Date:

Registration number:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
B.Sc., MATHEMATICS - II SEMESTER
SEMESTER EXAMINATION: April 2022
(Examination conducted in July 2022)
MTOE4 - MATHEMATICS FOR MANAGEMENT APTITUDE TEST

Time- 2 hrs **Max Marks-60**

Answer all the questions

1. If A and B together can complete a piece of work in 15 days and B alone can do in 20 days. In how many days can A complete the work?

   (a) 60 (b) 45 (c) 40 (d) 30

2. If 10 men can do a piece of work in 12 days, the time taken by 12 men to do the same work is ___.

   (a) 12 (b) 10 (c) 9 (d) 8

3. Two pipes P and Q can fill a cistern in 12 and 15 minutes respectively. Both are opened together and at end of 3 minutes, P is turned off. In how many minutes more will Q fill the cistern?

   (a) 7 (b) $7\frac{1}{2}$ (c) 8 (d) $8\frac{1}{4}$

4. A cistern can be filled by two pipes in 20 minutes and 30 minutes respectively. Both the pipes being opened, when the first pipe must be turned off so that the cistern may be filled in 10 more minutes?

   (a) after 10 minutes (b) after 12 minutes (c) after 20 minutes (d) after 8 minutes

5. A, B and C completed a work costing Rs. 1800. A work for 6 days, B work for 4 days and C for 9 days. If their daily wages are in the ratio 5: 6: 4, how much will A receive?

   (a) Rs.800 (b) Rs. 600 (c) Rs. 900 (d) Rs. 750

6. Subash can copy 50 pages in 10 hours. He and Prakash together can copy 300 pages in 40hours. In how much time can Prakash copy 30 pages?

   (a) 13 hours (b) 12 hours (c) 11 hours (d) 10 hours

7. P and Q together earn Rs. 188 per day. Q and R together earn Rs. 152 per day. P, Q and R when working together earn Rs. 300 per day. How much does Q earn daily?

   (a) 43 (b) 56 (c) 45 (d) 40

8. What will be share of Rajesh, if together Ramesh and Suresh complete only $\frac{7}{11}$ of the task, and all three had been given the contract to finish the task for Rs. 1100?

   (a) Rs. 350 (b) Rs. 200 (c) Rs. 400 (d) Rs. 650

9. A car covers a distance of 690 km in 30 h. What is the average speed of the car?

   (a) 25km/h (b) 23 km/h (c) 20 km/h (d) 18 km/h

10. The speed of the bus is 72 km/h. The distance covered by the bus in 5 seconds is ____.

    (a) 50 m/s (b) 74.5 m/s (c) 100 m/s (d) 60 m/s

11. A man covered a distance of 12 km in 90 min by cycle. How much distance will he cover in 3 hours, if he rides the cycle at a uniform speed?

    (a) 36 km (b) 24 km (c) 30 km (d) 27 km

12. Find the length of the bridge, which a train 130 meters long and travelling at 45 km/hr can cross in 30 seconds.

    (a) 200m (b) 225m (c) 245m (d) 250m

13. Two pipes A and B can fill a tank in 18 h and 6 h respectively. If both the pipes are opened simultaneously how much time will it take to fill the tank?

    (a) 4.5h (b) 7h (c) 6h (d) 10h

14. Two trains running in opposite directions cross a man standing on the platform in 27 seconds and 17 seconds respectively and they cross each other in 23 seconds. Find the ratio of their speeds.

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

15. A train 300 m long is running at a speed of 54 km/hr. In what time will it pass a bridge 150 m long?

(a) 32 seconds (b) 30 seconds (c) 51 seconds (d) 16 seconds

16. A man can row 6 km/h in still water. If the speed of the current is 2 km/h, it takes 3 hrs more in upstream than in the downstream for the same distance. Find the distance.

(a) 34km (b) 24km (c) 42km (d) 14km

17. A man can row at a speed of $\frac{15}{2}$km/hr in still water. If he takes 4 times as long to row a distance upstream as to row the same distance downstream, then the speed of stream (in km/hr) is ____.

(a) 3.5km/h (b) 2.5km/h (c) 5.5km/h (d) 4.5km/h

18. Two boats A and B start towards each other from two places, 150 km apart. Speed of the boat A and B in still water are 16 km/hr and 14 km/hr respectively. If A proceeds down and B up the stream, they will meet after ____.

(a) 3h (b) 4h (c) 5h (d) 6h

19. In a race of 150m, A gives B a start of 20m. What distance will be covered by B?

(a) 100m (b) 130m (c) 170m (d) 160m

20. In a 1000m race, X beats Y by 140m or 14seconds. What will be the X's time over the course?

(a) 86sec (b) 90sec (c) 95sec (d) 76sec

21. The value of 240° into radians should be ____.

(a) $\frac{4\pi}{3}$ (b) $\frac{3\pi}{4}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$

22. The value of $\frac{5\pi}{6}$ into degrees should be ____.

(a) $135°$ (b) $90°$ (c) $120°$ (d) $150°$

23. The angle subtended at the center of the circle by an arc, whose length and radius are equal is called ____.

(a) initial side (b) radian (c) vertex (d) point of intersection

24. In a triangle ABC, which is right angled at B, if $\sin A = \frac{3}{4}$, calculate $\cos A$.

(a) $\frac{\sqrt{7}}{4}$ (b) $\frac{\sqrt{7}}{3}$ (c) $\frac{4}{\sqrt{7}}$ (d) $\frac{3}{\sqrt{7}}$

25. The value of $\sin 60°$ = ____.

(a) 0 (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{\sqrt{3}}{2}$

26. Which of the following ratio is false?

(a) $\text{cosec}\, A = \frac{opp}{hyp}$ (b) $\cos A = \frac{adj}{hyp}$ (c) $\sin A = \frac{opp}{hyp}$ (d) $\tan A = \frac{opp}{adj}$

27. $1 + \tan^2\theta =$ ____.

(a) $cosec^2\theta$ (b) $\sec^2\theta$ (c) $\cot^2\theta$ (d) 0

28. $\sin\left(\frac{\pi}{2} - \theta\right) =$____.

(a) $-\cos\theta$ (b) $-\text{cosec}\,\theta$ (c) $\cos\theta$ (d) $\text{cosec}\,\theta$

29. In third quadrant, which are positive?

(a) All are positive (b) sin, cosec (c) cos, sec (d) tan, cot

30. $\sin(x+y) =$ ___.

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \sin y - \sin x \cos y$ (d) $\cos x \sin y + \sin x \cos y$

31. $\cos(A+B) + \cos(A-B) =$ ___.

(a) $2 \sin A \cos B$ (b) $2 \sin A \sin B$ (c) $2 \cos A \cos B$ (d) $2 \cos A \sin B$

32. Which of the following is not equal to $\cos 2x$?

(a) $\cos^2 x - \sin^2 x$ (b) $2 \cos^2 x - 1$ (c) $1 - 2 \sin^2 x$ (d) $1 - sin\, 2x$

33. The angle formed by the line of sight with the horizontal when the point is below the horizontal level is called ____.

(a) Angle of elevation (b) Angle of depression

(c) No such angle is formed (d) Line of sight

34. The line drawn from the eye of an observer to the point in the object viewed by the observer is said to be _____.

(a) Angle of elevation (b) Angle of depression

(c) Line of sight (d) No such angle is formed

35. A ladder makes an angle of 60° with the ground, when placed along a wall. Find the length of the ladder if the foot of ladder is 8 m away from the wall.

(a) 4 m (b) 8 m (c) 8√3 m (d) 16 m

36. What is the angle of elevation of the sun when the shadow of a pole is $\sqrt{3}$ times the length of pole?

(a) 30° (b) 45° (c) 60° (d) 75°

37. Due to sun, a 6ft man casts a shadow of 4ft, whereas a pole next to the man casts a shadow of 36ft. What is the height of the pole?

(a) 63 ft (b) 72 ft (c) 54 ft (d) 48 ft

38. A and B are standing on ground 50 meters apart. The angles of elevation for these two, to the top of a tree are 60° and 30°. What is height of the tree?

(a) $50\sqrt{3}\, m$ (b) $\frac{25}{\sqrt{3}}\, m$ (c) $25\sqrt{3}\, m$ (d) $\frac{25}{\sqrt{3}-1}\, m$

39. If the length of the shadow of a tree is decreasing then the angle of elevation is ____.

(a) Increasing (b) Decreasing (c) Remains the same (d) None of the above

40. If the height of the building and distance from the building feet to a point is increased by 20%, then the angle of elevation on the top of the building is ____.

(a) Increases (b) Decreases (c) Do not change (d) Remains the same

41. Find the number that comes next: 3, 10, 101, ____?

(a) 10101 (b) 10201 (c) 10202 (d) 11012

42. Complete the series: 589654237, 89654237, 8965423, 965423, ____?

(a) 58965 (b) 65423 (c) 89654 (d) 96542

43. If KAMAL is written as 21413, then MAHAL can be written as?

(a) 48113 (b) 41813 (c) 41831 (d) 38141

44. If FRAGRANCE is written as SBHSBODFG, how can IMPOSING be written?

(a) NQPTJHOJ (b) NQPTJOHI (c) NQTPJOHJ (d) NQPTJOHJ

45. Which letter fits in, to complete the pattern: _stt_tt_tts_

(a) tsts (b) ttst (c) sstt (d) tsst

46. If apple is grapes, grapes is mango, mango is nuts, nuts is guava, which of the following is a yellow fruit?

(a) Mango (b) Guava (c) Apple (d) Nuts

47. In a certain code,15789 is written as EGKPT and 2346 is written as ALUR. How can 23549 be written in that code?

(a) ALEUT (b) ALGTU (c) ALGUT (d) ALGRT

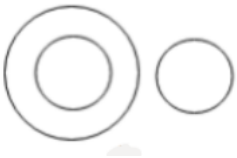
48. A man walks 5km towards south and then turns to the right. After walking 3km he turns to the left and walks 4km. and then he goes back 10km straight. Now in which direction is he from the starting place?

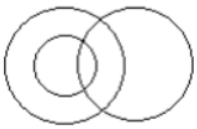
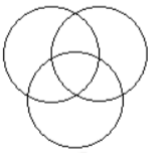
(a) South-east (b) North-west (c) South (d) West

49. Arun is facing north and walks 10kms. He turns 270^0 anti-clockwise and walks 15kms. Now, he again turns 45^0 clockwise and walks for 25kms. Which direction is he walking now?

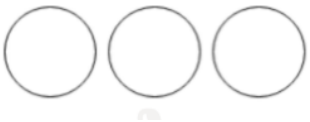
(a) North- west (b) South-west (c) North-east (d) South-east

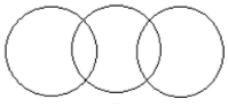
50. Which of the following diagrams correctly shows the relationship between boys, athletes and students?

(a)  (b) 

(c)  (d) 

51. Select the diagram which best illustrates the relationship between parrots, birds and dogs.

(a)  (b) 

(c)  (d) 

52. Suppose in a row there are 16 people, position of X from the left side is 4^{th}. Find the total number of people after X in the row.

(a) 14 (b) 13 (c) 12 (d) 11

53. How many 3's are there in the following sequence which are neither preceded by 6 nor immediately followed by 9?

9 3 6 6 3 9 5 9 3 7 8 9 1 6 3 9 6 3 9

(a) One (b) Two (c) Three (d) Four

54. If Rashmi is taller than Manisha, Manisha is taller than Priyanka, Sugandha is taller than Rashmi. Harsha is shorter than Priyanka; who among these girls is the tallest?

(a) Rashmi (b) Manisha (c) Sugandha (d) Priyanka

55. Observe the following series carefully and answer how many numbers follow a vowel.

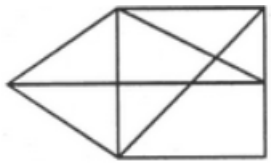
A $ 12 & * E 7 2 1! @ I * # @!! O * & # > 8 U >

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

56. If P denotes ÷, Q denotes ×, R denotes + and S denotes -, then 18 Q 12 P 4 R 5 S 6 = ___.

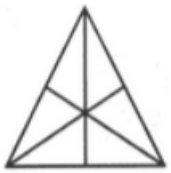
(a) 36 (b) 53 (c) 59 (d) 65

57. Find the number of triangles in the given figure.



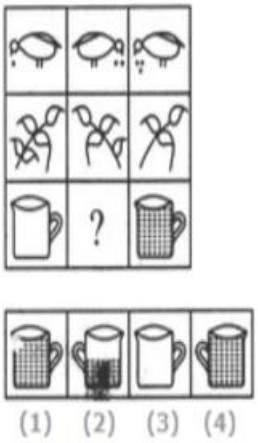
(a) 12 (b) 13 (c) 14 (d) 15

58. Find the number of triangles in the given figure.



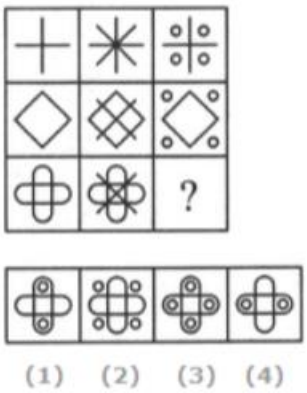
(a) 16 (b) 13 (c) 9 (d) 7

59. Select a suitable figure from the four alternatives that would complete the figure matrix.



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

60. Select a suitable figure from the four alternatives that would complete the figure matrix.



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