PREVIOUS YEARS' QUESTIONS EXERCISE-II

1. In a common-base mode of a transistor, the collector current is 5.488 mA for an emitter current of 5.60 mA. The value of the base current amplification factor (β) will be- **[AIEEE - 2006]**

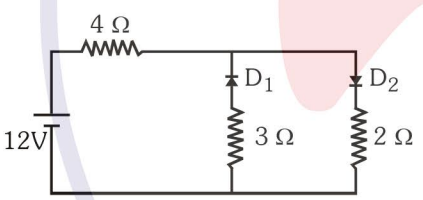
(1) 49 (2) 50

(3) 51 (4) 48

2. If the ratio of the concentration of electrons to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of currents is $\frac{7}{4}$, then what is the ratio of their drift velocities ? **[AIEEE - 2006]**

(1) $\frac{5}{8}$ (2) $\frac{4}{5}$ (3) $\frac{5}{4}$ (4) $\frac{4}{7}$

3. The circuit has two oppsitely connected ideal diodes in parallel. What is the current flowing in the circuit **[AIEEE - 2006]**



(1) 1.71 A (2) 2.00 A

(3) 2.31 A (4) 1.33 A

4. A working transitor with its three legs marked P, Q and R is tested using a multimeter. No conduction is found betwen P and Q. By connecting the common (negative) terminal of the multimeter to R and the other (positive) terminal to P or Q, some resistance is seen on the multimeter. Which of the following is true for the transistor?

[AIEEE - 2008]

(1) It is an npn transistor with R as base

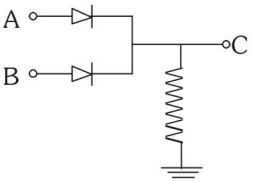
(2) It is a pnp transistor with R as collector

(3) It is a pnp transistor with R as emitter

(4) It is an npn transistor with R as collector

5. In the circuit below, A and B represent two inputs and C represents the output. The circuit represents

[AIEEE - 2008]



(1) NOR gate (2) AND gate

(3) NAND gate (4) OR gate

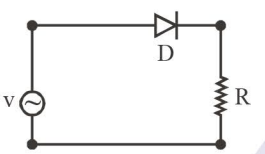
6. Two full turns of the circular scale of screw gauge cover a distance of 1 mm on scale. The total number of divisions on circular scale is 50. Further, it is found that screw gauge has a zero error of -0.03 mm. While measuring the diameter of a thin wire a student notes the main scale reading of 3 mm and the number of circular scale division in line, with the main scale is 35. The diameter of the wire is :-

[AIEEE - 2008]

(1) 3.32 mm (2) 3.73 mm

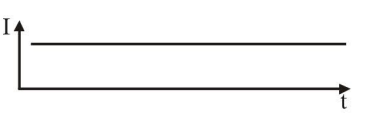
(3) 3.67 mm (4) 3.38 mm

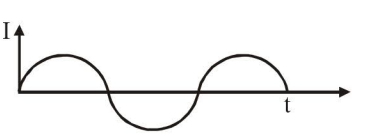
7. A p-n junction (D) shown in the figure can act as a rectifier. An alternating current source (V) is connected in the circuit.

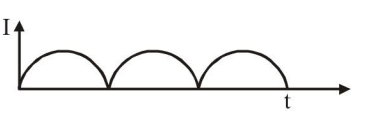


The current (I) in the resistor (R) can be shown by :- **[AIEEE - 2009]**

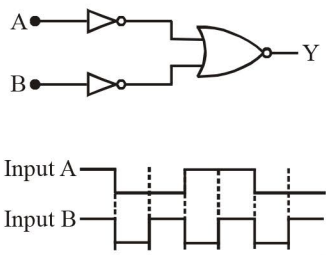
(1) 

(2) 

(3) 

(4) 

8. The logic circuit shown below has the input waveform 'A' and 'B' as shown. Pick out the correct output waveform :-



Output is :- **[AIEEE - 2009]**

(1) 

(2) 

(3) 

(4) 

9. In an experiment the angles are required to be measured using an instrument, 29 divisions of the main scale exactly coincide with the 30 divisions of the vernier scale. If the smallest division of the main scale is half-a-degree (=0.5°), then the least count of the instrument is :- **[AIEEE-2009]**

(1) One degree

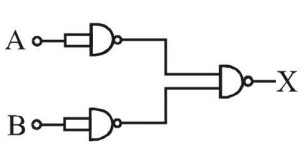
(2) Half degree

(3) One minute

(4) Half minute

10. The combination of gates shown below yields:-

[AIEEE - 2010]



(1) NAND gate (2) OR gate

(3) NOT gate (4) XOR gate

11. This question has Statement-1 and Statement-2. Of the four choices given after the statements, choose the one that best describes the two statements.

Statement-1:

Sky wave signals are used for long distance radio communication. These signals are in general, less stable than ground wave signals.

Statement-2 :

The state of ionosphere varies from hour to hour, day to day and season to season. **[AIEEE - 2011]**

(1) Statement-1 is true, Statement-2 is true and Statement-2 is not the correct explanation of Statement-1.

(2) Statement-1 is false, Statement-2 is true

(3) Statement-1 is true, Statement-2 is false

(4) Statement-1 is true, Statement-2 is true and Statement-2 is the correct explanation of statement-1.

12. The ouput of an OR gate is connected to both the inputs of a NAND gate. The combination will serve as a : **[AIEEE - 2011]**

(1) OR gate (2) NOT gate

(3) NOR gate (4) AND gate

13. Which of the following four alternatives is not correct We need modulation :-

[AIEEE - 2011]

(1) To increase the selectivity

(2) To reduce the time lag between transmission and reception of the information signal

(3) to reduce the size of antenna

(4) To reduce the fractional band width, that is the ratio of the signal band width to the centre frequency

14. A screw gauge gives the following reading when used to measure the diameter of a wire.

Main scale reading : 0 mm.

Circular scale reading : 52 divisions

Given that 1 mm on main scale corresponds to 100 divisions of the circular scale.

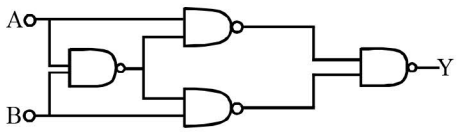
The diameter of wire from the above date is :-

[AIEEE - 2011]

(1) 0.026 cm (2) 0.005 cm

(3) 0.52 cm (4) 0.052 cm

15. Truth table for system of four NAND gates as shown in figure is :- **[AIEEE - 2012]**



(1)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

(2)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

(3)

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	1

(4)

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	0

16. A spectrometer gives the following reading when used to measure the angle of a prism. Main scale reading : 58.5 degree **[AIEEE - 2012]**

Vernier scale reading : 09 divisions Given that 1 division on main scale corresponds to 0.5 degree. Total divisions on the vernier scale is 30 and match with 29 divisions of the main scale. The angle of the prism from the above data :

(1) 59 degree

(2) 58.59 degree

(3) 58.77 degree

(4) 58.65 degree

17. N divisions on the main scale of a vernier callipers coincide with (N + 1) divisions of the vernier, scale. If each division of main scale is 'a' units, then the least count of the instrument is :-

[AIEEE - 2012 (Online)]

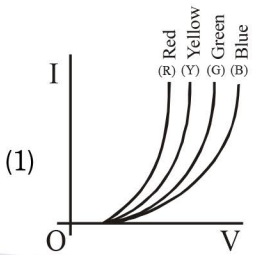
(1) $\frac{a}{N}$ (2) $\frac{N}{N+1} \times a$

(3) **a** (4) $\frac{a}{N+1}$

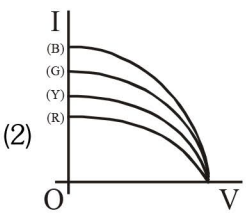
18. The I-V characteristic of an LED is :

[JEE (Main) 2013]

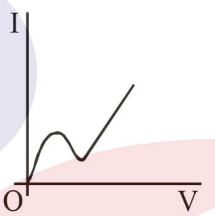
(1)



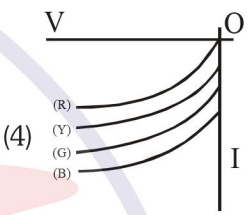
(2)



(3)



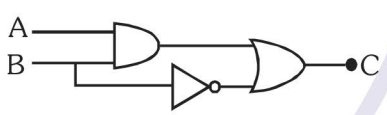
(4)



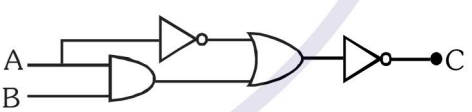
19. Which of the following circuits correctly represents the following truth table ? **[JEE (Main) 2013(Online)]**

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

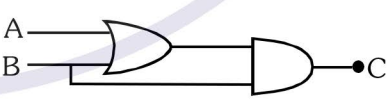
(1)



(2)



(3)



(4)

20. Which of the following modulated signal has the best noise-tolerance ? **[JEE (Main) 2013(Online)]**

(1) short-wave

(2) medium-wave

(3) long-wave

(4) amplitude-modulated

21. If a carrier wave $c(t) = A \sin\omega_c t$, were to be amplitude modulated by a modulating signal $m(t) = A \sin\omega_m t$, the equation representing the modulated signal $[C_m(t)]$, and its modulation index, would be respectively : **[JEE (Main) 2013(Online)]**

(1) $C_m(t) = A(1 + \sin\omega_m t)\sin\omega_c t$ and 1

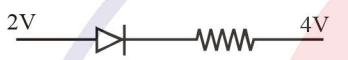
(2) $C_m(t) = A(1 + \sin\omega_m t)\sin\omega_c t$ and 2

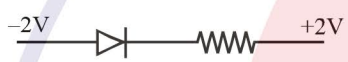
(3) $C_m(t) = A(1 + \sin\omega_c t)\sin\omega_m t$ and 2

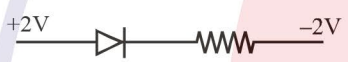
(4) $C_m(t) = A(1 + \sin\omega_c t)\sin\omega_m t$ and 1

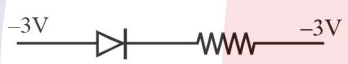
22. The forward biased diode connection is :

[JEE (Main) 2014]

(1) 

(2) 

(3) 

(4) 

23. A student measured the length of a rod and wrote it as 3.50 cm. Which instrument did he use to measure it? **[JEE (Main) - 2014]**

(1) A screw gauge having 100 divisions in the circular scale and pitch as 1 mm.

(2) A screw gauge having 50 divisions in the circular scale and pitch as 1 mm.

(3) A meter scale

(4) A vernier calliper where the 10 divisions in vernier scale matches with 9 division in main scale and main scale has 10 divisions in 1 cm.

24. A single of 5 kHz frequency is amplitude modulated on a carrier wave of frequency 2 MHz. The frequencies of the resultant signal is/are -

[JEE (Main) 2015]

(1) 2005 kHz, 2000 kHz and 1995 kHz

(2) 2000 kHz and 1995 kHz

(3) 2 MHz only

(4) 2005 kHz and 1995 kHz

25. Choose the correct statement : **[JEE (Main) 2016]**

(1) In frequency modulation the amplitude of the high frequency carrier wave is made to vary in proportion to the frequency of the audio signal.

(2) In amplitude modulation the amplitude of the high frequency carrier wave is made to vary in proportion to the amplitude of the audio signal.

(3) In amplitude modulation the frequency of the high frequency carrier wave is made to vary in proportion to the amplitude of the audio signal.

(4) In frequency modulation the amplitude of the high frequency carrier wave is made to vary in proportion to the amplitude of the audio signal.

26. For a common emitter configuration, if α and β have their usual meanings, the **incorrect** relationship between α and β is **[JEE (Main) 2016]**

(1) $\alpha = \dfrac{\beta^2}{1+\beta^2}$ (2) $\dfrac{1}{\alpha} = \dfrac{1}{\beta} + 1$

(3) $\alpha = \dfrac{\beta}{1-\beta}$ (4) $\alpha = \dfrac{\beta}{1+\beta}$

27. If a, b, c, d are inputs to a gate and x is its output, then as per the following time graph, the gate is

[JEE (Main) 2016]

(d) 

(c) 

(b) 

(a) 

(x) 

(1) NAND (2) NOT

(3) AND (4) OR

28. The temperature dependence of resistances of Cu and undoped Si in the temperature range 300-400K, is best described by :- **[JEE (Main) 2016]**

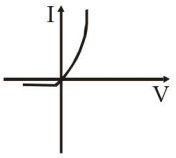
(1) Linear decrease for Cu, linear decrease for Si.

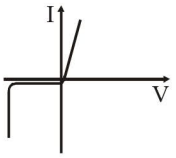
(2) Linear increase for Cu, linear increase for Si.

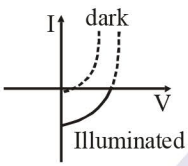
(3) Linear increase for Cu, exponential increase for Si

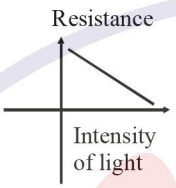
(4) Linear increase for Cu, exponential decrease for Si

29. Identify the semiconductor devices whose characteristics are given below, in the order (a), (b), (c), (d) :- **[JEE (Main) 2016]**

(a) 

(b) 

(c) 

(d) 

(1) Zener diode, Solar cell, Simple diode, Light dependent resistance

(2) Simple diode, Zener diode, Solar cell, Light dependent resistance

(3) Zener diode, Simple diode, Light dependent resistance, Solar cell

(4) Solar cell, Light dependent resistance, Zener diode, Simple diode

30. A screw gauge with a pitch of 0.5 mm and a circular scale with 50 divisions is used to measure the thickness of a thin sheet of Aluminium. Before starting the measurement , it is found that when the two jaws of the screw gauge are brought in contact, the 45th division coincides with the main scale line and that the zero of the main scale is barely visible. What is the thickness of the sheet if the main scale reading is 0.5 mm and the 25th division coincides with the main scale line ? **[JEE(Main)-2016]**

(1) 0.50 mm (2) 0.75 mm
(3) 0.80 mm (4) 0.70 mm

PREVIOUS YEARS QUESTIONS				ANSWER KEY						Exercise-II
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**1**	**3**	**2**	**1**	**4**	**4**	**1**	**3**	**3**	**2**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**1**	**3**	**2**	**4**	**2**	**4**	**4**	**1**	**2**	**1**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**3**	**4**	**1**	**2**	**1,3**	**4**	**4**	**2**	**3**