Electronics Engineering Students' Association

(ELESA)

Presents

ELECTROVERT 2018

The Performers' creed

Name of the Event: **Circuit-Tech(Novice)** Candidate's Code:	Date: **08 Sept 2018** Time: **40 min**

- All **30 questions** are compulsory.
- All questions are compulsory and carries equal amount of marks.
- Use of calculators is allowed.
- Use of mobile is strictly prohibited.

1. The miller effect in the context of a Common Emitter amplifier explains

a) an increase in the low-frequency cut-off frequency
b) an increase in the high- frequency cut-off frequency
c) a decrease in the low-frequency cut-off frequency
d) a decrease in the high- frequency cut-off frequency

2. Which one is the correct statement for Transposition theorem?

a) A+AB
b) (A+B) +C=A+(B+C)
c) (A.B).C=A. (B.C)
d)AB+(~A) C=(A+C) (~A+B)

3.Why we use centre-tapped X-mer in Full Wave Rectifier choose more correct option from them.
State 1: It provides central ground /low potential while ordinary x-mer not.
State 2: If we use ordinary x-mer in FWR the circuit is not completed. But if use centre-tapped x-mer It rectifies both cycles.

a) State 1 is correct
b) State 2 is correct & State 1 is correct explanation for it.
c) State 1 is correct & State 2 is correct explanation for it.
d) both are true.

4.Perform BCD addition

0011 1010
\+ 0111 1101

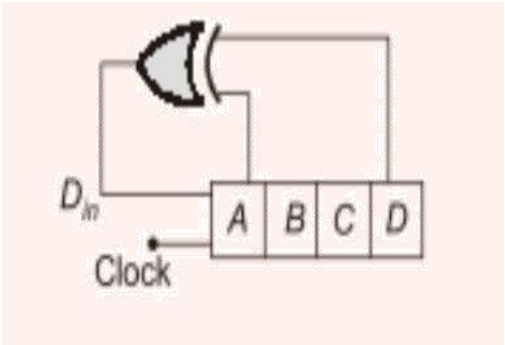
a)0011 0110 b)0110 0011
c)Not possible d) None of these

5.The main drawback of DC amplifier is

a) Drift b)Ripple

c) High reactance d)Heating

6. A 4-bit shift register circuit configured for right-shift operation, i.e. Din → A,A → B,B → C,C → D ,is shown. If the present state of the shift register is ABCD=1101. The number of clock cycles required to reach the state ABCD=1111 is_____



a)10 b)20 c)9 d)8

7.Which one of the following gives the simplified sum of products expression for the Boolean Function F=m0+m1+m2+m3+m5, where m0, m2, m3, &m5 are minterms corresponding to the inputs A, B and C with A as the the MSB and C as the LSB?

(a) $\bar{A}B+\bar{A}\bar{B}\bar{C}+A\bar{B}C$ (b) $\bar{A}\bar{C}+\bar{A}B+A\bar{B}C$

(c) $\bar{A}\bar{C}+A\bar{B}+A\bar{B}C$ (d) $\bar{A}BC+\bar{A}\bar{C}+A\bar{B}C$

8.The term Junction Capacitance is introduced when diode is _____ is & specially used in _____

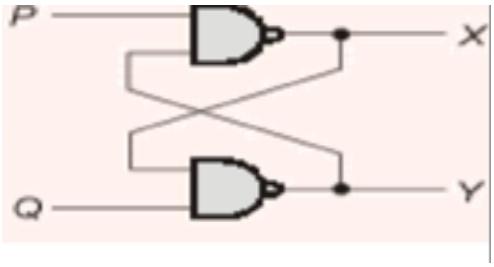
a) forward bias, Shockey diode.
b) No bias, photo diode.
c) reverse bias, varactor diode.
d) just by rotating diode in magnetic field.

9.In which counter, each flip-flop is triggered from the complement side of the previous flip-flop.

a) up counter b) down counter

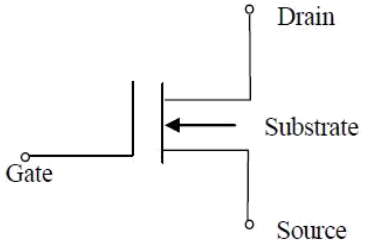
c) ring counter d) invert counter

10. In the latch circuit shown, the NAND gates have non-zero, but unequal propagation delays. The present input condition is: P=Q='0. If the input condition is changed simultaneously to P=Q='1', the outputs X&Y are



a) X='1', Y='1'
b) either X='1', Y='0' or X='0', Y='1'
c) either X='1', Y='1' or X='0', Y='0'
d) X='0', Y='0'

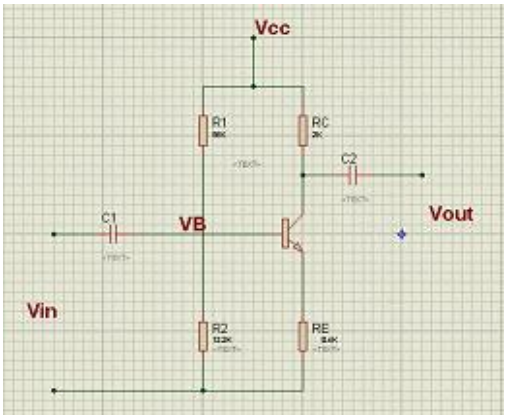
11. The figure shown represent:



a) n-channel MOSFET
b) Enhanced-mode E-MOSFET
c) p-Channel MOSFET
d) J-FET

12. The circuit parameters of Common Emitter Amplifier with RE i.e. without CE are
Rs=0.5K, RC=2K, R1=56K,
RE=0.4K, R2=12.2K, VCC=10V
The transistor parameters are =100, VBE(ON)=0.7V. Assume VT =26mV

Determine i) VCEQ and ICQ.
ii)Small signal voltage gain.



a) 5.6V, 3.50mA, -3.29997

b) 4.8074V, 2.16uA, -4.5273

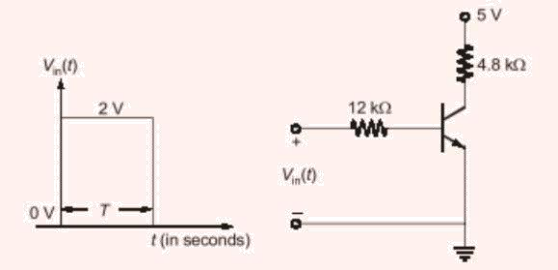
c) 4.8074V, 2.16mA, -4.5273

d) 5.68V, 3.50uA, -4.5273

13. For the circuit having parallel connected resistors of 3K and 2K, IT=5mA. What is the total power loss?

a)30mV b)60W c)60uW d)40mW

14. In the figure shown, the npn transistor acts as a switch



For the input Vin(t) as shown in the figure, the transistor switches between the cut off & saturation regions of the operation, When T is large, assume collector- to -emitter voltage at saturation Vce(sat)=0.2v and base-to-emitter voltage Vbe=0.7v. The minimum value of the common-base current gain (α)of the transistor for the switching should be _____

a)0.1
b)0.902
c)0.91
d)1.11

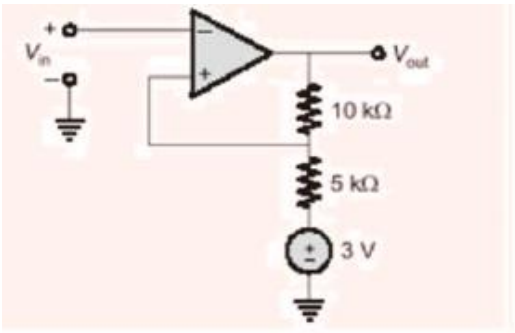
15.A good trans impedance amplifier has

a) low input impedance and high output impedance.
b) high input impedance and high output impedance.
c) high input impedance and low output impedance.
d) low input impedance and low output impedance.

16. Which components play a significant role in the formation of a dynamic RAM?

a) Two MOSFETs
b) Two capacitors
c) One MOSFET and one capacitor
d) One MOSFET and one capacitor

17. For the operational amplifier circuit shown, the output saturation voltages are ±15v.the upper and lower threshold voltages for the circuit are, respectively.



a) +5v and -5v
b) +7v and -3v
c) +3v and -7v
d) +3v and -3v

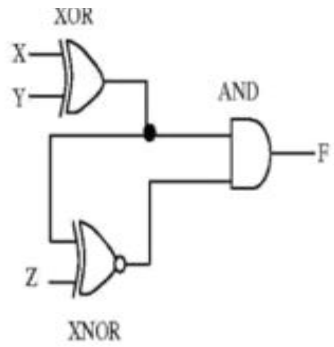
18. Given SOP F=A.B'.C'+A'.B.C'+A. B'.C'.
a) F=(A+B+C) (A+B'+C) (A'+B+C)

b) F=(A'+B'+C') (A'+B+C') (A+B'+C')

c) F=(A+B+C') (A+B'+C') (A'+B+C') (A'+B'+C) (A'+B'+C')

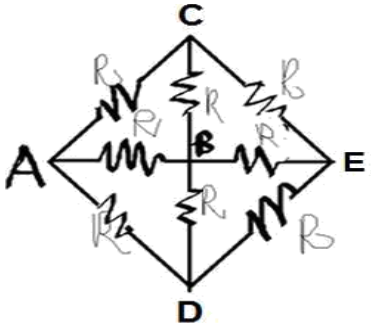
d) F=(A'+B'+C) (A'+B+C) (A+B'+C) (A+B +C') (A+B+C)

19. The output Fin the digital logic circuit shown in the figure is



(A) $F=\overline{X}YZ+X\overline{Y}Z$
(B) $F=\overline{X}Y\overline{Z}+X\overline{Y}Z$
(C) $F=\overline{XY}Z+XYZ$
(D) $F=\overline{XYZ}+XYZ$

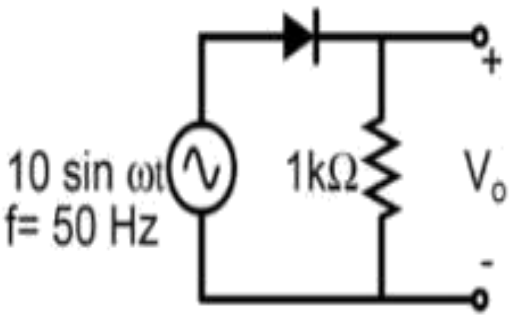
20. Find the equivalent resistance between A&B.



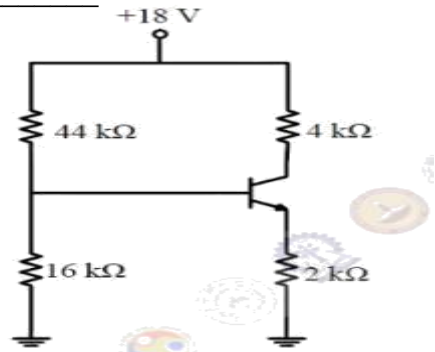
21. In active region base-emitter and base-collector junction Is ____ and _____resp.

a) forward, forward b) Forward, Reverse
c) Reverse, Reverse d) Reverse, forward

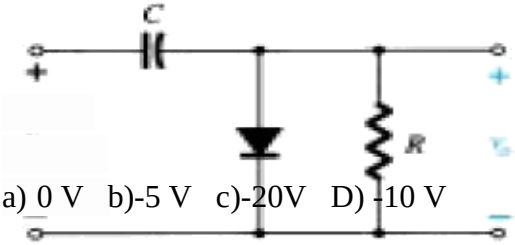
22. The output Vo of diode circuit shown in voltmeter. The reading on DC voltmeter in volts, neglecting voltage drop across the diode is _____



23. Consider the circuit shown in fig. Assume base to emitter voltage Vbe and common base current gain(alpha) of transistor is unity. The value of collector to emitter voltage Vce (in volts) is_____



24. For the given circuit, what is the minimum peak value of the output waveform if the input waveform is 10V square wave with switching time of 1 second?
Assume that the input switches between +10V and -10V DC levels.



a) 0 V b)-5 V c)-20V D) -10 V

25. With positive probe on NPN base, an ohmmeter reading between the other transistor terminals should be

a) Open b) Infinite
b) low resistance d) high resistance

26. ¼ as binary number would be_____

a) 0.01 b)0.11 c) 0.10 d)0.00

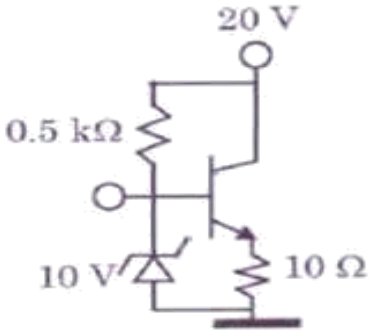
27. A good trans conductance amplifier should have____.

a) high input resistance & low output resistance
b) low input resistance & high output resistance
c) high input & output resistance
d) low input & output resistance

28. Base bias provides _____.

a) very stable Q point
b) very unstable Q point
c) no current gain
d) zero current in base and collector circuits

29. Common emitter DC current gain of the transistor is 100. The current through the 10V Zener diode (assuming VBE of the transistor is 0.7 V) is:



a) 10.7 mA b) 9.3 mA c) 20 mA d) 40 mA

30.By Thevenin's theorem find Vth and Rth

a)3V, 4Ω b)4V ,4Ω c)8V ,6Ω d)6V ,6Ω