

(For candidates admitted from 2022 – 2023 onwards)
P.G. DEGREE EXAMINATION, NOVEMBER 2023.

Mathematics – Non Major Elective

MATHEMATICS FOR COMPETITIVE EXAMINATION

Time : Three hours

Maximum : 75 marks

PART A — ($15 \times 1 = 15$)

Answer ALL questions.

1. If in a long division sum, the dividend is 380606 and the successive remainders from the first to the last are 434, 125 and 413, then divisor is
 - (a) 451
 - (b) 843
 - (c) 4215
 - (d) 3372
2. Find the present worth of Rs.9261 due 3 years hence at 5% per annum compounded yearly
 - (a) Rs. 7000
 - (b) Rs. 8000
 - (c) Rs. 9000
 - (d) Rs. 10000
3. Gupta and Bansal enter into a partnership with their capitals in the ratio 5 6. At the end of 8 months. Gupta withdraws his capital. If they receive the profits in the ratio of 5 : 9, find how long Bansal's capital was used?
 - (a) 10 months
 - (b) 11 months
 - (c) 12 months
 - (d) 14 months
4. 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) 6 hours
 - (b) 6.30 hours
 - (c) 7 hours
 - (d) 7.30 hours

5. A train passes a railway bridge 150m long in 18 seconds. If the train is running at a speed of 60 km/hr. then the length of the train in metres is
- (a) 150 (b) 160
(c) 170 (d) 180
6. $9999 + 8888 + 777 + \text{—————} = 19700$.
- (a) 33 (b) 34
(c) 35 (d) 36
7. The cost price of a shirt is Rs. 200 and selling price is Rs. 250. Calculate the % profit.
- (a) 20% (b) 25%
(c) 30% (d) 35%
8. If $A : B = 3 : 4$ and $B : C = 8 : 9$, then $A : B : C$ is
- (a) 7 : 8 : 9 (b) 6 : 7 : 9
(c) 6 : 8 : 9 (d) 6 : 8 : 7
9. A pipe can fill a tank in 5 hours, then the part of tank filled in one hour is —————
- (a) $\frac{1}{5}$ (b) $\frac{2}{5}$
(c) $\frac{3}{5}$ (d) $\frac{4}{5}$
10. In one hr a boat goes 11 km along the stream and 5 km against the stream. The speed of the boat in still water (in km/hr) is —————
- (a) 5 (b) 6
(c) 7 (d) 8

11. The ages of A and B are in the ratio of 6 : 5 and sum of their ages is 44 years. Find the ratio of their ages after 8 years.
- (a) 6:7 (b) 8:6
(c) 7:5 (d) 8:7
12. If A is 20% of C and B is 25% of C then what percentage is A of B?
- (a) 80% (b) 90%
(c) 100% (d) 110%
13. Find a fourth proportional to the numbers 2,5,4.
- (a) 10 (b) 11
(c) 12 (d) 13
14. A can finish a piece of work by working alone in 6 days and B. while working alone, can finish the same work in 12 days. If both of them work together, then in how many days, the work will be finished?
- (a) 4 days (b) 8 days
(c) 10 days (d) 11 days
15. A man can row 6km/hr in still water. If the river is running at 2 km/hr, it takes 3 hours more in upstream than to go to downstream for the same distance. How far is the place?
- (a) 20 km (b) 22 km
(c) 24 km (d) 26 km

PART B — ($30 \times 2 = 60$)

Answer ALL questions.

16. The sum of the ages A and B is 42 years. 3 years back, the age of A was 5 times the age of B. Find the difference between the present ages of A and B.
- (a) 9 years (b) 8 years
(c) 6 years (d) 5 years

17. 6 years ago Mahesh was twice as old as Suresh. If the ratio of their present ages is 9 : 5 respectively. What is the difference between their present ages?
- (a) 44 and 24 (b) 54 and 34
(c) 44 and 34 (d) 54 and 24
18. A sum of money put out on simple interest doubles itself in $12\frac{1}{2}$ years. In how many years would it treble itself?
- (a) 20 years (b) 25 years
(c) 30 years (d) 35 years
19. Rashi invested Rs. 16000 for two years at compound interest and received an amount of Rs. 17640 on maturity. What is the rate of interest?
- (a) 15% per annum (b) 5% per annum
(c) 20% per annum (d) 25% per annum
20. The incomes of Mohan and Sohan are in the ratio 7 : 2 and their expenditures are in the ratio 4 : 1. If each saves Rs. 1000, find their expenditures.
- (a) 30000 and 5000 (b) 25000 and 5000
(c) 20000 and 3000 (d) 20000 and 5000
21. Anu, Manu and Tanu invested capitals in the ratio 4 : 6 : 9. At the end of the business term, they received the profits in the ratio 2 : 3 : 5. Find the ratio of time for which they invested their capitals.
- (a) 8 : 9 : 10 (b) 9 : 8 : 10
(c) 9 : 9 : 9 (d) 9 : 9 : 10

22. If 10 persons can cut 20 trees in 3 days working 12 hours a day. Then, in how many days can 24 persons cut 32 trees working 4 hours a day?
- (a) 6 days (b) 7 days
(c) 8 days (d) 9 days
23. Sita takes twice as much time as Gita to complete a work and rita does it in the same time as Sita and Gita together. If all three working together can finish the work in 6 days, Find the time take by each of them to finish the work?
- (a) 19, 36 and 12 days
(b) 18, 34 and 10 days
(c) 18, 36 and 12 days
(d) 19, 36 and 10 days
24. By walking at $\frac{4}{5}$ of his usual speed. Mohan is 6 minutes late to his office. Find his usual time to cover the distance.
- (a) 22 minutes (b) 23 minutes
(c) 24 minutes (d) 25 minutes
25. Two trains of lengths 200 metres and 175 metres run on parallel tracks. When running in the same direction the faster train crosses the slower on in $37\frac{1}{2}$ seconds. When running in opposite directions at speeds same as their earlier speeds, they pass each other completely in $7\frac{1}{2}$ seconds. Find the speed of each train.
- (a) 20 m/s and 20 m/s (b) 30 m/s and 20 m/s
(c) 30 m/s and 30 m/s (d) 30 m/s and 40 m/s
26. One year ago the ratio between Samir and Ashok's age was 4 : 3. One year hence the ratio of their ages will be 5 : 4. What is the sum of their present ages in years?
- (a) 12 years (b) 14 years
(c) 16 years (d) 18 years

27. If a sum of Rs. 13040 is to be paid back in two equal annual installments at $3\frac{1}{4}$ % per annum, what is the amount of each instalment?
- (a) Rs.6889 (b) Rs.8889
(c) Rs.7889 (d) Rs.6890
28. What day of the week was on 5 June 1999?
- (a) Tuesday (b) Saturday
(c) Monday (d) Sunday
29. Two pipes A and B can fill a cistern in 4 minutes and 6 minutes respectively. If these pipes are turned on alternately for 1 minute each how long will it take for the cistern to fill?
- (a) 3 minutes 30 seconds
(b) 4 minutes 30 seconds
(c) 4 minutes 40 seconds
(d) 2 minutes 40 seconds
30. P, Q, R are three towns on a river which flows uniformly. Q is equidistant from P and R . A man rows from P to Q and back in 1 hour. He can row from P to R in 4 hr. Find the ratio of speed of man in still water to the speed of the current.
- (a) 5:3 (b) 4:3
(c) 5:2 (d) 4:2
31. How many numbers up to 100 are divisible by 7?
- (a) 14 (b) 107
(c) 93 (d) 100
32. The average of 7 consecutive numbers is 20. The largest of these numbers is
- (a) 24 (b) 23
(c) 22 (d) 20

33. The average of four consecutive even numbers is one-fourth of the sum of these numbers. What is the difference between the first and the last number?
- (a) 4 (b) 6
(c) 2 (d) cannot be determined
34. 25% of 25% = ?
- (a) 6.25 (b) 0.0625
(c) 0.8 (d) 0.9
35. The rate per cent per annum at which Rs. 1200 amount to Rs. 1440 in 4 years, is
- (a) 4% (b) 5%
(c) 6% (d) 7%
36. On what sum will the compound interest for $2\frac{1}{2}$ years at 10% amount to Rs. 6352.50?
- (a) Rs. 7,000 (b) Rs. 8,000
(c) Rs. 5,000 (d) Rs. 6,000
37. The mean proportional of 0.25 and 0.04 is
- (a) 0.01 (b) 0.1
(c) 0.001 (d) $\sqrt{10}$
38. A starts business with Rs. 3,500 and after 5 months B joins with A as his partner. After a year, the profit is divided in the ration 2:3. That is B's contribution in the capital?
- (a) Rs. 8000 (b) Rs. 8500
(c) Rs. 9000 (d) Rs. 7500

39. Mahatma Gandhi was born on 2 October 1869. The day of the week was
- (a) Sunday (b) Monday
(c) Saturday (d) Friday
40. A works twice as fast as B. If both of them can together finish a work in 12 days. B alone can do it in
- (a) 48 days (b) 36 days
(c) 27 days (d) 24 days
41. A cistern has a leak which would empty in 8 hours. A tap is turned on which admits 6 litres a minute into the cistern and it is now emptied in 12 hours. The cistern can hold
- (a) 6840 litres (b) 7860 litres
(c) 8640 litres (d) 8860 litres
42. A tap can empty a tank in one hour. A second tap can empty it in 30 minutes. If both the taps operate simultaneously, how much time is needed to empty the tank?
- (a) 20 minutes (b) 30 minutes
(c) 40 minutes (d) 45 minutes
43. A train passes through a telegraph post in 9 seconds moving with a speed of 54 km per hour. The length of the train is
- (a) 135 metres (b) 145 metres
(c) 125 metres (d) 115 metres
44. A boat goes 8 km in one hr along the stream and 2 km in one hr against the stream. The speed of the stream (in km/hr) is:
- (a) 2 (b) 3
(c) 4 (d) 5
45. A boatman can row 48 km downstream in 4 hr. If the speed of the current is 5 km/hr, then find in what time will he be able to cover 8 km upstream?
- (a) 6 hr (b) 4 hr
(c) 8 hr (d) 5 hr