Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS
PONDA - GOA
B.COM. UGC CCFUP F.Y B.Com(SEMESTER – I) SEMESTER END EXAMINATION
OCTOBER 2024

Mathematical Techniques for Competitive Exams(MAT-131)

Duration: 2 hours   **Total Marks: 60 marks**

Instructions:
- **Start each question on a fresh page.**
- **Figures to the right indicate maximum marks.**
- **Use of non-scientific, non-programmable calculators is allowed.**

Q 1. Answer each of the following: **03×04=12 Marks**

  i) Define triplicate, sub-triplicate and compound ratios.   **(BL1,CO1)**

  ii) State whether true or false:
    a) Time taken by hour hand to complete one rotation is 24 hours.   **(BL1,CO2)**
    b) Time taken by minute hand to complete one rotation is 30 minutes.   **(BL1,CO2)**
    c) The angle covered by second hand in 180 seconds is 1080°.   **(BL1,CO2)**

  iii) Define partnership and recall types of partnerships.   **(BL1,CO2)**

  iv) If the speed of the boat in still water is x Km/h and speed of the stream is y Km/h, then recall:
    a) speed downstream
    b) speed upstream
    c) speed of the river in terms of speed downstream and speed upstream.   **(BL1,CO4)**

Q 2. Answer <u>any four</u> the following: **03×04=12 Marks**

  i) Recall the following: **(BL2,CO2)**
    a) The time period in which both hour hand and minute hand coincide.
    b) The angle by which the minute hand moves faster as compared to the hour hand.
    c) The number of odd days in a leap year.

  ii) Recall the formula for Banker's discount and find the Banker's discount for the amount of
    Rs. 5000 due for 6 months at the interest rate 12 % per annum.   **(BL2,CO3)**

  iii) Define work and state the formula to compute the ratio of wages of A and B if they can complete a
    certain work in x and y days respectively.   **(BL2,CO2)**

  iv) Write the three basic formulas related to speed, distance and time.   **(BL2,CO3)**

  v) If the present ages of A is x and B is y, then write the formulas for the ratio of their ages
    'n' years ago and after 'm' years.   **(BL2,CO1)**

  vi) Recall the definition of mixture and mean price. Also state the formula of rule of mixture.

                                   (BL1,CO2)

Q 3. Answer any three of the following: $\qquad$ **04×03=12 Marks**

  i) a) Estimate the final value of $\dfrac{20}{15} = \dfrac{60}{45}$ by using componendo & dividendo **(BL3,CO1)**

    b) Find the value of α if : $\alpha = \dfrac{12}{15} = \dfrac{8}{10} = \dfrac{16}{20}$ **(BL3,CO1)**

  ii) Pipe A can fill a tank in 40 min, while pipe C can empty the full tank in 60 min. If both the pipes are opened together, then estimate the time required to completely fill the tank. **(BL3,CO2)**

  iii) A person covers a certain distance with a speed of 20 m/s in 240 seconds. If he wants to cover the same distance in 2 minutes, then find his required speed. **(BL3,CO3)**

  iv) Amruta, Vinay and Kapil can do a piece of work in 10, 18 and 26 days, respectively. If they work together and get an amount of Rs. 3600, then estimate the share of Amruta in that amount.
(BL3,CO2)

Q 4. Answer any three of the following: $\qquad$ **04×03=12 Marks**

  i) Estimate the present worth if the amount due after 6 years at interest rate 5% per annum is Rs. 10690. Also find the true discount. **(BL3,CO3)**

  ii) If the incomes of Samarth and Sarth are in the ratio 3 : 4, their expenditures are in the ratio 1 : 2 and and each of them saves Rs. 10,000 at the end of the month. Then calculate their incomes. **(BL3,CO1)**

  iii) Two trains of length 100m and 140m are travelling in opposite directions with speeds of 40 m/s and 60 m/s respectively. If they were 160 m apart initially, then calculate the time taken by them to cross each other. **(BL3,CO4)**

  iv) If 19 men can finish a work in 32 days then estimate the number of days required to complete the same amount of work by 16 men. **(BL3,CO2)**

Q 5. Attempt each of the following: $\qquad$ **06×02=12 Marks**

  i) Steve starts a business with Rs.500000 and Jack joins him after 5 months with Rs.1600000. Calculate the ratio of their profits at the end of the year. Also calculate the share of Bill in the profit if the total profit is Rs. 1500000. **(BL3,CO1)**

  ii) A boat goes 60 km downstream in 20 h. It takes 30 h to cover the same distance against the stream. Calculate the speed of the boat in still water and also the speed of the river. **(BL3,CO3)**

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