SECTION – QA

21. Swam a SME enterprise borrowed a sum of money from a nationalized bank at 10% simple interest per annum and the same amount at 8% simple interest per annum from a microfinance firm for the same period. It cleared the first loan 6 months before the scheduled date of repayment and repaid the second loan just at the end of the scheduled period. If in each case it had to pay Rs. 62100 as amount then how much money and for what time period did it borrow?

(a) Rs. 55750, 2 years
(b) Rs.52500, 2 years
(c) Rs. 51750, 2.5 years
(d) Rs. 55750, 2.5 years

Sol. (c); Let principle be x and time period is t months.

Then, $x + \frac{x \times 10 \times (t-6)}{1200} = x + \frac{x \times 8 \times t}{1200} = 62100$

On equating the first too, we get

$10 (t - 6) = 8t$

Or $5t – 30 = 4t$

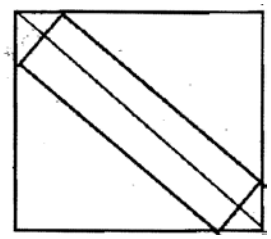
$t = 30$ months i.e. 2.5 years.

Now, $x + \frac{x \times 8 \times 30}{1200} = 62100$

$\Rightarrow x = 51750$

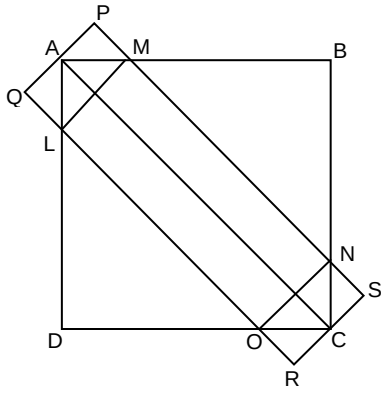
Option (c).

22. A rectangular plank $\sqrt{10}$ metre wide, is placed symmetrically along the diagonal of a square of side 10 metres as shown in the figure. The area of the plank is:



(a) $100(\sqrt{20}-1)$ sq. mt. (b) $100(\sqrt{5}-1)$ sq. mt. (c) $100\sqrt{20}-1$ sq. mt. (d) None

Sol. (a);



AB = 10

$AC = 10\sqrt{2}$

$OP = \sqrt{10}$

$\therefore$ Area PQRS = $10 \times \sqrt{2} \times \sqrt{10}$

$= 10\sqrt{20}$

Required area = area PQRS – 4 x area LAM

$= 10\sqrt{20} - 4 \times \frac{1}{2} \times \sqrt{5} \times \sqrt{5}$

$= 10\sqrt{20} - 10$

$= 10\left(\sqrt{20} - 1\right)$

Option (a).

23. Somesh, Tarun and Nikhil can complete a work separately in 45, 60 and 75 days. They started the work together but Nikhil left after 5 days of start and Somesh left 2 days before the completion of the work. In how many days will the work be completed?

(a) $25\frac{1}{7}$ (b) $50\frac{1}{7}$ (c) $35\frac{5}{7}$ (d) $340\frac{5}{7}$

Sol. (a);

M	S	T	N	S + T + N	T	S + T
R	20	15	12	47	15	35
T	45	60	75	5	2	127/7
W		900		235	30	635

Total days = $5 + 2 + 18\ \frac{1}{7} = 25\frac{1}{7}$

Option (a).

24. $(1+5)\ \log_e 3 + \frac{(1+5^2)}{2!}\ (\log_e 3)^2 + \frac{(1+5^3)}{3!}\ (\log_e 3)^3 + \ldots$

(a) 12 (b) 244 (c) 243 (d) 245

Sol. (b); $e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + ...\infty$

Or $\frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + ...\infty = e^x - 1$

The given series can be broken into two series

$\frac{\log_e 3}{1!} + \frac{(\log_e 3)^2}{2!} + ...e^{\log_e 3 - 1} = 3 - 1 = 2$

$+ \frac{5\log_e 3}{1!} + \frac{(5\log_e 3)}{2!} + ... = e^{5\log_e 3} - 1$

$= 3^5 - 1$

$=242$

$= 20 + 242 = 244$

Option (b).

25. If $f(x) = \frac{1}{1+x}$, then find the value of f[f{f(x)}], at x = 5

(a) 7/9 (b) 7/13 (c) 5/13 (d) 5/9

Sol. (b); $f(x) = \frac{1}{1+x}$ $f(5) = \frac{1}{6}$

$f\left(\frac{1}{6}\right) = \frac{1}{1+\frac{1}{6}} = \frac{6}{7}$

$f\left(\frac{6}{7}\right) = \frac{1}{1+\frac{6}{7}} = \frac{7}{13}$

26. A Pharmaceutical company produces "two chemicals X and Y, such that X consists of 5% salt A and 10% salt B and Y consists of 10% salt A and6% salt B. For producing the chemicals X and Y, the company requires at least 7 gm of Salt A and at least 7 gm of Salt B. If chemical X costs Rs. 10.59 per gm and chemical Y costs Rs. 7.80 per gm, what is the minimum cost at which the company can meet the requirement by using a combination of both types of chemicals?

(a) Rs. 810 (b) Rs. 850 (c) Rs. 537 (d) None

Sol. (a);

	Salt A	Salt B
X	5%	10%
Y	10%	6%

Let x & y are the quantities of x and y respectively. Then,

$\frac{5x}{100} + \frac{10y}{100} \geq 7$

And $\frac{10x}{100} + \frac{6y}{100} \geq 7$

$X + 2y \geq 140$

$5x + 3y \geq 350$

On solving, x = 40 and y = 50

$\therefore$ minimum cost required = 40 x 10.5 + 50 x 7.5

= 810.

Option (a).

27. Suntex Company plans to manufacture a new product line of Razor next year and sell it at a price of Rs. 12 per unit. The variable costs per unit in each production run is estimated to be 50% of the selling price, and the fixed costs for each production run is estimated to be Rs. 50,400. "Based on their estimated costs how many units of the new product will company Y, Suntex need to manufacture and sell in order for their revenue to be equal to their total costs for each production run?

(a) 5400 (b) 4200 (c) 8400 (d) 2100

Sol. (c); SP/unit = 12

CP/unit = 6 (55% of SP)

Let number of units be x

Then 50400x + 6x = 12x

Or x = 8400

Option (c).

28. In a certain sequence the term x_n is given by formula $X_n = 5X_{n-1} - \frac{3}{4} - X_{n-2}$ for $n \geq 2$. What is the value of x_3, if $x_0 = 4$ and $x_1 = 2$?

(a) 67/2 (b) 37/2 (c) 123/4 (d) None

Sol. (a); $x_n = 5x_{n-1} - \frac{3}{4}x_{n-2}$

Let n = 2

$x_2 = 5x_1 - \frac{3}{4}x_0 = 5 \times 2 - \frac{3}{4} \times 4$

= 7

Let n = 3

$x_3 = 5x_2 - \frac{3}{4}x_1 = 5 \times 7 - \frac{3}{4} \times 2$

$= 35 - \frac{3}{2}$

$= \frac{67}{2}$ Option (a).

29. A mobile company that sells two models ACN-I and ACN-IT of mobile, reported that revenues from ACN-I in 2016 were down 12% from 2015 and revenue from ACN-II sales in 2016 were up by 9010 from 2015. If the total revenues from sales of both the mobile models ACN-I and ACN-II in 2016 were up by 3% froQl2015, what is the ratio of revenue from ACN-I sales in 2015 to revenue from ACN-TI sales in 2015?
(a) 5:2 (b) 2:5 (c) 3:4 (d) None

Sol. (b);

	ACN – I	ACN – II	Total
2015	100x	100y	100x + 100y
2016	88x	109y	88x+ + 109y

From the given condition,

$\frac{9y-12x}{x+y}=3$ or $\frac{x}{y}=\frac{2}{5}$

$\frac{\text{ACN}-\text{I in 2015}}{\text{ACN}-\text{II in 2015}}=\frac{1400\times 25}{100\times 5}=\frac{2}{5}$

Option (a).

30. If 1067 - 87 is written as an integer in base 10 notation, what is the sum of digits in that integer?
(a) 683 (b) 489 (c) 583 (d) 589

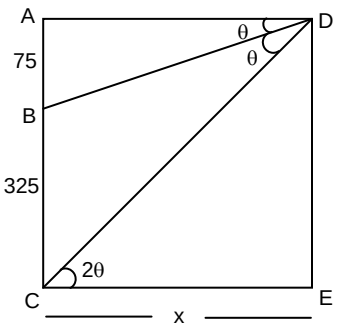
Sol. (d); $10^2 - 87 = 13$
$10^3 - 87 = 913$
$10^4 - 87 = 9913$ and so on

$\therefore 10^{67} - 87 = \underset{65 \text{ times}}{999.....9}\ 13$

$\therefore$ Sum of digit = 65 x 9 + 1 + 3 = 589
Option (d).

31. A flag pole on the top of a mall building is 75 m high. The height of the mall building is 325 m. To an observer at a height of400 m, the mall building and the pole subtend equal angle θ. 'If the horizontal distance of the observer from the pole is 'x', then what is the value of x?
(a) $20\sqrt{10}$ m (b) $30\sqrt{10}$ m (c) $25\sqrt{5}$ m (d) None

Sol. (d);



In Δ ADB, $\tan\theta\ \frac{75}{x}$

& In Δ CDE $\tan 2\theta = \frac{400}{x}$

Now, $\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$

$\therefore \frac{2\frac{75}{x}}{1-\left(\frac{75}{x}\right)^2}=\frac{400}{x}$

On solving, we get x = $30\sqrt{10}$.
Option (b).

32. Witrex Brown, an E-comrnerce company gives home delivery of its valuable products after receiving final order on their website by different modes of transportation like bike, scooter, tempo and truck. The probabilities of using bike, scooter, tempo and truck are respectively 2/9, 1/9,419 and 219. The probabilities of his delivering the product late to the destination by using these modes of transport are 3/5, 2/5, 1/5, and 4/5. If the product reach to the destination in time, find the probability that he has used scooter to reach the office;
(a) 1/10 (b) 4/25 (c) 3/25 (d) None

Sol. (c);

	Bike	Scooter	Tempo	Truck
Vehicle	2/9	1/9	4/9	2/9
On time	2/5	3/5	4/5	1/5

The required probability =

$$\frac{\frac{1}{9}\times\frac{3}{5}}{\frac{2}{9}\times\frac{2}{5}+\frac{1}{9}\times\frac{3}{5}+\frac{4}{9}\times\frac{4}{5}+\frac{2}{9}\times\frac{1}{5}}$$

$$=\frac{3}{25}$$

Option (c).

33. A pest control person uses a particular machine for. his job, it moves along the circumference of a circular hall of radius 49 metres in 148 minutes to finish the pest control. How many minutes more will it take him to move along the-perimeter of a hexagon of side. 54 metres?
(a) 7.69 minutes (b) 14.36 minutes (c) 14.00 minutes· (d) 4.28 minutes

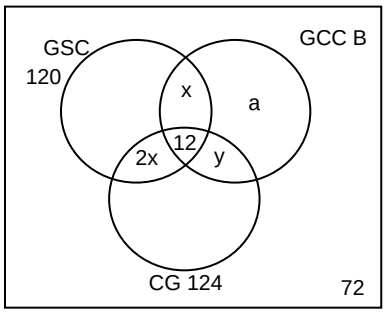
Sol. (a); Let the time required in II case is T.

Then $\frac{T}{148}=\frac{6\times 54}{2\times\frac{22}{7}\times 49}$

$\Rightarrow$ T = 155.69 m,n.
Hence, extra time needed = 155.69 – 148
= 7.69 m,n
Option (a).

34. A premier B-school, which is in process of getting an AACSB accreditation, has 360 second year students. To incorporate sustainability into their curriculum, it has offered 3 new elective subjects in the second year namely Green Supply Chain, Global Climate Change & Business and Corporate Governance. Twelve students have taken all the three electives, and 120 students have taken Green Supply Chain. There are twice as many students who study Green Supply Chain and Corporate Governance but not Global Climate Change & Business, as those who study both Green Supply' Chain and Global Climate Change & Business but not the Corporate Governance, and 4 times as many who study all the three. 124 students study Corporate Governance. There are 72 students who could not muster up the courage to take up any of these subjects. The group of students who study 'both Green Supply Chain and Corporate Governance but not Global Climate Change & Business is exactly the same as the group made up of the students who study both Global Climate Change & Business and Corporate governance. How many students study Global Climate Change & Business only?
(a) 176 (b) 104 (c) 152 (d) 188

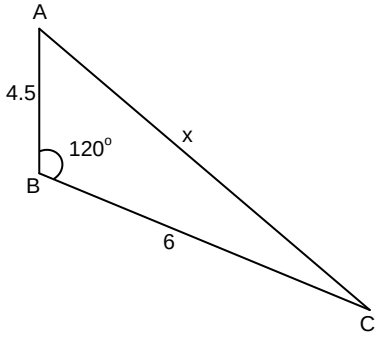
Sol. (b);



As per the given condition, 2x = 4 x 12 or x = 24
Also 2x = y + 12 $\Rightarrow$ y = 36
$\therefore$ only CG = 124 – 48 – 12 – 36 = 28
Now, 120 + a + y + 28 = 360 – 72
$\Rightarrow$ a = 104
Option (b).

35. Ramesh and Sohan start walking away from each other from a point P at an angle of 120°. Ramesh walks at a speed of 3 km/hour while Sohan walks at a speed of 4 km/hour. What is the distance between them after 90 minutes?
(a) 9.89 km (b) 10.56km (c) 9.12 km (d) 12.42 km

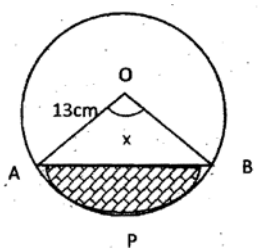
Sol. (c);



Distance traveled by Ramesh = 3 x 1.5 = 4.5 km
and that by sohan = 4 x 1.5 = 6km

Cos 120^o = $\frac{4.5^2 + 6^2 - x^2}{2 \times 4.5 \times 6}$
On solving, x = 9.12 km

36. A chord AB of length 24 cm is drawn in a circle of radius 13 cm. Find the area of the shaded portion APB.



(a) $13\pi x$ cm^2 (b) $\frac{13\pi x}{180}$ cm^2 (c) $\frac{169\pi x}{360} - 60$ cm^2 (d) $\frac{169\pi x}{180} - 60$ cm^2

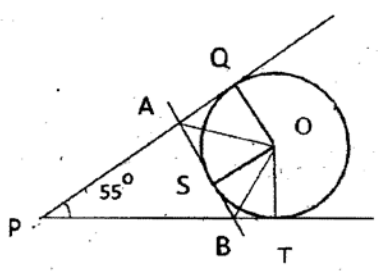
Sol. (c); The required area = area of sector – area of triangle

$= \frac{x}{360} \times \pi(13)^2 - \frac{1}{2} \times 24 \times 5$

$\frac{169\pi x}{360} - 60cm^2$

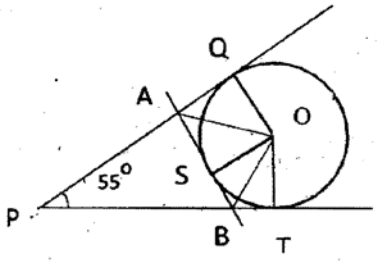
Option (c).

37. Two tangents are drawn from a point P on the circle with centre at 0, touching the circle at point Q and T respectively. Another tangent AB touches the circle at point S. If angle QPT=55°, find the angle AOB=?



(a) 125° (b) 62.5° (c) 97.5° (d) 95°

Sol. (b);



$\angle$ QOA = $\angle$ AOS ($\because$ the triangles are congruent) = x

and also $\angle$ SOB = $\angle$ BOT = y

$\therefore \angle$ QOT = 2x + 2y

Now in PQOT, $55 + 90 + 2x + 2y + 90 = 360^o$

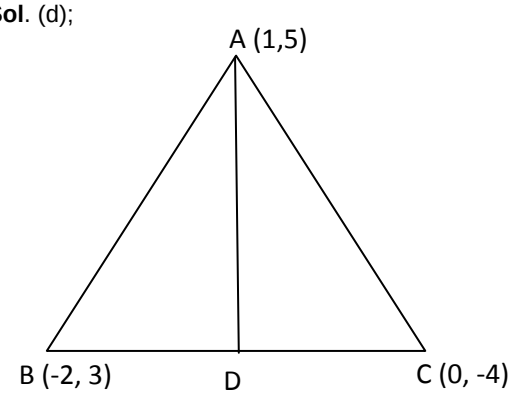
Or $x + y = 62.5^o$

Option (b).

38. The coordinates of a triangle ABC are A(1, 5), B(-2, 3), and C(0--4); find the equation of the median AD?

(a) 7x-3y+8=0 (b) 5x-4y+15=0 (c) x+3y-16=0 (d) 11x-4y+9=0

Sol. (d);



Coordinates of D are $\left(\frac{0-2}{2}, \frac{3-4}{2}\right) = \left(-1, \frac{-1}{2}\right)$

Equation of AD is

$$(y-5) = \frac{\frac{-1}{2}-5}{-1-1}(x-1)$$

Or 11x - 4y + 9 = 0
Option (d).

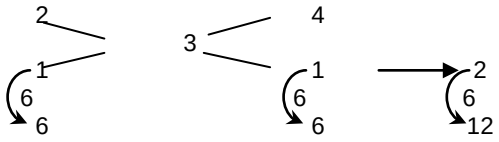
39. The Drizzle Pvt. Ltd., a squash company has 2 cans of juice. The first contains 25% water and the rest is fruit pulp. The second contains 50% water and rest is fruit pulp. How much juice should be mixed from each of the containers so as to get 12 litres of juice such that the ratio of water to fruit pulp is 3:5?
(a) 6 litres, 6 litres (b) 4 litres, 8 litres (c) 5 litres, 7 litres (d) 9 litres, 3 litres

Sol. (a);
Water

$\frac{1}{4}$ $\frac{1}{2}$

$\frac{3}{8}$

Or



Option (a).

40. An overhead tank, which supplies water to a settlement, is filled by three bore wells. First two bore wells operating together fill the tank in the same time as taken by third bore well to fill it. The second bore well fills the tank 10 hours faster than the first .one and 8 hours slower than the third one. The time required by the third bore well to fill the tank alone is:
(a) 9 hours (b) 12 hours (c) 18 hours (d) 9 hours

Sol. (b); The question can be easily solved using options;
Check option B

M	III	I	II	I + II
R		2	3	5
T	12	30	20	12
W		60		60