Reg. No. : ——————————

Code No. : 10430 E   Sub. Code : CNMA 41

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Mathematics

Non Major Elective – MATHEMATICS FOR COMPETITIVE EXAMINATION – II

(For those who joined in July 2021 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Simple Interest on Rs. 5664 at $13\frac{3}{4}$% per annum for 9 months is Rs. ——————

   (a) 600   (b) 584.10

   (c) 584   (d) 684.10

2. The compound Interest on Rs. 2800 for $1\frac{1}{2}$ years at 10% per annum is ——————

   (a) Rs. 441.35   (b) Rs. 436.75

   (c) Rs. 434   (d) Rs. 420

3. Dilip can reap a field in 9 days, which Ram alone can reap in 12 days. In how many days, both together, can reap this field?

   (a) $5\frac{1}{2}$ (b) $6\frac{1}{2}$

   (c) $5\frac{1}{7}$ (d) $5\frac{3}{4}$

4. A and B can do a piece of work in 6 days and A alone can do it in 9 days. The time taken by B alone to do the work is —————— days

   (a) 18   (b) 15

   (c) 12   (d) $7\frac{1}{2}$

5. Convert 45 km/hr is to metres /sec

   (a) 12.5 m/sec   (b) 13.5 m/sec

   (c) 14.5 m/sec   (d) 12 m/sec

6. Harish covers a certain distance by car driving at 70 km/hr and he returns back at the starting point at 55 km/hr. Find his average speed for the whole journey

   (a) 61 km/hr   (b) 66 km/hr

   (c) 61.6 km/hr   (d) 66.6 km/hr

7. If the rent for grazing 40 cows for 20 days is Rs. 370 how many cows can graze for 30 days on Rs. 111?

   (a) 6   (b) 8

   (c) 5   (d) 12

8. If 20 men can build a wall 112 metres long in 6 days, what length of a similar wall can be built by 25 men is 3 days?

   (a) 140 m   (b) 44.8 m

   (c) 105 m   (d) 70 m

9. One tap can fill a cistern in 2 hours and another can empty the cistern in 3 hours. How long will they take to fill the cistern if both the taps are opened?

   (a) 5 hrs   (b) 6 hrs

   (c) 7 hrs   (d) 8 hrs

10. Pipe A can fill a tank in 20 hours while Pipe B alone can fill it in 30 hours and Pipe C can empty the full tank in 40 hours. If all the pipes are opened together, how much time will be needed to make the tank full?

    (a) $17\frac{1}{7}$ hrs   (b) $18\frac{1}{7}$ hrs

    (c) 20 hrs   (d) $16\frac{1}{7}$ hrs

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

11. (a) Rs. 800 amounts to Rs. 920 in 3 years at simple interest. If the interest rate is increased by 3%, if would amount to how much?

    Or

    (b) A sum amounts to Rs. 2916 in 2 years and to Rs. 3149.28 in 3 years at compound interest. What is the sum?

12. (a) A and B can complete a work in 10 days and 15 days respectively. A starts the work and after 5 days B also joins him. In all, the work would be completed in hour many days?

    Or

(b) A is thrice as good a works man as B and is therefore able to finish a piece of work in 60 days less than B. Find the time in which they can do it, working together.

13. (a) Ram travels a certain distance of 3 km/hr and reaches 15 min. late. If he travels at 4 km/hr, he reaches 15 min. earlier. Find the distance he travelled.

Or

(b) Two men start together to walk to a certain destination, one of 3.75 km an hour and another at 3 km an hour. The former arrives half an hour before the letter. Find the distance.

14. (a) A contract is to be completed in 56 days and 104 men were set to work, each working 8 hours a day. After 30 days $\frac{2}{5}$ of the work is completed. How many additional men may be employed, so that the work may be completed in time, each man now working 9 hours a day?

Or

(b) If 17 labourers can dig a ditch 26 metres long in 18 days, working 8 hours a day how many more labourers should be engaged to dig a similar ditch 39 metres long in 6 days, each labourer working 9 hours a day?

15. (a) Two pipes A and B can fill a tank in 36 min and 45 min respectively. A waste pipe C can empty the tank in 30 min. First A and B are opened. After 7 min. C is also opened. In how much time the tank is full?

Or

(b) A tank can be filled by one tap in 20 minutes and another in 25 minutes. Both the taps are kept open for 5 minutes and then the second is turned off. In how many minutes more is the tank completely filled?

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

16. (a) Two equal amounts of money are deposited in two banks, each at 15% per annum, for $3\frac{1}{2}$ years and 5 years. If the difference between their interests is Rs. 144, find the sum?

Or

(b) A certain sum on compound interest amounts to Rs. 2809 in 2 years and Rs. 2977.54 in 3 years. Find the sum and rate percent?

17. (a) A can do a piece of work in 10 days while B alone do it in 15 days. They work together for 5 days and the rest of the work is done by C in 2 days. If they get Rs. 450 for the whole work, how should they divide the money?

Or

(b) A and B can do a piece of work in 45 and 40 days respectively. They began the work together, but A leaves after some days and B finished the remaining work in 23 days. After how many days did A leave?

18. (a) A man walking at 3km/hr crosses a square field diagonally in 2 minutes. Find the area of the field?

Or

(b) The distance between two stations A and B is 220 km. A train leaves A towards B at an average speed of 80 km/hr. After half an hour, another train leaves B towards A at an average speed of 100 km/hr. Find the distance of the point where the two trains meet from A.

19. (a) 2 men and 7 boys together complete a certain work in 16 days while 3 men and 8 boys together complete the same work in 12 days. Find in how many days will 8 men and 8 boys together, complete a work twice as big as the previous one?

Or

(b) A contractor employed 30 men to do a piece of work in 38 days. After 25 days, he employed 5 men more and the work was finished one day earlier. How many days he would have been behind, if he had not employed additional men?

20. (b) If two pipes function simultaneously the reservoir will be filled in 12 hours. One pipe fills the reservoir 10 hours faster than the other. How many hours does the faster pipe take to fill the reservoir?

Or

(b) Three pipes A, B and C can fill a cistern in 6 hours. After working altogether for 2 hours, C is closed and A and B can fill it in 7 hours. Find the time taken by C alone to fill the cistern.

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