Section A:

1. When we convert (4760) to the base 10 to the base 12 the number obtained is

   a) 2908 b) 2818 c) 3012 d) 2753

2. Find the greatest number which on being divided by 12, 21 and 35 will leave in each case the same remainder 6.

   a) 210 b) 414 c) 420 d) 426

3. If $x = b + c$, $y = c - a$, $z = a - b$, find $x^2 + y^2 + z^2 - 2xy - 2xz + 2yz$.

   a) $a + b + c$ b) $4b^2$ c) abc d) $a^2 + b^2$

4. At an election where there are only two candidates. the candidate who gets 62% of the votes is elected by a majority of 144 votes. Find the total number of votes recorded assuming that no vote was void.

   a) 950 votes b) 600 votes c) 300 votes d) 699 votes

5. A person borrows two equal sums at the same time at 5 and 4 percent respectively and finds that if he repays the former sum with simple interest on a certain date 6 months before the latter , he will have to pay in each case the same amount , viz , Rs. 1100. Find the amount borrowed.

   a) Rs.850 b) Rs. 1000 c) Rs. 995 d) Rs. 990

6. The average salary of 50 workers in a factory was Rs. 350. Five new workers with salaries 250, 300, 320 and 400 were employed. What would be the new average salary?

   a) 256.78 b) 988.65 c) 347.63 d) 543.87

7. The wages of laborers' in a factory increased in the ratio 22 : 25 and there was a reduction in their number in the ratio 15 : 11. Find the original wage bill if the present bill is Rs. 5000.

   a) Rs. 2500 b) Rs. 3000 c) Rs.5000 d) Rs.6000

8. A cask contains a mixture of to liquids A and B in the ratio 7: 5. When 9 gallons of the mixture are drawn off and the cask is filled with liquid B, the proportion becomes A : B :: 7: 9. How many gallons does the cask hold?

   a) 36 gallons b) 48 gallons c) 56 gallons d) 60 gallons

9. A trader allows a discount of 5 percent to his customers. What price should he mark on an article the cost price of which is Rs. 800 so as to make a clear profit of 25 percent on his outlay?

   a) Rs. 1000 b) Rs. 1053 c) Rs. 1200 d) Rs. 1123

10. A cheetah chases a deer which is 100 m ahead. The time in which the deer takes 10 leaps the cheetah takes only 6 leaps. In one leap, the deer covers 1 m while the cheetah covers 2 m. In how many leaps would the cheetah catch up the deer?

    a) 300 b) 200 c) 150 d) 250

SECTION-B : TECHNICAL TEST

11. A body of mass 10kg moving with a velocity of 1 m/s is acted upon by a force of 50N for two seconds. The final velocity will be

    a)22m/s b) 10m/s c) $\sqrt{21}$m/s d) 11m/s

12. A person standing on a moving elevator feels 20% heavier than when at rest. The elevator is accelerating upward at

    a)2 m/s^2 b) 12 m/s^2 c) 4 m/s^2 d) 6 m/s^2

13. A ball is dropped from a height of 2.25m on a smooth floor and it rises to a height of 1m after the first bounce. The co-efficient of restitution between the ball and the floor is

    a) 0.57 b) 0.44 c) 0.33 d) 0.67

14. A machine requires an effort of 10kg to lift a load of 250kg and an effort of 13kg for a load of 400kg. the effort required to lift a load of 500kg will be

    a)15kg b) 25kg c) 35kg d) 45kg

15. Two shafts A and B are of same material. The diameter of shaft B is twice that of shaft A. the ratio of the power which can be transmitted by shaft A to that of shaft B is

    a)1/2 b)1/4 c)1/8 d)1/16

16. A solid shaft can resist a bending moment of 30kNm and a twisting moment of 4.0kNm together, then the maximum torque that can be applied is
    a) 7.kNm b) 3.5kNm c) 4.5kNm d) 5.0kNm

17. The buckling load in a steel column is
    a) Related to the length
    b) Directly proportional to the slenderness ratio
    c) Inversely proportional to the slenderness ratio
    d) Non-linearity to the slenderness ratio

18. The buckling load will be maximum for a column, if
    a) One end of the column is clamped and the other end is free
    b) Both ends of the column are clamped
    c) Both ends of the column are hinged
    d) One end of the column is hinged and the other end is free

19. The plane of maximum shear stress has normal stress that is
    a) Maximum b) minimum c) zero d) none of these

20. For the design of a cast iron member, the most appropriate theory of failure is
    a) Mohr's theory b) Rankine's theory c) Maximum strain theory d) Maximum shear energy theory