

**UNIVERSITY POLYTECHNIC  
BIT, MESRA**

**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  $4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \rightarrow 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$ 
  - (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) sonorosity
  - (d) conductivity

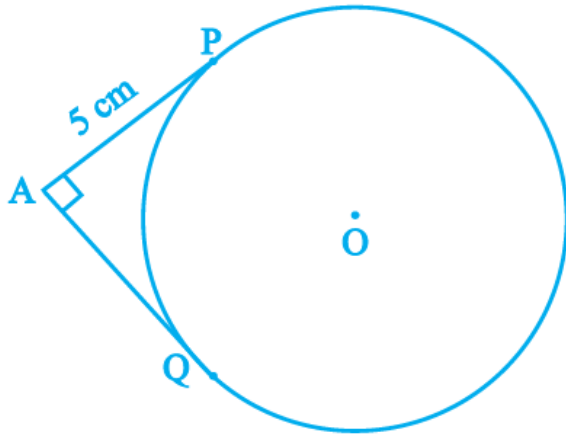
7. Carbon exists in the atmosphere in the form of
- carbon monoxide only
  - carbon monoxide in traces and carbon dioxide
  - carbon dioxide only
  - coal
8. Which of the following statements are usually correct for carbon compounds? These
- are good conductors of electricity
  - are poor conductors of electricity
  - have strong forces of attraction between their molecules
  - 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
- Oxygen
  - Calcium
  - Cobalt
  - Potassium
10. According to Mendeleev's Periodic Law, the elements were arranged in the periodic table in the order of
- increasing atomic number
  - decreasing atomic number
  - increasing atomic masses
  - 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?
- Concave mirror as well as convex lens
  - Convex mirror as well as concave lens
  - Two plane mirrors placed at  $90^\circ$  to each other
  - 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
- 30 cm (b) – 20 cm
  - 40 cm (d) – 60 cm
13. Which of the following statements is true?
- A convex lens has 4 dioptre power having a focal length 0.25 m
  - A convex lens has –4 dioptre power having a focal length 0.25 m
  - A concave lens has 4 dioptre power having a focal length 0.25 m
  - 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  $2x^2 - kx + k = 0$  has equal roots is  
 (A) 0 only (B) 4 (C) 8 only (D) 0, 8
34. The 10<sup>th</sup> term of the AP: 5, 8, 11, 14, ... is  
 (A) 32 (B) 35 (C) 38 (D) 185
35. The 21<sup>st</sup> 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  $(\sin 30^\circ + \cos 30^\circ) - (\sin 60^\circ + \cos 60^\circ)$  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  $130^\circ$ , the angle between the tangents at the ends of the radii is :  
 (A)  $90^\circ$  (B)  $50^\circ$  (C)  $70^\circ$  (D)  $40^\circ$

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  $154 \text{ cm}^2$ , 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