

Physics English Classified MCQ Electronics 1992 - 2016

@AL_Past_Papers

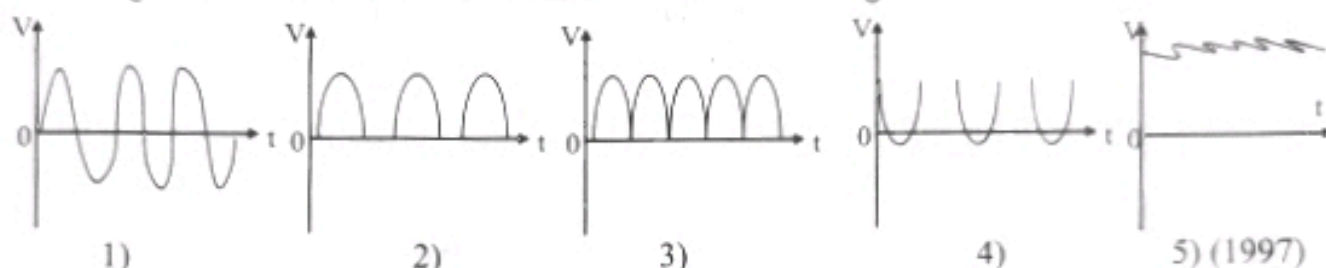
01. Semi Conductor Diodes

- 1) Consider the following statements regarding an intrinsic semiconductor.
 (A) The electrical conductivity decreases with the increasing temperature
 (B) The ratio of the number of free electrons to the number of holes remains constant with increasing temperature.
 (C) Both the free electrons and holes contribute to the electric conduction process.

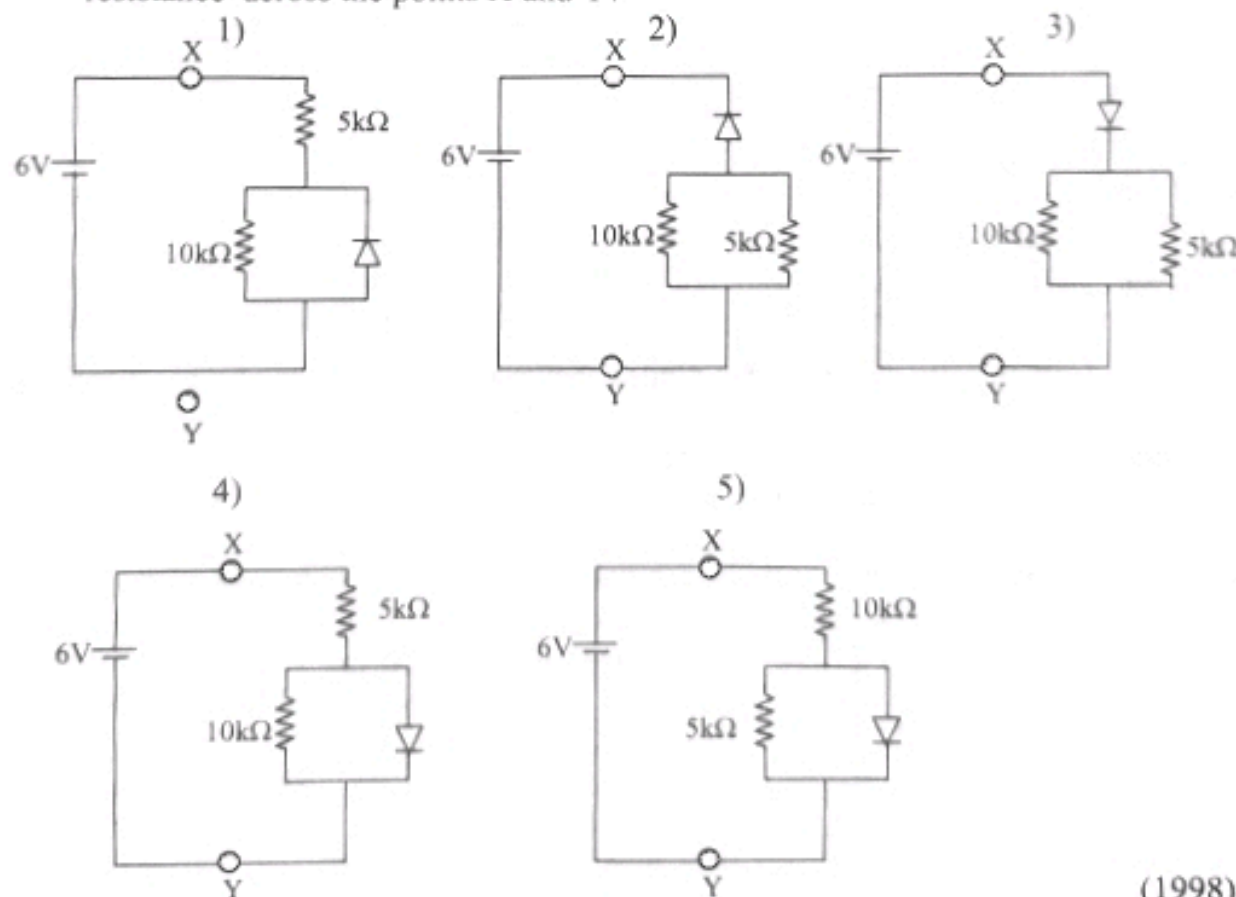
Of the above statements.

- 1) Only A is true 2) Only B is true 3) Only C is true
 4) Only B and C only 5) all A, B and C are true (1997)

- 2) Which of the following graphs best represents the relationship between voltage (V) and time (t) for the output from a power supply consisting of an alternating current generator and a full wave rectifier without smoothing?

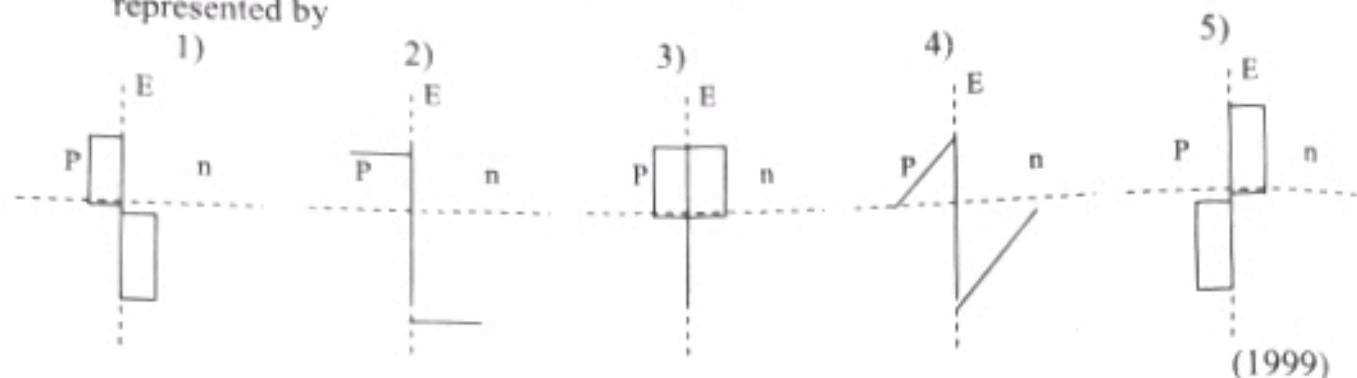


- 3) Which of the following combinations of resistance and diode produces the least resistance across the points X and Y?



(1998)

- 4) The variation of the electric field intensity, E across an ideal p-n junction is best represented by



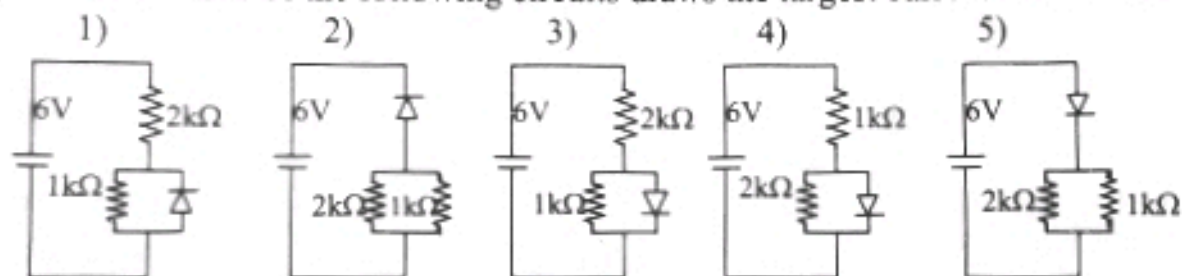
(1999)

- 5) Consider the following statements made about a p-n junction in,
 (A) Its current (I) – Voltage (V) characteristic is linear
 (B) Built in electric field across the junction is directed from n-region to p-region
 (C) Currents carried by holes and electrons are in opposite directions

Of the above statements

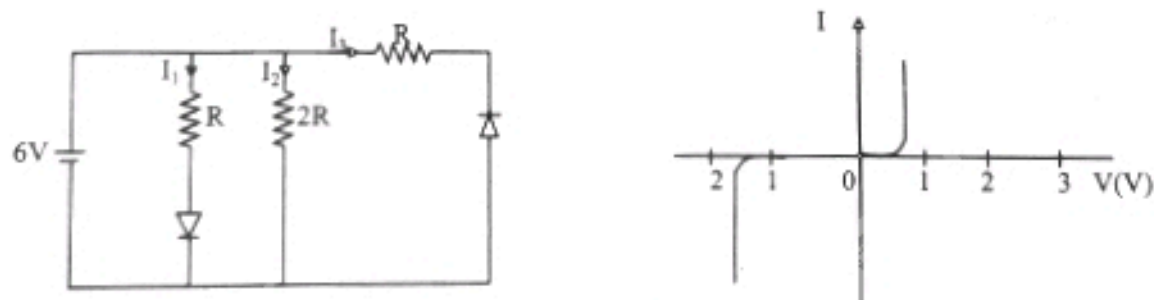
- 1) Only (B) is true 2) Only (B) and (C) are true 3) Only (B) and (C) are true
 4) Only (A) and (B) are true 5) all (A), (B) and (C) are true (2000)

- 6) Which one of the following circuits draws the largest current from the 6V cell?



(2001)

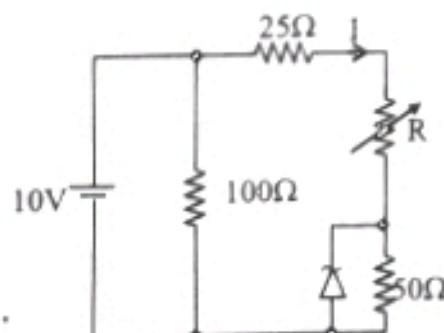
7)



I-V characteristic of the silicon diodes shown in circuit (A) is given in figure (B). 6V cell has negligible internal resistance. Of I_1 , I_2 and I_3 the maximum and the minimum currents respectively, are

- (1) I_2 and I_1 (2) I_3 and I_2 (3) I_1 and I_2 (4) I_3 and I_1 (5) I_1 and I_3 (2003)

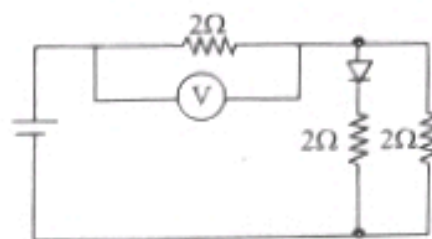
8)



The breakdown voltage of the zener diode of the circuit shown is 5 V. The internal resistance of the cell is negligible. When the value of R is changed from 25Ω to 0, the current I in the circuit will change from

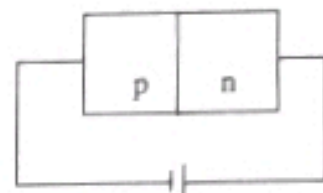
- 1) 0.10 A to 0.13 A 2) 0.2 A to 0.40 A
 3) 0.13 A to 0.20 A 4) 0.10 A to 0.20 A
 5) 0.20 A to 0.27 A (2004)

- 9) The diode in the circuit shown has zero forward bias resistance and a reverse break down voltage of 75 V. Internal resistance of the cell is negligible. The voltmeter reads 1 V. When the terminals of the diode are reversed the voltmeter reading is,

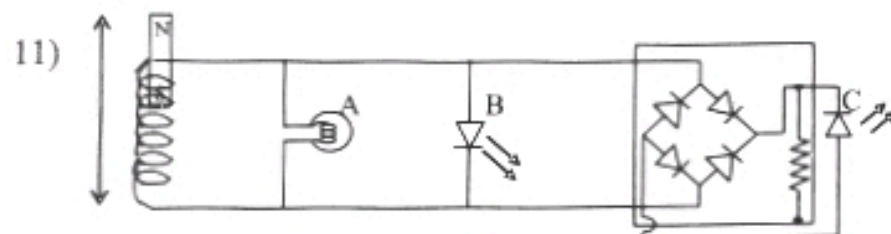


1) 6V 2) 8V 3) 9V 4) 10 V 5) 18 V (2005)

- 10) A $p - n$ junction is connected to a battery as shown in the figure. When light is shown on the junction, electron - hole pairs are created due to the absorption of photons. The current in the circuit produced by the incident light is,



- 1) due to electrons moving in the direction of n to p and holes moving in the opposite direction.
 - 2) due to electrons moving in the direction of p to n and holes moving in the opposite direction.
 - 3) due to electrons moving from p to n only.
 - 4) due to holes moving from n to p only.
 - 5) zero
- (2005)



In the figure shown A is a torch bulb B and C are light emitting diodes. If a strong bar magnet is moved up and down continuously at a high rate through the coil and generates an a voltage of peak amplitude 4 V

- 1) only (A) will glow
- 2) only (C) will glow
- 3) only (A) and (B) will glow
- 4) all (A), (B) and (C) will glow.
- 5) none of the bulbs will glow.

(2006)

- 12) In the circuit shown in figure (a) as supply voltage (B) increases linearly with time (t) as shown in figure (b) . At time $t = t_0$ supply voltage surpasses the breakdown voltage of the Zener diode. The variation of the voltage (V_R) across 100Ω resistor, and the voltage (V_Z) across the Zener diode with time (t) is best represented in

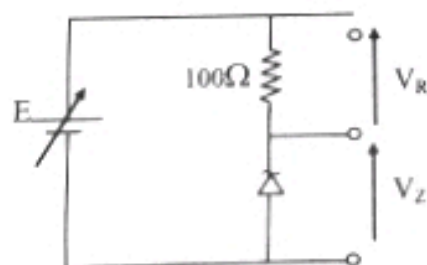
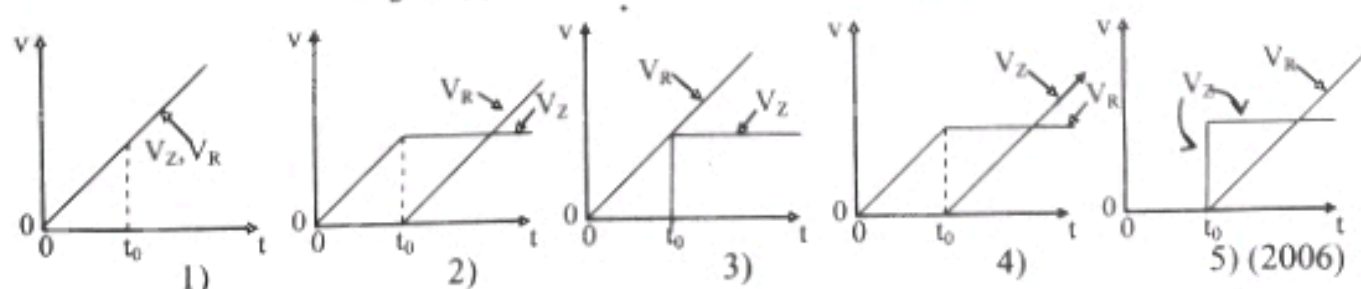


diagram (a)



diagram (b)



1)

2)

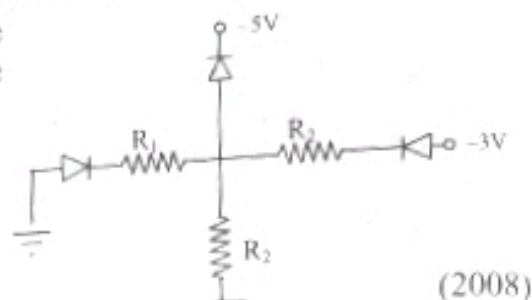
3)

4)

5) (2006)

- 13) In the circuit shown R_1 , R_2 and R_3 are of the order of a few kilo ohms. Appreciable currents can be found,

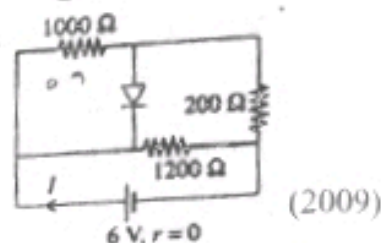
- 1) only through R_1 and R_3
- 2) only through R_2 and R_3
- 3) only through R_1 and R_2
- 4) through all R_1 , R_2 and R_3
- 5) through non of the resistors



(2008)

- 14) If the voltage necessary to forward bias the diode shown in figure is 0.7V, the current (I) drawn from the battery would be,

- 1) 0
- 2) 5 mA
- 3) 10 mA
- 4) 30 mA
- 5) 60 mA



(2009)

- 15) Two NOT gates are connected as shown in figure. Consider following combinations of logic levels for the outputs Q_1 and Q_2



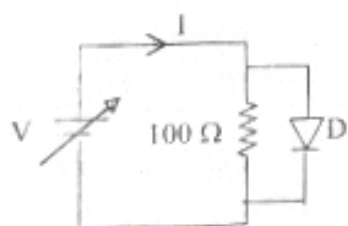
	Logic level for Q_1	Logic level for Q_2
(A)	0	0
(B)	0	1
(C)	1	0
(D)	1	1

Which of the above combination/ s will provide stable logic levels for Q_1 and Q_2 outputs?

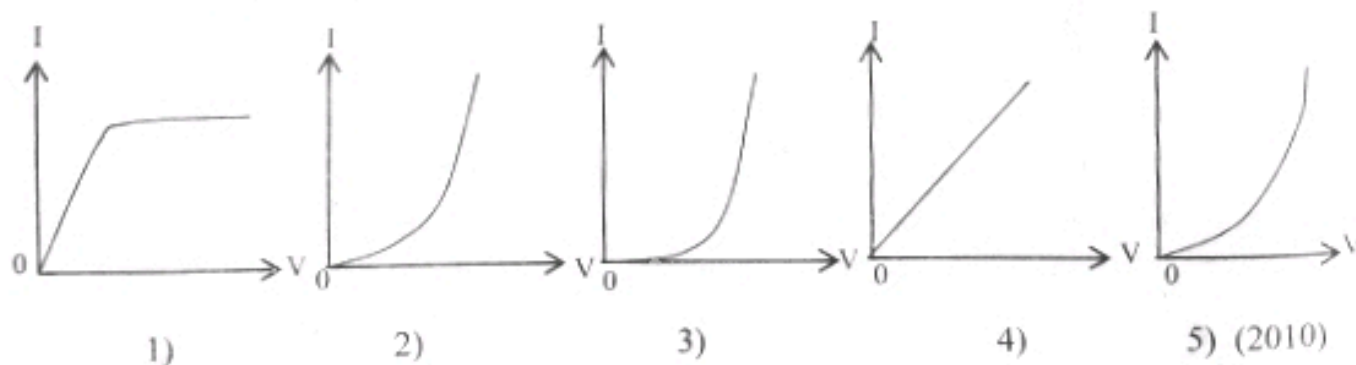
- 1) (A) only
- 2) (D) only
- 3) (A) and (B) only
- 4) (A) and (D) only
- 5) (B) and (C) only

(2009)

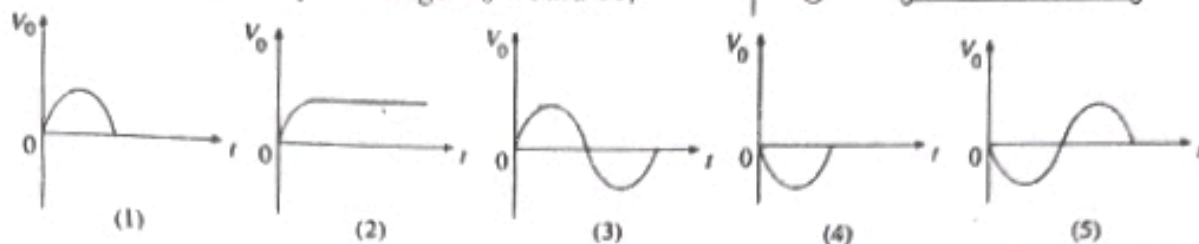
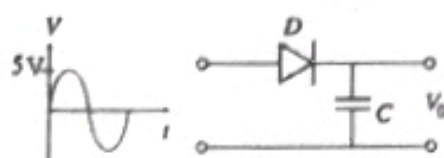
- 16)



In the circuit shown, D is a silicon diode. The voltage source provides a variable voltage V . Which of the following curves best represents the variation of I with V ?

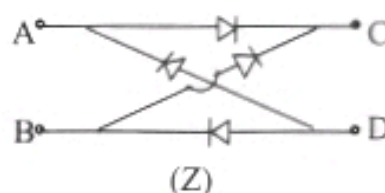
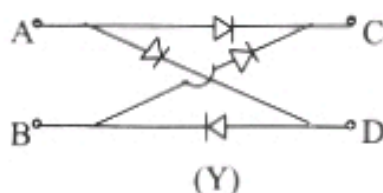
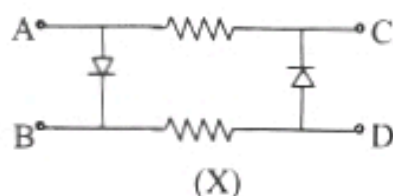
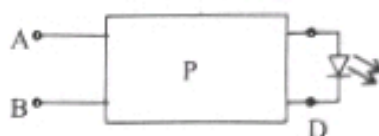


- 17) The circuit shown in the figure is made of ideal elements. When a sinusoidal voltage of peak amplitude 5V is applied to the input, the waveform of the output voltage V_0 would be,



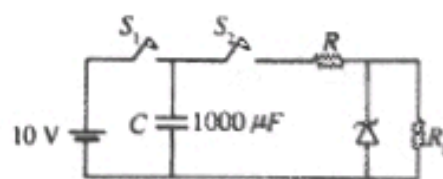
(2011N/S)

- 18) The box P shown contains a circuit and when a battery is connected between A and B, the Light Emitting Diode (LED) connected to the circuit is lit. Which of the following circuit / circuits inside the box P enables / enable the Light Emitting Diode to be lit even when the battery terminals are interchanged between A and B?



- 1) only X and Y 2) only Y and Z 3) only X and Z
4) only Y 5) only Z (2013)

- 19) Breakdown voltage of the zener diode in the circuit shown is 5V. R_L is a suitable resistor. The capacitor C is first charged to 10 V by closing the switch S_1 and opening the switch S_2 . Subsequently, S_1 is opened and S_2 is closed. Consider the following statements made about the functioning of the circuit after S_2 is closed.



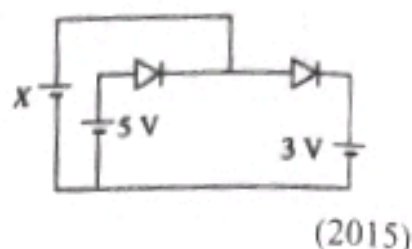
- A) Voltage across R_L will be 5V so long as the capacitor voltage is adequately above 5V.
B) Time period through which the voltage across R_L remains constant does not depend on the value of the capacitance.
C) Potential drop across R gradually decreases with time.

Of the above statements,

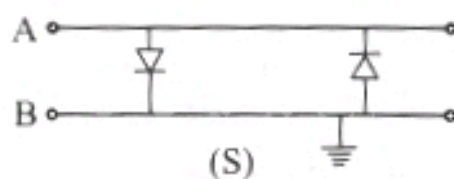
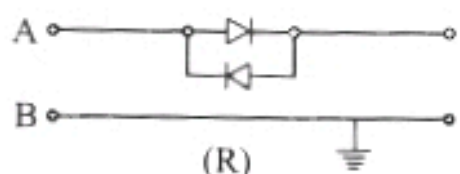
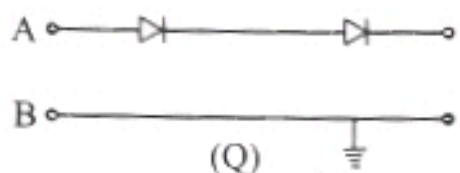
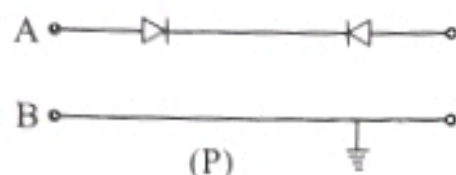
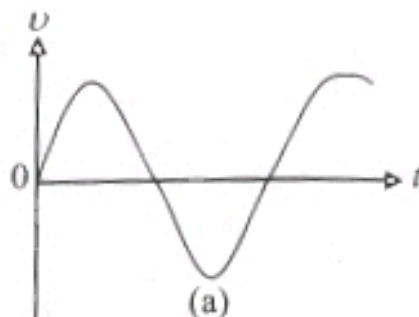
- 1) only A is true. 2) only C is true. 3) only A and B are true
4) only A and C are true 5) All A, B and C are true (2014)

- 20) In the circuit shown, each of the rectifier diodes requires a voltage of 1 V across it to make it forward biased. In order to make both diodes forward biased, the voltage of the battery X should be

- (1) 1 V (2) 2 V (3) 3 V
(4) 4 V (5) 5 V



- 21) The waveform shown in figure (a) is applied across the input terminals A, B of the circuits P, Q, R and S shown below.



If the potential drops across the diodes are negligible, the input waveform will travel unaffected through

- 1) The circuit P only. 2) The circuit Q only. 3) The circuit R only.
4) The circuit S only. 5) The circuits R and S only. (2016)

02. Transistors

- 1) Consider the following statements made about a transistor and a transformer.
(A) Both devices can be used to increase the voltage of a small ac signal
(B) Both devices can be used to increase the current of a small ac signal
(C) None of the devices can be used to increase the power of a small ac signal

Of the statements,

- 1) Only A is true 2) Only B is true
3) Only A and B are true 4) only A and C are true
5) all A, B and C are true

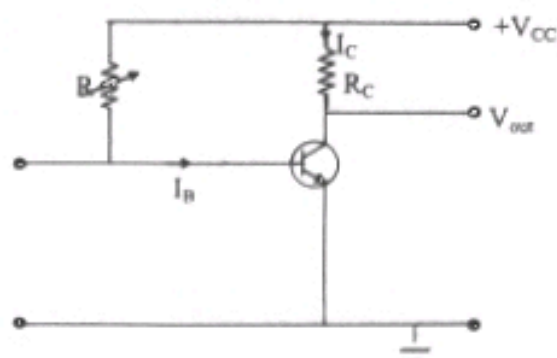
(1998)

- 2) In comparison to the open switch condition, an npn transistor operating as a closed switch has a very small

- 1) base current 2) collector current
3) emitter current 4) emitter – base voltage
5) collector – emitter voltage

(1998)

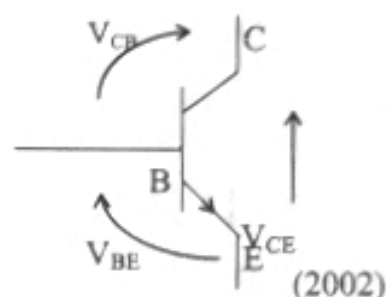
- 3) In the circuit shown R is a variable resistor and R_C has a fixed value. When R is at its maximum value, the transistor is biased in the active region. When R is gradually decreased.



- (A) the base current I_B increases
(B) the collector current I_C decreases
(C) the output voltage V_{out} decreases
Of the above statements

- 1) Only (A) is true 2) Only (B) is true 3) Only (C) is true
4) only (A) and (B) are true 5) Only (A) and (C) are true (1999)

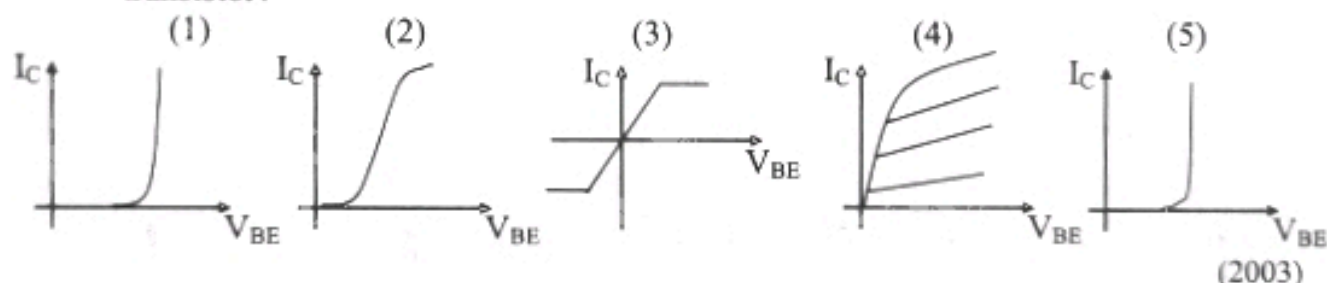
- 4) Voltages applied across a silicon transistor shown are represented with symbols V_{BE} , V_{CB} and V_{CE} . The transistor will operate in the active region if



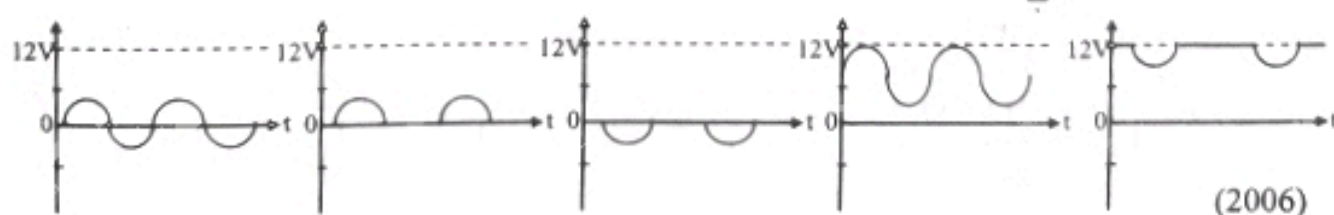
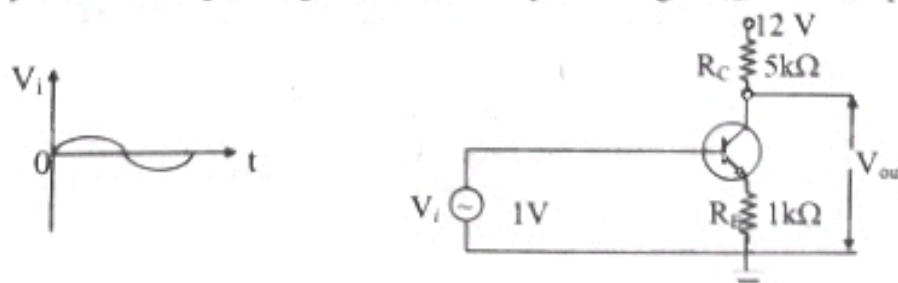
- 1) $V_{BE} = 0.7 \text{ V}$ and $V_{CB} = 0.7 \text{ V}$
2) $V_{BE} = 0$ and $V_{CB} = 0.7 \text{ V}$
3) $V_{BE} = 0.5 \text{ V}$ and $V_{CE} = 4.2 \text{ V}$
4) $V_{BE} = 0.7 \text{ V}$ and $V_{CE} = 5 \text{ V}$
5) $V_{CB} = 0.7 \text{ V}$ and $V_{CE} = 0 \text{ V}$ (2002)

- 5) Of the elements given below, power (VI) can be amplified only with,
1) resistors 2) diodes 3) capacitors 4) transformers 5) transistors (2003)

- 6) Which of the curves shown in figures represents the output characteristic of an npn transistor?

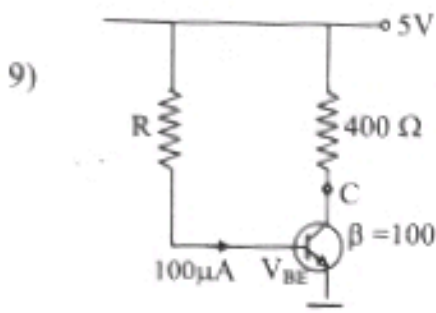
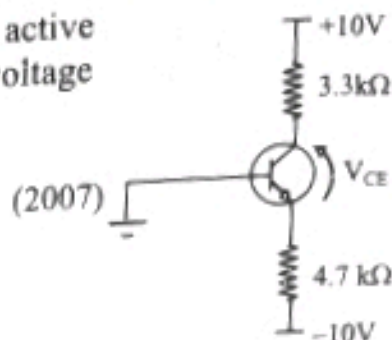


- 7) The figure shows a circuit constructed using a silicon transistor. If the peak value V_1 of the input alternating voltage is 1 V , the output voltage V_{out} is best represented by,



(2006)

- 8) In the circuit shown, the transistor operates in the active mode with $V_{BE} = 0.6$ V. The collector emitter voltage V_{CE} in the circuit is approximately,
- 1) 0 2) 2V 3) 4V
 - 4) 6V 5) 10 V



- In the circuit shown base current to the transistor is $100 \mu\text{A}$, and $V_{BE} = 0.7$ V. If the current gain of the transistor is 100, then the voltage at C is
- 1) 0.1V 2) 1V 3) 2V
 - 4) 4V 5) 5V
- (2008)

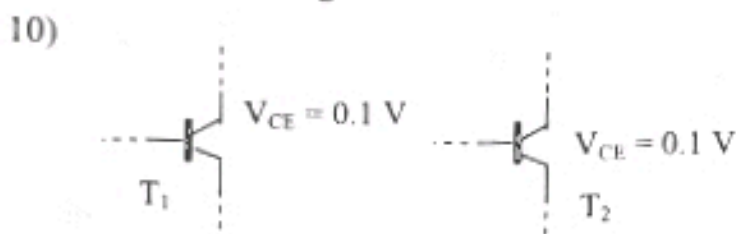
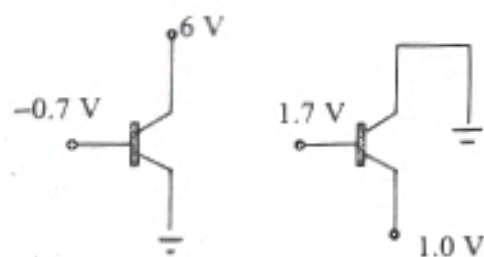


Figure shows two silicon transistors T_1 and T_2 located in a circuit, which operates properly. If V_{CE} values of the transistors T_1 and T_2 are 0.1V and 3V respectively. Which of the following is true?

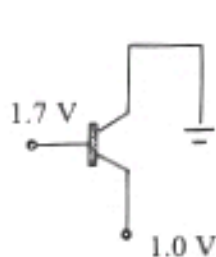
- 1) V_{BC} of T_1 is approximately 0.6 V, and the BC junction is forward biased.
- 2) V_{BC} of T_2 is approximately 0.6 V, and the BC junction is forward biased.
- 3) V_{BC} of T_1 is approximately 0.6 V, and the BC junction is reversed biased.
- 4) V_{BC} of T_2 is approximately 2.3 V, and the BC junction is forward biased.
- 5) V_{BC} of T_1 is approximately 3 V, and the BC junction is reversed biased.

(2010)

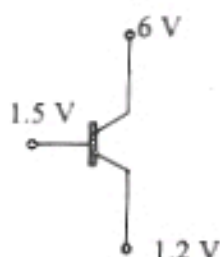
- 11) Which of the Si transistors shown, operates in the active mode?



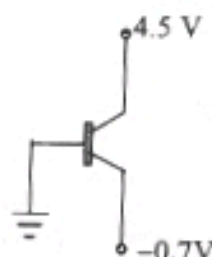
1)



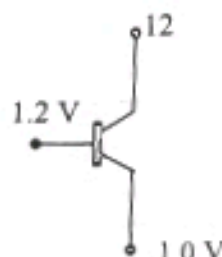
2)



3)



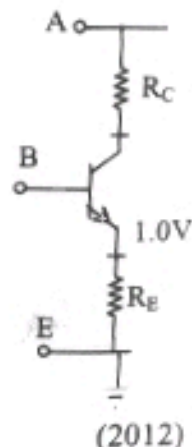
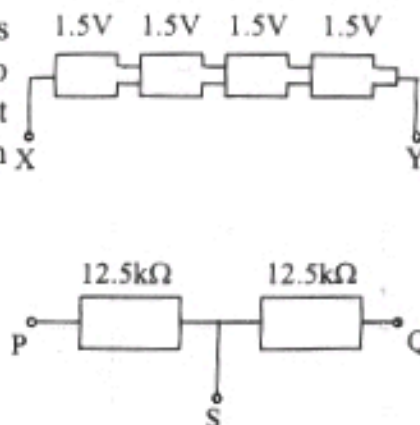
4)



5)(2011NS)

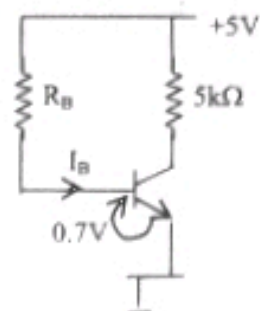
- 12) Which of the following connections will have to be made in order to operate the transistor (Si) circuit given in the figure as a common emitter amplifier?

- 1) XE, YB, AP, BQ, SE
- 2) PA, YE, XP, BS, QE
- 3) SB, YA, AQ, BQ, SE
- 4) XE, YB, AQ, BP, SA
- 5) YA, XE, AP, BS, QE



(2012)

- 13) In the circuit shown $I_B = 500 \mu\text{A}$ and the transistor has a current gain, β of 100. Current through the $5 \text{ k}\Omega$ resistor is approximately
- 1) 0.5 mA
 - 2) 1.0 mA
 - 3) 2.0 mA
 - 4) 5.0 mA
 - 5) 50.0 mA



(2013)

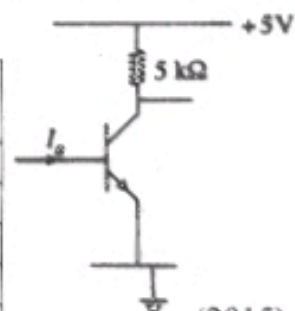
- 14) Which of the following is not true regarding an npn transistor and an n-channel junction field effect transistor (JFET)

	npn transistor	n-channel JFET
1)	Has two pn junctions.	Has only one pn junction.
2)	Base – emitter junction is forward biased when operating in the active mode.	Gate-source junction is reverse biased during the operation.
3)	An arrow is marked on the emitter of the transistor symbol.	An arrow is marked on the source of the transistor symbol.
4)	Both free electrons and holes participate in the operation of the transistor.	Only free electrons participate in the operation
5)	Magnitude of the current through the collector depends on the base-emitter voltage.	Magnitude of the current through the channel depends on the gate source voltage.

(2014)

- 15) In the circuit shown, the current gain of the transistor is 100. When different I_B values are applied to the base, which of the following is true regarding the mode of operation of the transistor?

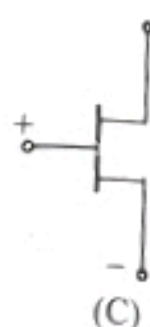
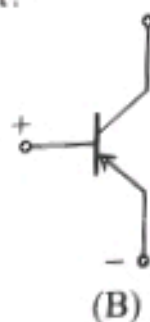
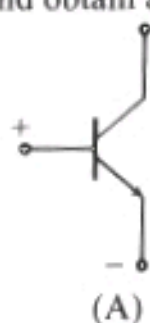
	I_B value applied in μA	Mode of operation of the transistor
1)	0	Saturation mode
2)	5	Cut off mode
3)	12	Active mode
4)	15	Cut off mode
5)	20	Saturation mode



(2015)

- 16) Which of the figures shown correctly indicate/s the polarities of potential difference that have to be applied across the junctions shown in order to operate the transistor properly and obtain a suitable current?

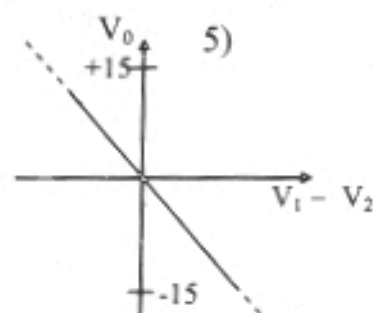
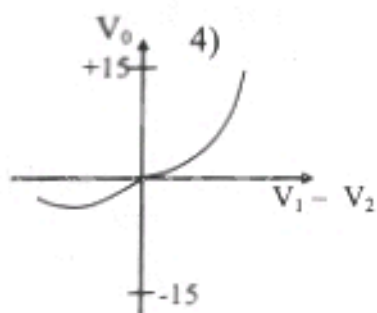
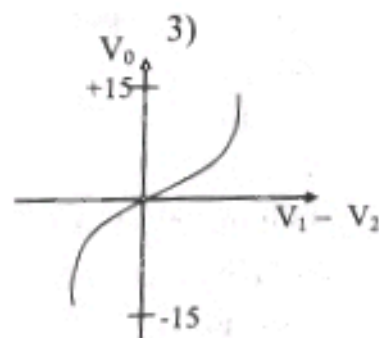
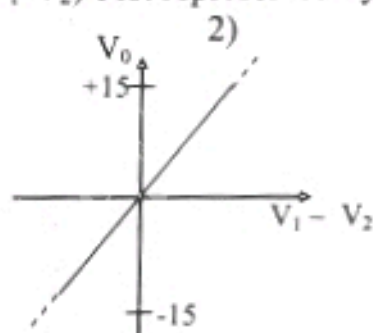
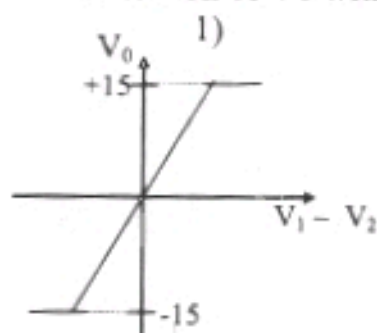
- 1) In A only.
- 2) In B only.
- 3) In C only.
- 4) In A and C only.
- 5) In B and C only.



(2016)

03. Integrated Circuits

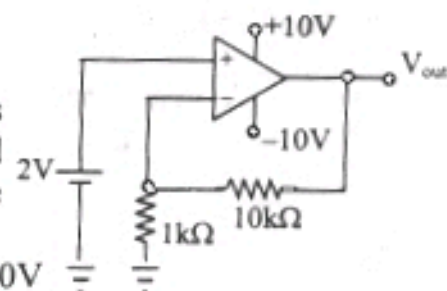
- 1) A 741 operational amplifier is powered with supply voltages of $\pm 15V$. If V_1 and V_2 represent the input voltages and V_0 represents the output voltages, of the variation of V_0 with $(V_1 - V_2)$ best represented by,



(2001)

- 2) The Operational amplifier circuit shown operates with $+10V$ and $-10V$ power supplies. What would be the approximate output voltage (V_{out}) of the circuit?

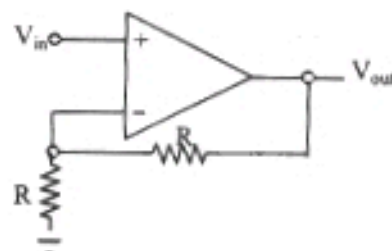
- 1) $+22V$
- 2) $-22V$
- 3) $+20V$
- 4) $+10V$
- 5) $-10V$



(2004)

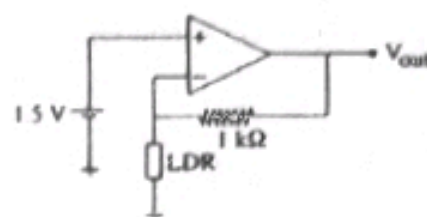
- 3) The voltage gain of the circuit shown is,

- 1) $+2$
- 2) -2
- 3) $+1$
- 4) -1
- 5) $+4$

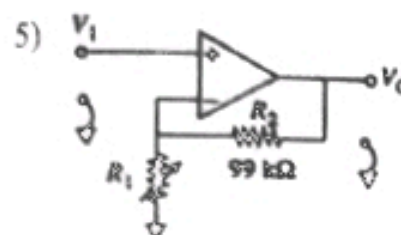


(2005)

- 4) The figure shows an operational amplifier circuit with a light dependant resistor (LDR) and a $1\text{ k}\Omega$ resistor. The supply voltage to the operational amplifier is $\pm 16.5\text{ V}$ and its saturation voltage is $\pm 15\text{ V}$. The resistance of the LDR is $1\text{ M}\Omega$ at complete darkness and $100\text{ }\Omega$ at bright light. The approximate value of the output voltage of the circuit V_{out} at complete darkness and bright light will be respectively.



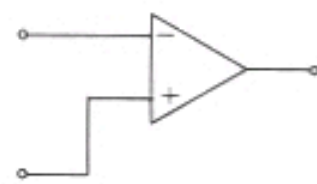
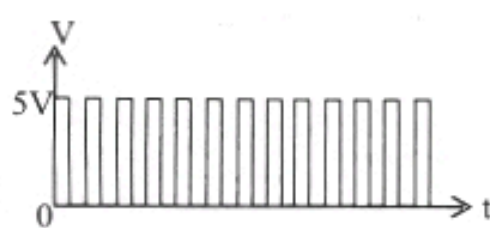
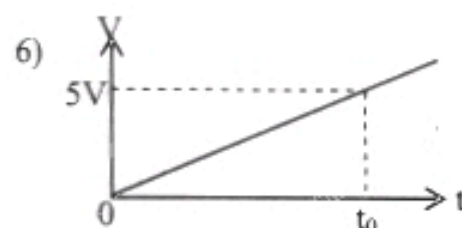
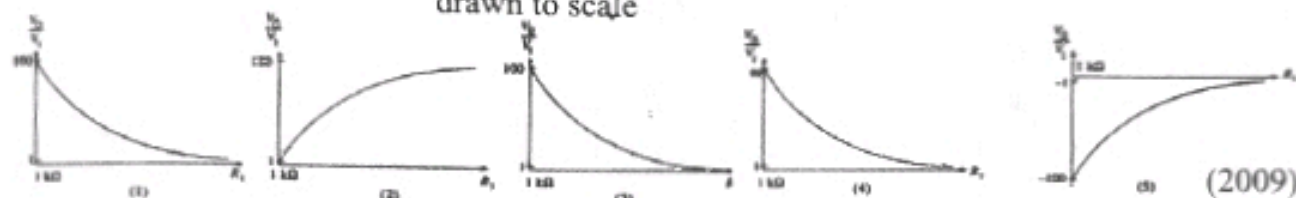
- 1) 1.5 V and 15 V 2) 1.5 V and 16.5 V 3) -1.5 mV and -1.5 mV
 4) -1.5 V and -16.5 V 5) 1.5 mV and 15 V (2007)



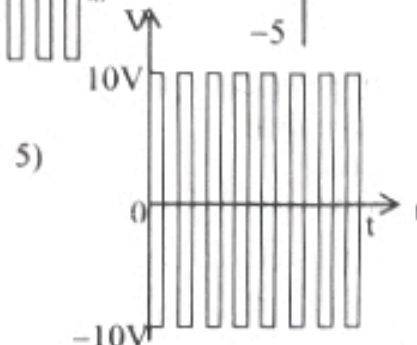
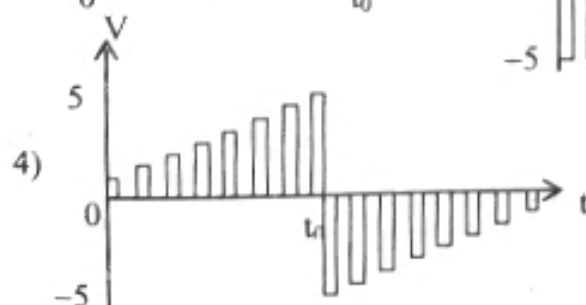
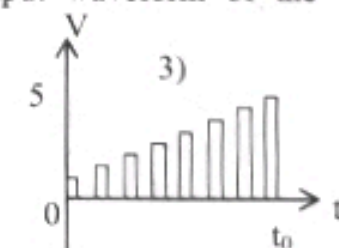
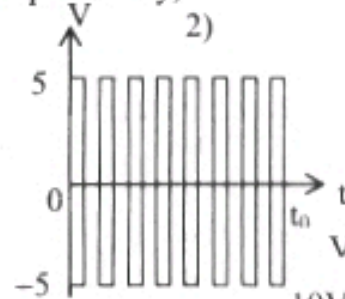
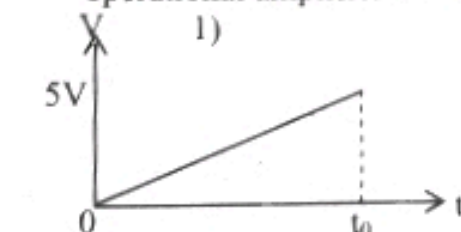
Which of the following curves correctly represents the variation of the voltage gain $\left(\frac{V_o}{V_i}\right)$ of the circuit shown when

the value of R_1 is changed from $1\text{ k}\Omega$ to infinity? $\left(\frac{V_o}{V_i}\right)$ is not

drawn to scale

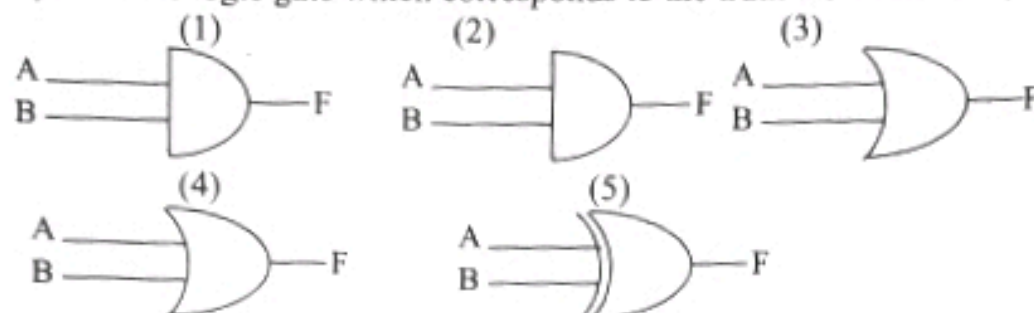


The inverting input of a 741 operational amplifier operating with $\pm 10\text{ V}$ power supply voltage is provided with a voltage signal which increases linearly with time (t) as shown in the figure. The non-inverting input is provided with a rectangular voltage waveform of amplitude 5 V as shown. The output waveform of the operational amplifier is best represent by,



04. Logic Gates

- 1) The logic gate which corresponds to the truth table shown is,

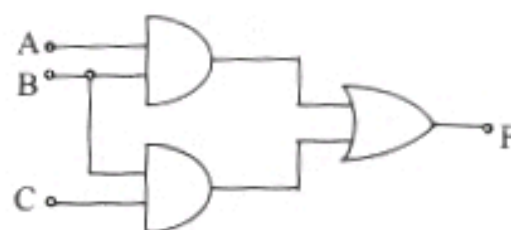


A	B	F
0	0	0
0	1	1
1	0	1
1	1	1

(1997)

- 2) In the circuit shown ABC represents a binary number for the output F to be binary 1, ABC should be,

- 1) 000 2) 010
3) 100 4) 101
5) 110



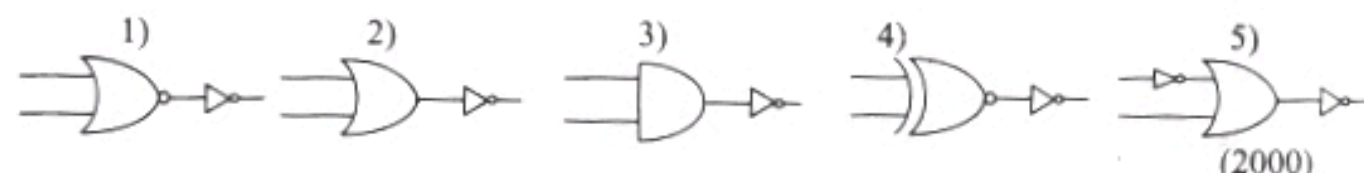
(1998)

- 3) If A, B and C are three Boolean variables, the output F is given by

- 1) $F = A + \bar{B}C$ 2) $F = (\bar{B} + C)A$
3) $F = (A + \bar{B})C$ 4) $F = (\bar{C} + B)A$ 5) $F = A + BC$ (1999)

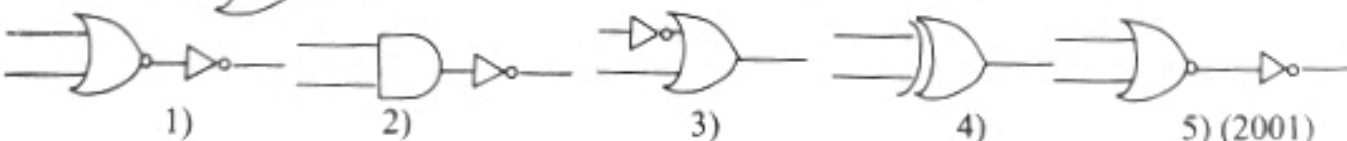


- 4) The gate shown in figure is equivalent to



(2000)

- 5) The gate shown the figure is equivalent to



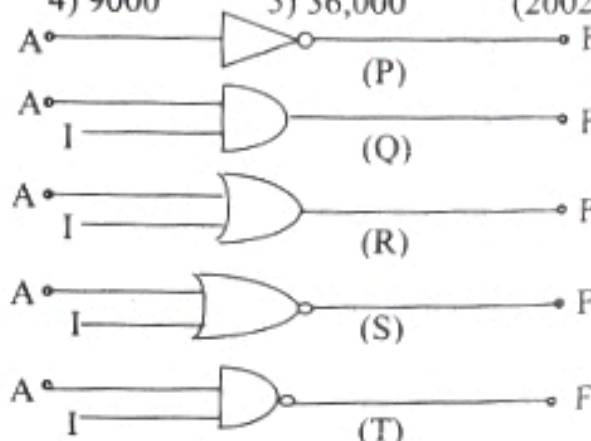
(2001)

- 6) 100W filament electric bulb is replaced with an energy saving bulb of 10W. If the bulb is used 4 hours daily the electrical units (kWh) saved in 100 days would be,

- 1) 3.6 2) 9 3) 36 4) 9000 5) 36,000 (2002)

- 7) The second input of the gates shown in the diagram is connected to binary 1. Of the gates, performances are identical only in

- 1) P and Q 2) Q and R
3) R and S 4) S and T
5) P and T (2003)



8)

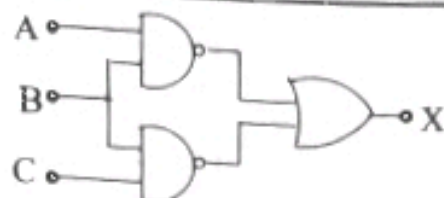
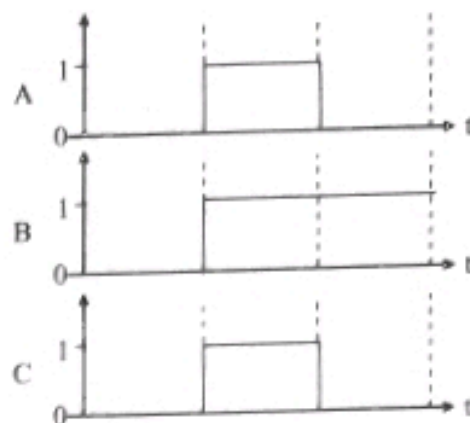


Figure (a) shows a digital circuit. The variations of the logic values of its inputs A, B and C with time (t) are shown in figure (b);

The output X will be 0 during the time interval / intervals

- 1) from t_0 to t_1 2) from t_0 to t_1 3) from t_2 to t_3
 4) from t_1 to t_3 5) from t_0 to t_1 , and from t_2 to t_3 (2004)

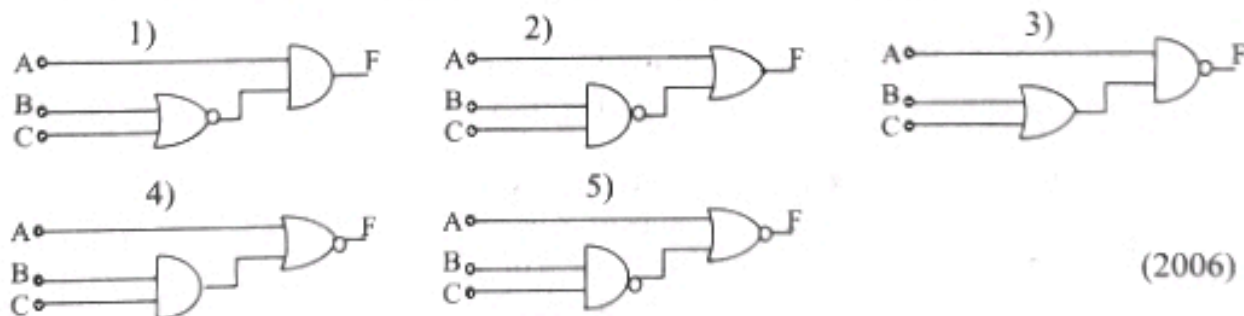


- 9) An alarm is to be sounded to a car at least when the car is started while a door is open, or the car is started while the driver is not wearing seat belt. Three sensors A, B and C provide signals such that $A=1$ when at least one door open, $B=1$ when the engine is running and $C=1$ when the driver is not wearing seat belt. If the alarm is activated when $F=1$, the correct truth table for, F is,

A	B	C	F	A	B	C	F	A	B	C	F	A	B	C	F	A	B	C	F
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
0	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1	0	0
0	1	1	1	0	1	1	0	0	1	1	1	0	1	1	0	0	1	1	1
1	0	0	1	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0
1	0	1	1	1	0	1	0	1	0	1	1	1	0	1	0	1	0	1	0
1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

1) 2) 3) 4) 5) (2005)

- 10) The circuit corresponding to the logic expression $F = A \cdot \overline{B + C}$



- 11) Consider the following statements made regarding the logic gate shown in the figure.

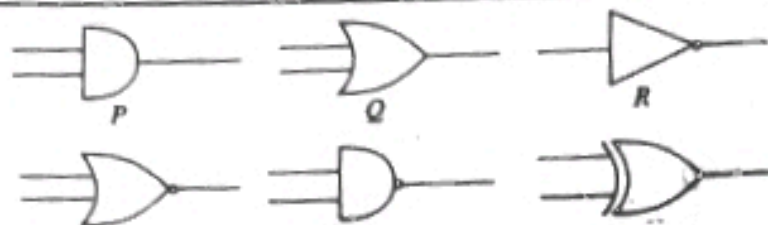
- A) When $P = 1$, $R = Q$ B) When $Q = 0$, $R = P$
 C) When $P = 0$, $R = 0$



Of the above statements,

- 1) only (C) is true. 2) only (A) and (B) are true.
 3) only (A) and (C) are true. 4) all (B) and (C) are true.
 5) all (A), (B) and (C) are true. (2007)

12)



Which of the two gates shown can be combined to construct a circuit in order to obtain a binary output of 1 for input binary digit combinations of 00 and 11 only?

1) P and R 2) P and Q 3) R and U 4) S and R 5) T and Q (2008)

13)

Two NOT gates are connected as shown in figure. Consider following combinations of logic levels for the outputs Q_1 and Q_2

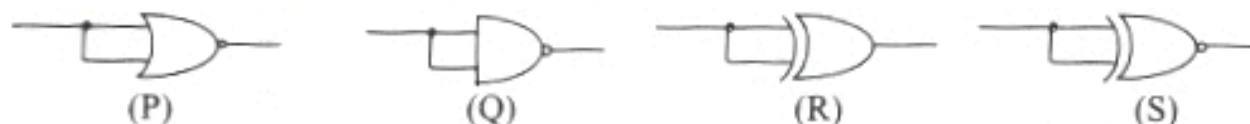


	Logic level for Q_1	Logic level for Q_2
(A)	0	0
(B)	0	1
(C)	1	0
(D)	1	1

Which of the above combination/s will provide stable logic levels for Q_1 and Q_2 outputs?

1) (A) only 2) (D) only 3) (A) and (B) only
4) (A) and (D) only 5) (B) and (C) only (2009)

14) Which of the arrangements shown is/ true equivalent to a NOT gate?



1) P only 2) Q only 3) P and Q only
4) P, Q and S only 5) all P, Q, R and S. (2010)

15) Which of the following gates **cannot** have more than one input?

1) AND gate 2) OR gate 3) NAND gate 4) NOT gate 5) EX - OR gate (2011 NS)

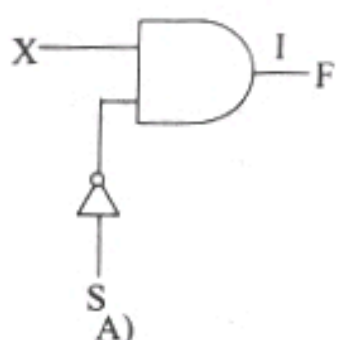
16) Which of the following gates **cannot** have more than one input?

1) AND gate 2) OR gate 3) NAND gate 4) NOT gate 5) EX - OR gate (2012)

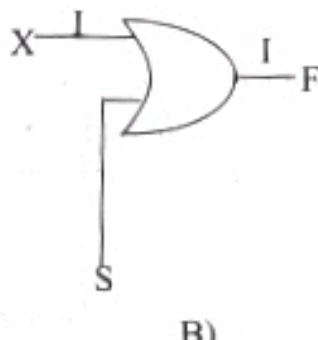
17) Which of the logic circuits shown will operate in the following manner?

When $S = 0$, output $F = X$ (value of X can be either 1 to 0)

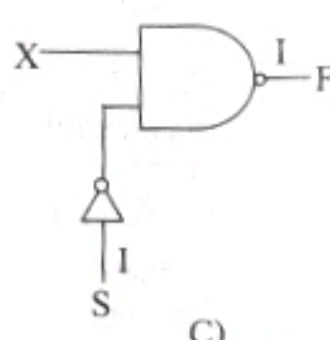
When $S = 1$, output $F = 0$, (irrespective of the value of X)



1) only A



2) only B



3) only C

4) only A and B

5) only B and C

ANSWERS

ELECTRONICS

01) Semi Conductor Diodes

(01) 4 (02) 3 (03) 3 (04) 3 (05) 1 (06) 5 (07) 3 (08) 4 (09) 3 (10) 2
 (11) 2 (12) 2 (13) 3,4 (14) 3 (15) 5 (16) 2 (17) 2 (18) 5 (19) 4 (20) 4
 (21) 3

02) Transistors

(01) 3 (02) 5 (03) 5 (04) 4 (05) 5 (06) 4 (07) 5 (08) 3 (09) 2 (10) 1
 (11) 4 (12) 5 (13) 2 (14) 3 (15) 5 (16) 1

03) Integrated Circuits

(01) 1 (02) 4 (03) 1 (04) 1 (05) 1 (06) 5

04) Logic Gates

(01) 3 (02) 5 (03) 1 (04) 3 (05) 5 (06) 1 (07) 5 (08) 2 (09) 5 (10) 1
 (11) 3 (12) 3 (13) 5 (14) 3 (15) 5 (16) 4 (17) 1 (18) 5 (19) 5 (20) 4
 (21) 4