



**SIR PADAMPAT SINGHANIA UNIVERSITY
UDAIPUR**

**Sample Question Paper for M.Tech
(Electronics & Communication Engineering)
SPSAT'18**

INSTRUCTIONS

The test is 60 minutes long and consists of 40 multiple choice questions (MCQ) adding up to 40 marks.

1. Refer to Figure 1B. What is the expected power level at the input to the receiver?
(a) 20 dBm (b) 30 dBm (c) 40 dBm (d) 50 dBm
2. Why is it important to maintain an impedance match from the source to the load when sending signals?
(a) To reduce external noise (b) To keep the line balanced
(c) To reduce reflected energy (d) To reduce attenuation
3. Which of the following is represented by the symbol XL?
(a) Impedance of a load (b) Reactance of a coil
(c) Resonant frequency of a filter (d) Output level of a source
4. One coulomb-per-second is equal to one:
(a) Watt (b) Joule (c) Volt (d) Ampere
5. Refer to Figure 2. Which of the components is the symbol for a PNP bipolar transistor?
(a) A (b) C (c) D (d) G
6. The frequency of a signal is INVERSELY proportional to which of the following:
(a) Period (b) Amplitude (c) Phase (d) Power
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. Refer to Figure 1D. A voltage level of 20 V is measured at the output of the power supply with no load attached. Which of the following is the probable cause?
(a) R1 shorted (b) C1 open (c) D1 shorted (d) D3 open
9. As the efficiency of a device DECREASES, which of the following will INCREASE?
(a) Power output (b) Amplifier gain
(c) Heat output (d) Output impedance

10. What is the peak voltage of a sine wave that measures 220 VAC rms?
(a) 155 V (b) 169 V (c) 311 V (d) 440 V
11. A 1-mW signal is attenuated at the rate of 5 dB/1,000ft. What is the power level into a receiver that is 6,000 feet from the signal source?
(a) -5 dBm (b) -10 dBm (c) -20 dBm (d) -30 dBm
12. Which of the following is one of the functions performed by a diode?
(a) Filter (b) Amplifier (c) Rectifier (d) Inverter
13. Refer to Figure 1A. What is the total resistance of this circuit?
(a) 10 Ω (b) 25 Ω (c) 40 Ω (d) 55 Ω
14. Refer to Figure 2. Which component is used to protect against high-voltage transients?
(a) B (b) E (c) G (d) H
15. Refer to Figure 1A. What is the voltage drop across R1?
(a) 4.8 V (b) 9.6 V (c) 19.2 V (d) 28.8 V
16. A transmission line is rated at 25 pF/ft. How much capacitance will one mile (5280 ft) of this transmission line have?
(a) 13,200 pF (b) 13.2 nF (c) 132 nF (d) 1.32 μ F
17. Refer to Figure 1C. In this circuit, what is the function of the inductor?
(a) High pass filter (b) Low pass filter
(c) Band pass filter (d) Band stop filter
18. There is no voltage measured across R4. Which if the following component failures is the most probable cause?
(a) R4 open (b) R5 shorted (c) R2 open (d) R3 shorted
19. A power amplifier has a gain of 20 dB and an input level of 2 volts. Assuming that the input and output impedances are the same, what is the voltage level at the amplifier output?
(a) 10 V (b) 20 V (c) 30 V (d) 40 V
20. A precision current shunt is measuring 100 millivolts across it. This indicates a current of 25 A. What is the actual resistance of this shunt?
(a) 0.004 Ω (b) 0.04 Ω (c) 0.25 Ω (d) 2.5 Ω
21. 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

22. The leads of a multimeter are across a diode in the following manner:
Red lead connects to the end of diode with marking band, and the black lead connects on other end. What does a reading of -0.6 volts indicate?
- (a) Forward bias, leads connected with proper polarity
 - (b) Reverse bias, leads connected with proper polarity
 - (c) Forward bias, leads connected with reverse polarity
 - (d) Reverse bias, leads connected with reverse polarity
23. 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
24. What is the “power factor”?
- (a) Ratio of true power to apparent power
 - (b) Peak power times .707
 - (c) Sin of the phase difference between e and i
 - (d) Cos of the phase angle between true power and apparent power
25. A power system is providing 200 VAC at 25 A. The phase angle between current and voltage is 25°. What is the true power used by the system?
- (a) 2,113 W
 - (b) 4,531 W
 - (c) 5,517 W
 - (d) 11,831 W

Formulas

$$E = IR$$

$$PF = \cos \Theta = \frac{P_{true}}{P_{app}}$$

$$V_{rms} = V_{peak} \times .707$$

$$P = IE$$

$$dB = 10 \times \log_{10} \left(\frac{W_{out}}{W_{in}} \right)$$

$$dB = 20 \times \log_{10} \left(\frac{V_{out}}{V_{in}} \right)$$

Figure 1.

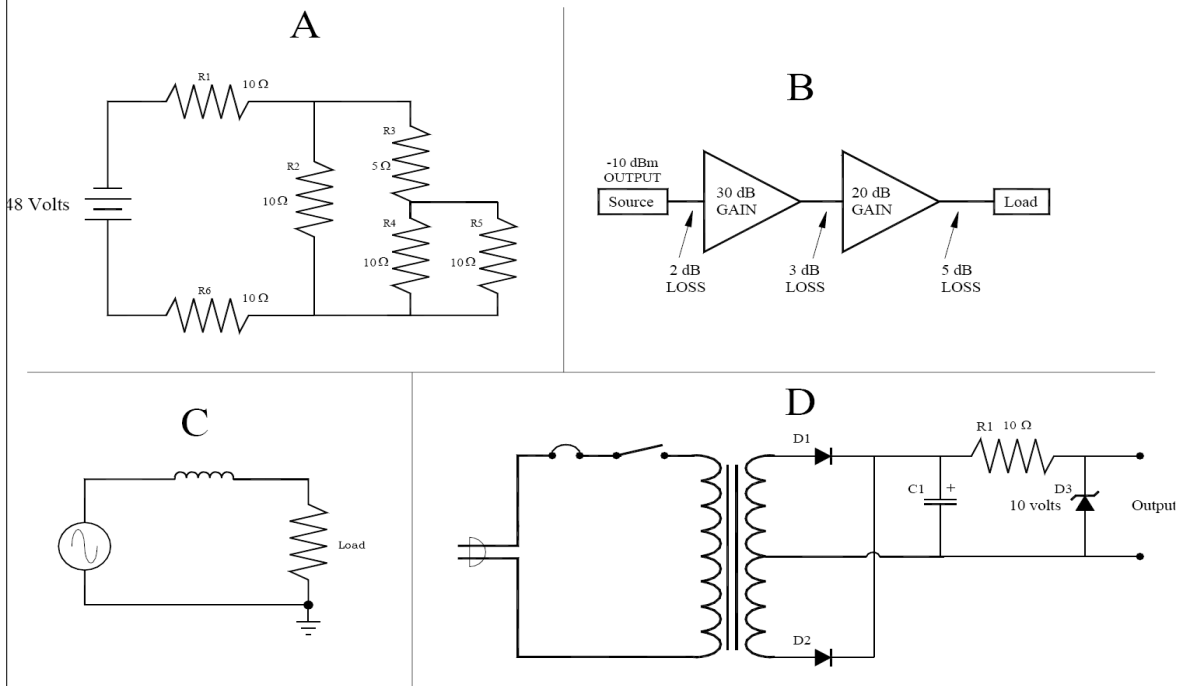
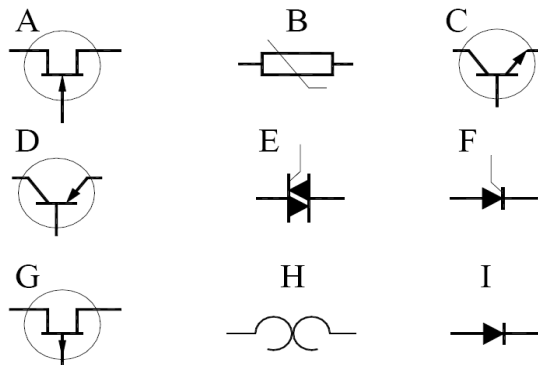
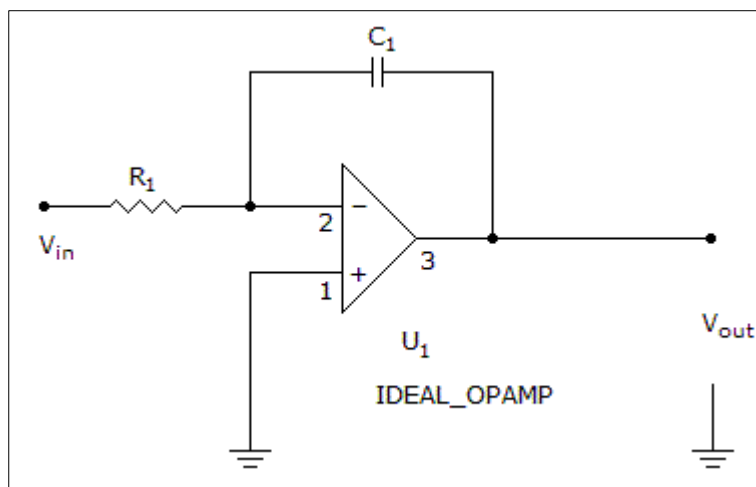


Figure 2.



26. The primary function of the bias circuit is to
- (a) Hold the circuit stable at VCC (b) Hold the circuit stable at v_{in}
(c) Ensure proper gain is achieved (d) Hold the circuit stable at the designed Q-point
27. The capacitor that produces an AC ground is called
- (a) Coupling capacitor (b) DCopen (c) Bypass capacitor (d) AC open
28. Latches constructed with NOR and NAND gates tend to remain in the latched condition due to which configuration feature?
- (a) Asynchronous operation (b) Low input voltages
(c) Gate impedance (d) Cross coupling
29. The 555 timer can be used in which of the following configurations?
- (a) Astable, monostable (b) Monostable, bistable
(c) Astable, toggled (d) Bistable, tristable
30. A basic S-R flip-flop can be constructed by cross-coupling which basic logic gates?
- (a) AND or OR gates (b) XOR or XNOR gates
(c) NOR or NAND gates (d) AND or NOR gates
31. When two or more inputs are active simultaneously, the process is called:
- (a) First-in, first-out processing (b) Priority encoding
(c) Ripple blanking (d) Priority decoding
32. An ideal operational amplifier has
- (a) Infinite output impedance (b) Zero input impedance
(c) Infinite bandwidth (d) All of the above
33. What is the output waveform?



- (a) Sine wave (b) Square wave (c) Sawtooth wave (d) Triangle wave

34. A circuit whose output is proportional to the difference between the input signals is considered to be which type of amplifier?
(a) Common-mode (b) Darlington (c) Differential (d) Operational
35. The voltage follower has a:
(a) Closed-loop voltage gain of unity (b) Small open-loop voltage gain
(c) Closed-loop bandwidth of zero (d) Large closed-loop output impedance
36. In a 20 Vac series RC circuit, if 20 V is measured across the resistor and 40 V is measured across the capacitor, the applied voltage is:
(a) 45 V (b) 50 V (c) 55 V (d) 60 V
37. The ends of a load line drawn on a family of curves determine:
(a) Saturation and cutoff (b) The operating point
(c) The power curve (d) The amplification factor
38. With a PNP circuit, the most positive voltage is probably:
(a) Ground (b) VC (c) VBE (d) VCC
39. Which component is considered to be an "OFF" device?
(a) Transistor (b) JFET (c) D-MOSFET (d) E-MOSFET
40. D-MOSFETs are sometimes used in series to construct a cascade high-frequency amplifier to overcome the loss of:
(a) Low output impedance (b) Capacitive reactance
(c) High input impedance (d) Inductive reactance