Valve & Digital electronics Assignment

1. If $R_p = 7K\Omega, g_m = 2.5$ *millimho*, then on increasing plate voltage by $50V$, how much the grid voltage is changed so that plate current remains the same

(a) – 2.86 *V* (b) – 4 *V* (c) + 4 *V* (d) + 2 *V*

2. The amplification factor of a triode is 20 and trans-conductance is 3 *milli mho* and load resistance $3\times10^4\Omega$, then the voltage gain is

(a) 16.36 (b) 28 (c) 78 (d) 108

3. In a triode amplifier, $\mu = 25, r_p = 40$ kilo ohm and load resistance $R_L = 10$ kilo ohm. If the input signal voltage is 0.5 volt, then output signal voltage will be

(a) 1.25 *volt* (b) 5 *volt* (c) 2.5 *volt* (d) 10 *volt*

4. The amplification factor of a triode is 20. If the grid potential is reduced by 0.2 *volt* then to keep the plate current constant its plate voltage is to be increased by

(a) 10 *volt* (b) 4 *volt* (c) 40 *volt* (d) 100 *volt*

5. For a triode $r_p = 10$ *kilo ohm* and $g_m = 3$ *milli mho*. If the load resistance is double of plate resistance, then the value of voltage gain will be

(a) 10 (b) 20 (c) 15 (d) 30

6. The amplification produced by a triode is due to the action of

(a) Filament (b) Cathode (c) Grid (d) Plate

7. In an experiment, the saturation in the plate current in a diode is observed at 240 *V*. But a student still wants to increase the plate current. It can be done, if

(a) The plate voltage is increased further (b) The plate voltage is decreased

(c) The filament current is decreased (d) The filament current is increased

8. In a triode amplifier, the value of maximum gain is equal to

(a) Half the amplification factor (b) Amplification factor

(c) Twice the amplification factor (d) Infinity

9. For a given triode $\mu = 20$. The load resistance is 1.5 times the anode resistance. The maximum gain will be

(a) 16 (b) 12 (c) 10 (d) None of the above

10. The amplification factor of a triode is 20. Its plate resistance is 10 kilo ohms. Mutual conductance is

(a) 2×10^5 *mhos* (b) 2×10^4 *mhos* (c) 500 *mhos* (d) 2×10^{-3} *mhos*

11. The voltage gain of a triode depends upon

(a) Filament voltage (b) Plate voltage (c) Plate resistance (d) Plate current

12. In a triode valve

(a) If the grid voltage is zero then plate current will be zero

(b) If the temperature of filament is doubled, then the thermionic current will also be doubled

(c) If the temperature of filament is doubled, then the thermionic current will nearly be four times

(d) At a definite grid voltage the plate current varies with plate voltage according to Ohm's law

13. The plate current i_p in a triode valve is given $i_p = K(V_p + \mu V_g)^{3/2}$ where i_p is in milliampere and V_p and V_g are in *volt*. If $r_p = 10^4$ *ohm*, and $g_m = 5\times10^{-3}\,mho$, then for $i_p = 8\,mA$ and $V_p = 300\,volt$, what is the value of *K* and grid cut off voltage

(a) – 6 *V*, $(30)^{3/2}$ (b) $-6V, (1/30)^{3/2}$ (c) + 6 *V*, $(30)^{3/2}$ (d) + 6 *V*, $(1/30)^{3/2}$

14. The amplification factor of a triode valve is 15. If the grid voltage is changed by 0.3 *volt* the change in plate voltage in order to keep the plate current constant (in volt) is

(a) 0.02 (b) 0.002 (c) 4.5 (d) 5.0

15. The slopes of anode and mutual characteristics of a triode are 0.02 *mA* V^{-1} and 1 *mA* V^{-1} respectively. What is the amplification factor of the valve

(a) 5 (b) 50 (c) 500 (d) 0.5

16. The slope of plate characteristic of a vacuum tube diode for certain operating point on the curve is $10^{-3}\,\frac{mA}{V}$. The plate resistance of the diode and its nature respectively

(a) 100 kilo-ohms static (b) 1000 *kilo-ohms* static (c) 1000 *kilo-ohms* dynamic (d) 100 *kilo-ohms* dynamic

17. A triode has a mutual conductance of $2\times10^{-3}mho$ and an amplification factor of 50. The anode is connected through a resistance of 25×10^3 *ohms* to a 250 *volts* supply. The voltage gain of this amplifier is

(a) 50 (b) 25 (c) 100 (d) 12.5

18. 14×10^{15} electrons reach the anode per second. If the power consumed is 448 *milliwatts*, then the plate (anode) voltage is

(a) 150 *V* (b) 200 *V* (c) 14×448 *V* (d) 448/14 *V*

19. A valve oscillator is

(a) Simple diode (b) Double diode (c) Triode (d) *L-C* circuit

20. Amplification factor of a triode is 20. If the grid voltage is reduced by one volt, how much should the plate voltage be increased so that plate current remains constant

(a) 10 *V* (b) 1/10 *V* (c) 1/20 *V* (d) 20 *V*

21. If the amplification factor of a triode valve is 100, then at plate potential of 250 *volt* the cutoff voltage of its grid will be

(a) 0 *V* (b) – 0.4 *V* (c) – 2.5 *V* (d) – 150 *V*

22. In the circuit of a triode valve, there is no change in the plate current, when the plate potential is increased from 200 *volt* to 220 *volt* and the grid potential is decreased from – 0.5 *volt* to –1.3 *volt*. The amplification factor of this valve is

(a) 15 (b) 20 (c) 25 (d) 35

23. If the amplification factor of a triode (μ) is 22 and its plate resistance is 6600 *ohm*, then the mutual conductance of this valve is mho is

(a) $\frac{1}{300}$ (b) 25×10^{-2} (c) 2.5×10^{-2} (d) 0.25×10^{-2}

24. For a triode, at $V_g = -1$ *volt*, the following observations were taken $V_p = 75\,V, I_p = 2mA$, $V_p = 100\,V, I_p = 4mA$. The value of plate resistance will be

(a) 25 KΩ (b) 20.8 KΩ (c) 12.5 KΩ (d) 100 KΩ

25. The triode constant is out of the following

(a) Plate resistance (b) Amplification factor (c) Mutual conductance (d) All the above

26. The unit of mutual conductance of a triode valve is

(a) Siemen (b) *Ohm* (c) *Ohm metre* (d) *Joule Coulomb*$^{-1}$

27. With a change of load resistance of a triode, used as an amplifier, from 50 *kilo ohms* to 100 *kilo ohms*, its voltage amplification changes from 25 to 30. Plate resistance of the triode is

(a) 25 *Kilo ohms* (b) 75 *Kilo ohms* (c) 7.5 *Kilo ohms* (d) 2.5 *Kilo ohms*

28. The amplification factors of a triode is 10. If the grid potential is reduced by 0.4 *volt* then what should be the increase in plate potential, so that the current remains constant

(a) 0.4 *V* (b) 40 *V* (c) 4 *V* (d) 14 *V*

29. Select the correct statements from the following

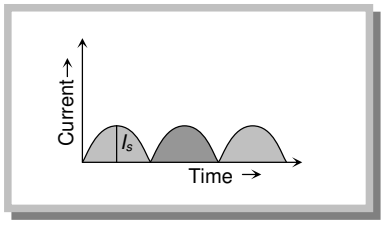
(a) A diode can be used as a rectifier

(b) A triode cannot be used as a rectifier

(c) The current in a diode is always proportional to the applied voltage

(d) The linear portion of the I–V characteristic of a triode is used for amplification without distortion

30. The output current versus time curve of a rectifier is shown in the figure. The average value of the output current in this case is



(a) 0

(b) $\frac{i_0}{\pi}$

(c) $\frac{2i_0}{\pi}$

(d) i_0

31. The introduction of a grid in a triode valve affects plate current by

(a) Making the thermionic emission easier at low temperature (b) Releasing more electrons from the plate

(c) By increasing plate voltage (d) By neutralising space charge

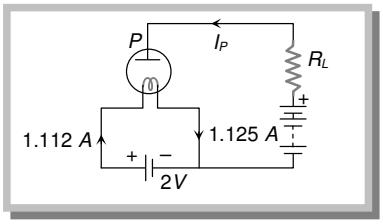
32. Before the saturation state of a diode at the plate voltages of 400 *V* and 200 *V* respectively the currents are i_1 and i_2 respectively. The ratio i_1/i_2 will be

(a) $\sqrt{2}/4$ (b) $2\sqrt{2}$ (c) 2 (d) 1/2

33. The value of constant *A* in Richardson-Dushman equation in $A/m^2/k^2$ is

(a) $\frac{4\pi me}{h^3}$ (b) $\frac{4\pi me^2}{h^3}$ (c) $\frac{4\pi me^2k}{h^3}$ (d) $\frac{4\pi mk^2e}{h^3}$

34. The value of plate current in the given circuit diagram will be



(a) 3 *mA*
(b) 8 *mA*
(c) 13 *mA*
(d) 18 *mA*

35. The plate resistance of a diode valve is 5000 Ω. If the value of plate current is 4.5 *mA* at a plate potential of 70 *V*, then what will be the plate potential at plate current of 6.5 *mA*

(a) 60 *V* (b) 70 *V* (c) 80 *V* (d) 90 *V*

36. How many NAND gates are used to form an AND gate

(a) 1 (b) 2 (c) 3 (d) 4

37. A gate has the following truth table

P	1	1	0	0
Q	1	0	1	0
R	1	0	0	0

The gate is

(a) NOR (b) OR (c) NAND (d) AND

38. A logic gate is an electronic circuit which

(a) Makes logic decisions
(b) Allows electrons flow only in one direction
(c) Works binary algebra
(d) Alternates between 0 and 1 values

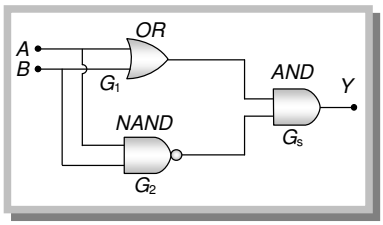
39. The logic behind 'NOR' gate is that it gives

(a) High output when both the inputs are low
(b) Low output when both the inputs are low
(c) High output when both the inputs are high
(d) None of these

40. Boolean algebra is essentially based on

(a) Truth (b) Logic (c) Symbol (d) Numbers

41. The following configuration of gate is equivalent to



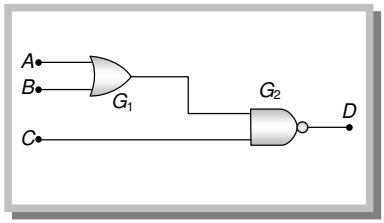
(a) NAND
(b) XOR
(c) OR
(d) None of these

42. The truth-table given below is for which gate

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

(a) XOR (b) OR (c) AND (d) NAND

43. For the given combination of gates, if the logic states of inputs *A*, *B*, *C* are as follows *A* = *B* = *C* = 0 and *A* = *B* = 1, *C* = 0 then the logic states of output *D* are



(a) 0, 0
(b) 0, 1
(c) 1, 0
(d) 1, 1

44. The truth table shown in figure is for

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

(a) XOR (b) AND (c) XNOR (d) OR

45. Which one of the following gates can be served as a building block for any digital circuit

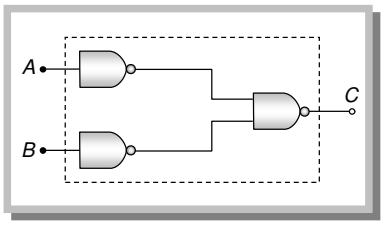
(a) OR (b) AND (c) NOT (d) NAND

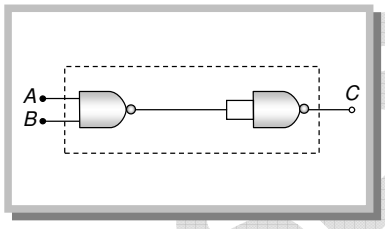
46. A truth table is given below. Which of the following has this type of truth table

A	0	1	0	1
B	0	0	1	1
y	1	0	0	0

(a) XOR gate (b) NOR gate (c) AND gate (d) OR gate

47. The combination of 'NAND' gates shown here under (figure) are equivalent to





(a) An OR gate and an AND gate respectively (b) An AND gate and a NOT gate respectively

(c) An AND gate and an OR gate respectively (d) An OR gate and a NOT gate respectively.

48. The following truth table corresponds to the logic gate

A	0	0	1	1
B	0	1	0	1
X	0	1	1	1

(a) NAND (b) OR (c) AND (d) XOR

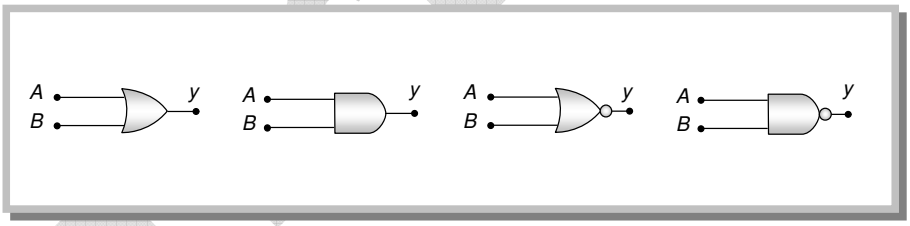
49. Given below are four logic gate symbol (figure). Those for OR, NOR and NAND are respectively

(a) 1, 4, 3

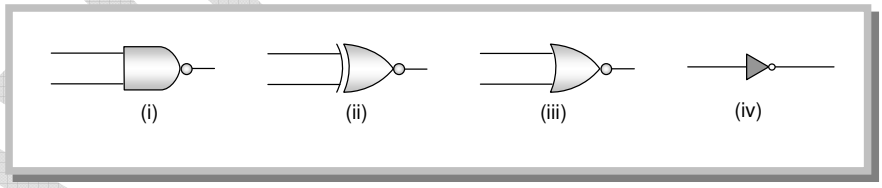
(b) 4, 1, 2

(c) 1, 3, 4

(d) 4, 2, 1



50. Given below are symbols for some logic gates



The XOR gate and NOR gate respectively are

(a) 1 and 2 (b) 2 and 3 (c) 3 and 4 (d) 1 and 4