UNIVERSITY POLYTECHNIC
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SAMPLE QUESTION PAPER
Lateral Entry Examination
(Diploma in Engineering)

1. Which of the following is not a physical change?
(a) Boiling of water to give water vapour
(b) Melting of ice to give water
(c) Dissolution of salt in water
(d) Combustion of Liquefied Petroleum Gas (LPG)

2. The following reaction is an example of a $4NH_3(g) + 5O_2(g) \circledR 4NO(g) + 6H_2O(g)$
(i) displacement reaction
(ii) combination reaction
(iii) redox reaction
(iv) neutralisation reaction
(a) (i) and (iv) (b) (ii) and (iii)
(c) (i) and (iii) (d) (iii) and (iv)

3. What happens when a solution of an acid is mixed with a solution of a base in a test tube?
(i) The temperature of the solution increases
(ii) The temperature of the solution decreases
(iii) The temperature of the solution remains the same
(iv) Salt formation takes place
(a) (i) only (b) (i) and (iii)
(c) (ii) and (iii) (d) (i) and (iv)

4. An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change?
(a) Baking powder
(b) Lime
(c) Ammonium hydroxide solution
(d) Hydrochloric acid

5. Which of the following property is generally not shown by metals?
(a) Electrical conduction
(b) Sonorous in nature
(c) Dullness
(d) Ductility

6. The ability of metals to be drawn into thin wire is known as
(a) ductility
(b) malleability
(c) sonorousity
(d) conductivity

7. Carbon exists in the atmosphere in the form of
(a) carbon monoxide only

(b) carbon monoxide in traces and carbon dioxide
(c) carbon dioxide only
(d) coal

8. Which of the following statements are usually correct for carbon compounds? These
(i) are good conductors of electricity
(ii) are poor conductors of electricity
(iii) have strong forces of attraction between their molecules
(iv) do not have strong forces of attraction between their molecules
(a) (i) and (iii) (b) (ii) and (iii)
(c) (i) and (iv) (d) (ii) and (iv)

9. Upto which element, the Law of Octaves was found to be applicable
(a) Oxygen
(b) Calcium
(c) Cobalt
(d) Potassium

10. According to Mendele¢ev's Periodic Law, the elements were arranged in the periodic table in the order of
(a) increasing atomic number
(b) decreasing atomic number
(c) increasing atomic masses
(d) decreasing atomic masses

11. Which of the following can make a parallel beam of light when light from a point source is incident on it?
(a) Concave mirror as well as convex lens
(b) Convex mirror as well as concave lens
(c) Two plane mirrors placed at 90° to each other
(d) Concave mirror as well as concave lens

12. A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is
(a) – 30 cm (b) – 20 cm
(c) – 40 cm (d) – 60 cm

13. Which of the following statements is true?
(a) A convex lens has 4 dioptre power having a focal length 0.25 m
(b) A convex lens has –4 dioptre power having a focal length 0.25 m
(c) A concave lens has 4 dioptre power having a focal length 0.25 m
(d) A concave lens has –4 dioptre power having a focal length 0.25 m

14. Magnification produced by a rear view mirror fitted in vehicles
(a) is less than one
(b) is more than one
(c) is equal to one
(d) can be more than or less than one depending upon the position of the object in front of it

15. In an electrical circuit two resistors of 2 W and 4 W respectively are connected in series to a 6 V battery. The heat dissipated by the 4 W resistor in 5 s will be
(a) 5 J
(b) 10 J
(c) 20 J
(d) 30 J

16. Electrical resistivity of a given metallic wire depends upon
(a) its length
(b) its thickness
(c) its shape
(d) nature of the material

17. A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross section of the filament in 16 seconds would be roughly
(a) 10^{20}
(b) 10^{16}
(c) 10^{18}
(d) 10^{23}

18. What is the maximum resistance which can be made using five resistors each of 1/5 W?
(a) 1/5 W
(b) 10 W
(c) 5 W
(d) 1 W

19. Choose the incorrect statement from the following regarding magnetic lines of field
(a) The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points
(b) Magnetic field lines are closed curves
(c) If magnetic field lines are parallel and equidistant, they represent zero field strength
(d) Relative strength of magnetic field is shown by the degree of closeness of the field lines

20. For a current in a long straight solenoid N- and S-poles are created at the two ends. Among the following statements, the incorrect statement is
(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid
(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet
(d) The N- and S-poles exchange position when the direction of current through the solenoid is reversed

21. Commercial electric motors do not use
(a) an electromagnet to rotate the armature
(b) effectively large number of turns of conducting wire in the current carrying coil
(c) a permanent magnet to rotate the armature
(d) a soft iron core on which the coil is wound

22. The most important safety method used for protecting home appliances from short circuiting or overloading is

(a) earthing
(b) use of fuse
(c) use of stabilizers
(d) use of electric meter

23. Which of the following is a non-renewable source of energy?
(a) Wood
(b) Sun
(c) Coal
(d) Wind

24. Fuel used in thermal power plants is
(a) water
(b) uranium
(c) biomass
(d) Coal

25. Which one of the following forms of energy leads to least environmental pollution in the process of its harnessing and utilisation?
(a) Nuclear energy
(b) Thermal energy
(c) Solar energy
(d) Geothermal energy

26. If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is
(A) 4 (B) 2
(C) 1 (D) 3

27. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is
(A) 13 (B) 65
(C) 875 (D) 1750

28. The pair of equations $5x - 15y = 8$ and $3x - 9y = 24/5$ has

(A) one solution (B) two solutions (C) infinitely many solutions (D) no solution

29. The sum of the digits of a two-digit number is 9. If 27 is added to it, the digits of the number get reversed. The number is
 (A) 25 (B) 72 (C) 63 (D) 36

30. The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 3$ will have infinitely many solutions is
(A) 3 (B) – 3 (C) –12 (D) no value

31. Which one of the following is not a quadratic equation?
(A) $(x + 2)^2 = 2(x + 3)$ (B) $x^2 + 3x = (-1)(1 - 3x)^2$
(C) $(x + 2)(x - 1) = x^2 - 2x - 3$ (D) $x^3 - x^2 + 2x + 1 = (x + 1)^3$

32. Which of the following equations has 2 as a root?
(A) $x^2 - 4x + 5 = 0$ (B) $x^2 + 3x - 12 = 0$
(C) $2x^2 - 7x + 6 = 0$ (D) $3x^2 - 6x - 2 = 0$

33. Values of k for which the quadratic equation $2x2 - kx + k = 0$ has equal roots is
(A) 0 only (B) 4 (C) 8 only (D) 0, 8

34. The 10th term of the AP: 5, 8, 11, 14, ... is
(A) 32 (B) 35 (C) 38 (D) 185

35. The 21st term of the AP whose first two terms are –3 and 4 is
(A) 17 (B) 137 (C) 143 (D) –143

36. The length of the diagonal of a rhombus are 16 cm 12 cm. Then the length of the side of the rhombus is
(A) 9 cm (B) 10 cm (C) 8 cm (D) 20 cm

37. If in triangles ABC and DEF, AB/DE=BC/FD, then they will be similar, when
(A) $\angle B=\angle E$ (B) $\angle A=\angle D$ (C) $\angle B=\angle D$ (D) $\angle A=\angle F$

38. If the distance between the points (2, –2) and (–1, x) is 5, one of the values of x is
      (A) –2 (B) 2 (C) –1 (D) 1

39. The distance between the points A (0, 6) and B (0, –2) is
      (A) 6 (B) 8 (C) 4 (D) 2

40. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is
      (A) 5 (B) 12 (C) 11 (D) 7+ $\sqrt{5}$

41. The value of $(\sin30° + \cos30°) - (\sin60° + \cos60°)$ is
      (A) – 1 (B) 0 (C) 1 (D) 2

42. If $\cos(\alpha + \beta) = 0$, then $\sin(\alpha - \beta)$ can be reduced to
(A) $\cos \beta$ (B) $\cos 2\beta$ (C) $\sin \alpha$ (D) $\sin 2\alpha$

43. If triangle ABC is right angled at C, then the value of $\cos(A+B)$ is
(A) 0   (B) 1   (C)1/2 (D) $\sqrt{3}/2$

44. If angle between two radii of a circle is 130º, the angle between the tangents at the ends of the radii is :
(A) 90º (B) 50º (C) 70º (D) 40º

45. In the figure given below, the pair of tangents AP and AQ drawn from an external point A to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm.
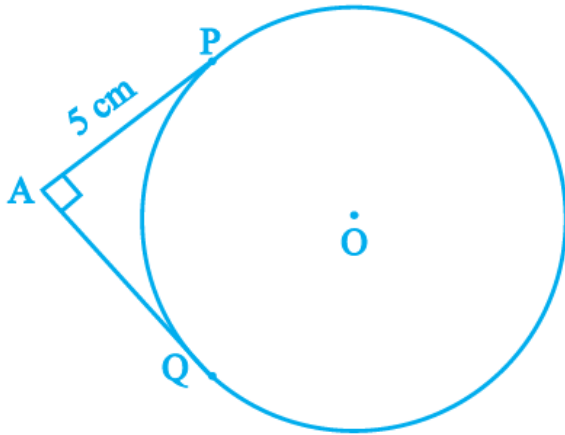
Then the radius of the circle is
(A) 10 cm (B) 7.5 cm
(C) 5 cm (D) 2.5 cm

46. If the area of a circle is 154 cm^2, then its perimeter is
(A) 11 cm (B) 22 cm (C) 44 cm (D) 55 cm

47. If the circumference of a circle and the perimeter of a square are equal, then
(A) Area of the circle = Area of the square
(B) Area of the circle > Area of the square
(C) Area of the circle < Area of the square
(D) Nothing definite can be said about the relation between the areas of the circle and square.

48. A cubical ice cream brick of edge 22 cm is to be distributed among some children by filling ice cream cones of radius 2 cm and height 7 cm upto its brim. How many children will get the ice cream cones?
(A) 163 (B) 263 (C) 363 (D) 463

49. A cylindrical pencil sharpened at one edge is the combination of
(A) a cone and a cylinder (B) frustum of a cone and a cylinder
(C) a hemisphere and a cylinder (D) two cylinders.

50. During conversion of a solid from one shape to another, the volume of the new shape will
(A) increase (B) decrease (C) remain unaltered (D) be doubled