JEE Main 24 January 2023 Shift 2 Memory-Based Questions

1. For limits (3*sqrt 2)/4 to (3*sqrt 3)/4, calculate integration of [48 dx/sqrt (9 -4x^2)].
2. Two switches are arranged in a series combination in the given circuit. Identify the Gate.
3. Let x_1 be the ratio of molar heat at constant pressure and constant volume for a monoatomic gas. Similarly, x_2 is the ratio of molar heat at constant pressure and constant volume for a diatomic gas. Find x_1/x_2.
4. Find the area bound between y^2 + x =4y & x + y = 0.
5. Which of the following is the best oxidizing agent? i. Lu^{2+}, ii. Ce^{2+}, iii. Ce^{4+}, iv. Sn^{2+}
6. In which of the following metal extraction, both oxidation and reduction processes are involved? i. Au, ii. Cu, iii. Fe, iv. Al
7. A particle, a proton, and an electron have the same kinetic energy. What is the correct order of de-Broglie wavelength?
8. Cube of [(1 + cos(2∏/9) + *i*sin(2∏/9) divided by (1 + cos(2∏/9) - *i*sin(2∏/9)] equals?
9. If a = i + 2j + mk and b = i + 2j - mk and if a and b are perpendicular to each other, then what is the value of m?
10. If a1, a2, ..., a6 are in an arithmetic progression such that a1 + a3 = 10 and mean of all the six numbers is 19/2. Then 8 times the variation equals?
11. The sum of coefficients of the first three terms in the expansion of [x - (3/x^2)]^n. The coefficient of x^4 equals...
12. A right-angled triangle has a current of 2A. The edge lengths are 5 cm, 12, cm and 13 cm. The magnetic field is acting in the plane of the triangle. The magnetic force acting on the horizontal 5 cm wire is?
13. Assertion (A): Steel is used to build big structures.
    Reason (R): Steel has a more elastic modulus when compared to other materials.

14. A copper wire is elongated such that its length is increased by 20%. Then the percentage increase in resistance is?

15. Assertion (A): Acceleration due to gravity decreases with both height and depth from the earth.

    Reason (R): If height and depth are equal for two points from the surface of the earth, then the acceleration due to gravity will be the same for these two points.

16. Two concentric semicircular rings of radii R_1 and R_2 have equal linear charge density. Find the potential at the centre.

17. Find the work done by the gas for a complete cyclic process comprising of isobaric, isochoric, and isothermal processes.

18. Find the sum of the number of unpaired electrons in the diatomic molecules: N_2, N_2^+, O_2, O_2^+

19. pK_a of lactic acid is 4. Find the pH of 0.005M calcium lactate at a temperature of 27C.

20. Find the number of $\prod$ bonds in peroxydisulphuric acid and pyrosulphuric acid.

21. Which of the following terms are temperature independent?

22. If the length of the resistance wire is decreased by 20%, what is the change in resistance?

23. Let A = {a, b, c, d} and relation A to R be R = {(a,b), (b,d), (b,c), (b,a)}. Then minimum number of elements required to make the equivalent of R is...

24. A contains 4 red and 6 black balls, B contains 5 red and 5 black balls , C contains m red and 4 black balls. A ball was drawn and found to be red. If probability that the ball was drawn from C is 0.4, what is the value of m?

25. Total numbers formed using digits 3, 5, 6, 7, 8 without repetition which are greater than 7000 are...