) 60 V, 12Ω
- (b) 12V, 60Ω

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- (c) 6V, 1.2Ω
- (d) None of these

Q. 6. What is the fourier cosine transform of e^{-t^2} ?

- (a) e^{-s^2}
- (b) $e^{-s^2/2}$
- (c) $e^{-s^2/4}$
- (d) $\frac{1}{\sqrt{2}}e^{-s^2/4}$

Q. 7. The frequency of phase shift oscillator is :

- (a) $f = \frac{1}{2\pi\sqrt{LC}}$
- (b) $f = \frac{1}{2\sqrt{10}(\pi RC)}$

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(c) $f = \frac{1}{2\pi\sqrt{RC}}$

(d) None of these

Q. 8. The transconductance curve of a JFET is :

(a) A straight line

(b) Parabolic

(c) Hyperbolic

(d) Inverted V-type

Q. 9. Simplify the logic circuit boolean expression

$$Y = [A \cdot \bar{B}(C + BD) + \bar{A}\bar{B}]C$$

(a) AB

(b) BC

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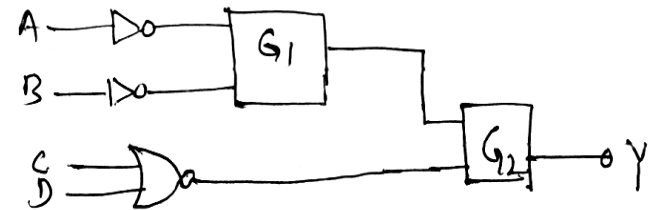
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(c) $\bar{B}C$

(d) $B\bar{C}$

Q. 10. Let Y denote the output in the following logical

circuit :



If $Y = AB + \bar{C}\bar{D}$, the gates G_1 and G_2 must be :

(a) OR and NAND

(b) NOR and OR

(c) AND and NAND

(d) NAND and OR

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Q. 11. In 8086 microprocessor, example for Non-maskable interrupts are :

- (a) TRAP
- (b) RST 6.5
- (c) INTR
- (d) RST 6.6

Q. 12. On power up, the 8051 uses which RAM locations for register R0-R7 :

- (a) 00-2F
- (b) 00-07
- (c) 00-7F
- (d) 00-0F

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Q. 13. Photodiode is a semiconductor P-N junction device whose operation is limited to :

- (a) Forward bias region
- (b) Reverse bias region
- (c) Cut-off region
- (d) Saturation region

Q. 14. In LED, which type of process occur :

- (a) Mechanoluminescence
- (b) Electroluminescence
- (c) Thermoluminescence
- (d) Sonoluminescence

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Q. 15. In LASER, the ratio of probability of spontaneous

emission to stimulated emission is :

(a) $\frac{8\pi h\nu^3}{c^3}$

(b) $\frac{8\pi h\nu^2}{c^2}$

(c) $\frac{8\pi h\nu}{c}$

(d) None of these

Q. 16. The Radar range equation is :

(a) $\left[\frac{P_t A_o^2 S}{4\pi\lambda^2 (P_r)_{\min}} \right]^{1/4}$

(b) $\left[\frac{P_t A_o^2 S}{4\pi\lambda^2 (P_r)_{\min}} \right]^{1/2}$

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(c) $\left[\frac{P_t A_o^2 S}{4\pi\lambda^2 (P_r)_{\max}} \right]^{1/4}$

(d) $\left[\frac{P_t A_o^2 S}{4\pi\lambda^2 (P_r)_{\max}} \right]^{1/2}$

Q. 17. A high power microwave pulse of the order of

megawatts can be generated in :

(a) Travelling wave tube

(b) Magnetron

(c) Reflex Klystron

(d) Gunn Diode

Q. 18. Klystron operates on the principle of :

(a) Amplitude modulation

(b) Frequency modulation

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(c) Velocity modulation

(d) Pulse modulation

Q. 19. A wireless transmitter radiates 4 kilowatt with an unmodulated carrier wave and 5.2 kilowatt with modulated wave. The percentage of modulation is :

(a) 25%

(b) 75%

(c) 77.46%

(d) 95.6%

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Q. 20. Numerical Aperture of optical fiber in air :

(a) $\sqrt{\mu_1^2 - \mu_2^2}$

(b) $\frac{\sqrt{\mu_1^2 - \mu_2^2}}{\mu_1}$

(c) $\sqrt{\mu_1^2 + \mu_2^2}$

(d) None of these

Q. 21. In satellite communication, the equipment which receives a signal, amplifies it, changes its frequency and retransmit it is called :

(a) Transducer

(b) Transponder

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- (c) Transmitter
- (d) None of the above

Q. 22. SCR is used as :

- (a) An Amplifier
- (b) Rectifier
- (c) Modulator
- (d) Demodulator

Q. 23. Which one of the following is a measure of purity

of the power output of a power supply ?

- (a) Rectification
- (b) Regulation

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- (c) Ripple factor
- (d) Knee voltage

Q. 24. What is the convolution of $F(t)$ with delta function

$\delta(t - t_0)$ is :

- (a) $F(t + t_0)$
- (b) $F(t - t_0)$
- (c) $F(t)$
- (d) None of these

Q. 25. Active transducer work on the principle of :

- (a) Energy conversion
- (b) Mass conversion

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(c) Energy alteration

(d) Volume conversion

