Astha shukla
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Assignment - 2

CSE - IV - B

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Que (1) x: 0 1 2 3 4 5 6 7 8

P(x): a 3a 5a 7a 9a 11a 13a 15a 17a

(i)
$$\sum_{x=0}^{8} P(x_i) = 1$$

$1 = a + 3a + 5a + 7a + 9a + 11a + 13a + 15a + 17a$

$1 = 81a$

$a = 1/81$

(ii) $P(x<3) = P(0<x<3)$

$= a + 3a + 5a$

$= 9a$

$= 9 \times 1/81 = 1/9$

$P(x \geq 3) = 1 - P(x<3)$

$= 1 - 1/9 = 8/9$

$P(2 \leq x < 5) = P(x=2) + P(3) + P(4)$

$= 5a + 7a + 9a$

$= 21a = 7/27$

(iii) $P(x \leq x) > 0.5$

$P(x \leq 0) = 1/81$ which is smaller than 0.5

$P(x \leq 1) = 1/81 + 1/27 = 0.049 < 0.5$

$P(x \leq 2) = \frac{1}{81} + \frac{1}{27} + \frac{5}{81} = 0.11 < 0.5$

$P(x \leq 3) = \frac{1}{81} + \frac{1}{27} + \frac{5}{81} + \frac{7}{81} = 0.19 < 0.5$

$P(x \leq 4) = \frac{1}{81} + \frac{1}{27} + \frac{5}{81} + \frac{7}{81} + \frac{1}{9} = 0.3 < 0.5$

$P(x \leq 5) = 0.44 < 0.5$

$P(x \leq 6) = 0.66 > 0.5$

$x = 6$ is smallest value for which $P(x \leq x)$ is greater than 0.5

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(2) (i) Probability distribution funtion:- Collection of pair (x_i, p_i) where $i = 1, 2, 3 \ldots$ is called probab. distributen of random variable X which is sometime display inform of table

(ii) Probability density function:- If X is a random variable which takes value from an interval than the function $f(x)$ where $x \in X$ is called PDF, if it satisfy following

$f(x) \geq 0$ for every x

$$\int_{-\infty}^{\infty} f(x)dx = 1$$

(iii) Cumulative distribution funcn:- when value of variate $X \leq x$ then the probability of function $F(x)$ is written as

$$F(x) = \int_{-\infty}^{x} f(x)dx = P(X \leq x)$$

Properties →

(i) $F'(x) = f(x) \geq 0$

(ii) $F(-\infty) = 0$

(iii) $F(\infty) = 1$

(iv) $F(x)$ is a continuous f^n of x on right

(3) $E(x) = 10$ $\qquad$ $E(Y) = 0$

$Var(X) = 25$ $\qquad$ $Var(Y) = 1$

$$Y = ax + (-b)$$

$$Var(Y) = Var(ax - b)$$

$$Var(Y) = a^2 Var(X)$$

$$1 = a^2 \times 25$$

$$\boxed{a = 1/5}$$

Now, $E(Y) = E(ax - b)$

$$= aE(x) - b$$

$$0 = a \times 10 - b$$

$b = 10a$

$\boxed{b = 2}$

Solution (4) Since, $Y = 3x+1$ is continuously differentiable and non-decreasing for $0 \le x < 1$. So we apply transformation method.

for $y = 3x+1 \Rightarrow x = \left[\frac{y-1}{3}\right] \Rightarrow \frac{dx}{dy} = 1/3$

$0 \le x < 1 \Rightarrow 0 \le \frac{y-1}{3} < 1 \Rightarrow 1 \le y < 4$

Thus for these value of y, we have

$$g(y) = f(x/y) \left|\frac{dx}{dy}\right|$$

$$= 2 \times \left[\frac{y-1}{3}\right] \times \frac{1}{3}$$

$$g(y) = \frac{2}{9}(y-1)$$

The pdf of Y is

$$g(y) = \begin{cases} 2/9\,(y-1) ; & 1 \le y < 4 \\ 0 ; & \text{otherwise} \end{cases}$$

Solution (5) $f(x) = \int_2^4 \frac{1}{18}(3+2x)\,dx$

$$= \frac{1}{18}\left[(3x)_2^4 + [x^2]_2^4\right]$$

$$= \frac{1}{18}[12-6+16-4] \Rightarrow \frac{18}{18} = 1$$

Hence, the given function is a probability density fn.

$$f(x) = \int_2^3 \frac{1}{18}(3+2x)\,dx$$

$$= \frac{1}{18}\left[3x+x^2\right]_2^3$$

$$= \frac{8}{18} = 4/9$$

$$P(2 \le x \le 3) = 4/9$$

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$P(2 \le x \le 3) = 4/9$

Solution-(7) $f(x,y) = 4xye^{-(x^2+y^2)}; \; x \geq 0, y \geq 0$

$f_x(x) = \int_0^\infty 4xy\, e^{-(x^2+y^2)}\, dy$

$= 4xe^{-x^2}\int_0^\infty y e^{-y^2}\, dy$

Let $y^2 = t \quad 2y\,dy = dt$

$f_x(x) = \frac{4}{2}xe^{-x^2}\int_0^\infty e^{-t}\,dt$

$= -2xe^{-x^2}\left[e^{-t}\right]_0^\infty$

$\Rightarrow -2xe^{-x^2}\left[e^{-\infty} - e^{0}\right]$

$\boxed{f_x(x) = 2xe^{-x^2}}$ Similarly, $\boxed{f_y(y) = 2ye^{-y^2}}$

Solution-(6) $f\left(\frac{y}{x}\right) = \frac{8xy/9}{4x(4-x^2)/9} = \frac{2y}{4-x^2}$

Similarly, $f\left[\frac{x}{y} = y\right] = \frac{f(x,y)}{f_Y(y)}$

$= \frac{8xy/9}{4y(y^2-1)/9} = \frac{2x}{y^2-1}$

$f_x(x) = \int f(x,y)\,dy = \int_x^2 \frac{8}{9}xy\,dy$

$f_x(x) = \frac{8}{9}x\left[\frac{y^2}{2}\right]_x^2 = \frac{8}{9}x\left[\frac{4}{2} - \frac{x^2}{2}\right]$

$= \frac{4}{9}\left[4-x^2\right]$

$$\boxed{f_x(x) = \begin{cases} \frac{4}{9}x(4-x^2); & 1 \leq x \leq 2 \\ 0; & \text{otherwise} \end{cases}}$$

Solution-(8) (i) Σ

If

(ii) P(X

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P

Solution-(10)

(ii)

Solutio

$x, y \geq 0$

$(y) = 2ye^{-y^2}$

Solution (8) (i) $\Sigma p(x) = 3c^3 - 10c^2 + 9c - 1 = 1$

$= 3c^2 - 10c^2 + 9c - 2 = 0$

$c = 2, \ 0.33, \ 1$ on solving equati

$\boxed{c = 0.33}$

If $c = 2$, $p(0) > 1$

$c = 1$, $p(0) > 1$

So, c is the only possible value

(ii) $P(X < 2) = 3c^3 - 10c^2 + 4c$

$P(2x + 3 \geq 5) = P(x \geq 1)$

$= 4c + 5c - 10c^2 - 1$

$P(1 \leq x \leq 2) = 5c - 1$

wkt, $c = 0.33$

So,

x	0	1	2
$P(x)$	0.108	0.231	0.65

$P(x < 2) = 0.108 + 0.231$

$= 0.339$

$P(1 < x \leq 2) = 0.65$

$P(x \geq 1) = 0.231 + 0.650$

$= 0.881$

Solution (10) (i) $P(|x| \geq 1) = \int_{-2}^{-1} f(x)\,dx + \int_{1}^{2} f(x)\,dx$

$= \frac{1}{4}\left[(2-1) + (2-1)\right]$

$\boxed{P(|x| \geq 1) = 1/2}$

(ii) $\boxed{P(2x + 3 > 5) = 1/4}$

Solution (9) when $x \in [1, \infty)$

$f(x) = \int_{-\infty}^{-1} f(t)\,dt + \int_{-1}^{0} f(t)\,dt + \int_{0}^{1} f(t)\,dt + \int_{1}^{x} f(t)\,dt$

$0, y \geq 0$

$(y) = 2ye^{-y^2}$

Solution-(8) (i) $\Sigma p(x) = 3c^3 - 10c^2 + 9c - 1 = 1$

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w.k.t, $c = 0.33$

So,

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$P(x)$	0.108	0.231	0.65

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Solution-(10) (i) $P(|x| > 1) = \int_{-2}^{-1} f(x)dx + \int_{1}^{2} f(x)dx$

$= \frac{1}{4}[(2-1) + (2-1)]$

$\boxed{P(|x| \geq 1) = 1/2}$

(ii) $\boxed{P(2x + 3 > 5) = 1/4}$

Solution-(9) when $x \in [1, \infty)$

$f(x) = \int_{-\infty}^{-1} f(t)dt + \int_{-1}^{0} f(t)dt + \int_{0}^{1} f(t)dt + \int_{1}^{x} f(t)dt$

$$= 0 + \frac{1}{2} + \left[\frac{-x^2}{2} + x\right]_0^1 + 0$$

$$F(x) = \frac{1}{2} + \left[\frac{-1}{2} + 1\right] = 1$$

$$F(x) = \begin{cases} 0 & ; x \le -1 \\ \frac{x^2}{2} + x + \frac{1}{2} & ; -1 \le x < 0 \\ -\frac{x^2}{2} + x + \frac{1}{2} & ; 0 \le x \le 1 \\ 1 & ; x \geq 1 \end{cases}$$

Solution (11) conditional pmf of Y given X=x is defined as;

$$P(Y=y/X=x) = \frac{P[X=x, Y=y]}{P[X=x]}$$

We can find $P(X=x)$ by summing the joint pmf overall possible values of Y.

$$P(X=x) = \frac{1}{27}(2x+0) + \frac{1}{27}(2x+1) + \frac{1}{27}(2x+2)$$

$$= \frac{1}{27} \times (6x+3)$$

$$P[Y=0/x=x] = \frac{2x+0}{6x+3}$$

$$P(Y=1/x=x) = \frac{2x+1}{6x+3}$$

$$P(Y=2/X=x) = \frac{2x+2}{6x+9}$$

Solution (12) $f_X(x) = \int_2^4 f(x,y)\,dy$

$$= \int_2^4 6(1-x-y)\,dy = 6\left[y - xy - \frac{y^2}{2}\right]_2^4$$

= 6 [(4
= 6 [
[f
$f_Y(y)$
[f_Y
if X
X

$= 6\left[(4-2)-(4x-2x)-\left[\frac{16}{2}-\frac{4}{2}\right]\right]$

$= 6[2-2x-6]$

$$\boxed{f_x(x) = 6[-4-2x]}$$

$f_y(y) = \int_0^2 f(x,y)\,dy$

$= 6\left[x-\frac{x^2}{2}-yx\right]_0^2$

$= 6\left[(2-0)-\left[\frac{y}{2}\right]-2y\right]$

$$\boxed{f_y(y) = -12y}$$

if x & y are independent then $f(x,y) = f_x(x)\cdot f_y(y)$

$6(1-x-y) \neq (-12y)\,6[-4-2x)$

x & y are not independent.

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Assignment - 4

CSE - IV - B

(1) If x is a random variable for which $E(X) = 10$ and $Var(X) = 25$. Find the value of a & b such that $y = ax - b$ has expectation 0 & variance 1.

Sol^n $E(X) = 10$ $\qquad E(Y) = 0$
$Var(X) = 25$ $\qquad Var(Y) = 1$

$y = ax - b$

$Var(Y) = Var(ax - b) = a^2 Var(x)$
$1 = a^2 \times 25$
$a^2 = 1/25$
$a = 1/5$
$\boxed{a = 0.5}$

$E(Y) = E(ax - b) = a E(X) - b$
$0 = a \times 10 - b$
$10a = b$
$2 \ \cancel{10} \times 1/\cancel{5} = b$ $\qquad \{a = 1/5\}$
$\boxed{b = 2}$

Que (2) Obtained the MGF of the random variable having probability distribution $f(x) = \begin{cases} x & 0<x<1 \\ 2-x & 1 \le x < 2 \\ 0 & \text{else} \end{cases}$
Also determine mean & variance of the distribution.

$M_x(t) = E(e^{xt}) = \int_{-\infty}^{\infty} e^{xt} f(x) dx$

$= \int_0^1 x e^{xt} dx + \int_1^2 (2-x) e^{xt} dx + \int_2^{\infty} e^{xt} \cdot 0 \, dx$

$= \left[\frac{x e^{xt}}{t} - \int 1 \frac{e^{xt}}{t} dt\right]_0^1 + 2\left[e^{xt}\right]_1^2 - \left[\frac{x e^{xt}}{t} - \int \frac{e^{xt}}{t} dx\right]_1^2$

$= \left[\frac{x e^{xt}}{t} - \frac{e^{xt}}{t^2}\right]_0^1 + 2\left[\frac{e^{2t} - e^t}{t}\right] - \left[\frac{x e^{2t}}{t} - \frac{e^{xt}}{t^2}\right]_1^2$

$= \left[1 \cdot \frac{e^t}{t} - 0\right] - \left[\frac{e^t}{t^2} - \frac{1}{t^2}\right] + 2\frac{e^{2t}}{t} - \frac{2e^t}{t} - \frac{2e^{2t}}{t} + \frac{e^t}{t} + \frac{e^{2t}}{t^2} - \frac{e^t}{t}$

$$= \frac{-e^t}{t^2} + \frac{1}{t^2} + \frac{e^{2t}}{t^2} - \frac{e^t}{t^2}$$

$$= \frac{e^{2t}}{t^2} - \frac{2e^t}{t^2} + \frac{1}{t^2} = \frac{e^{2t} - 2e^t + 1}{t^2}$$

$$\boxed{M_x(t) = \frac{(e^t - 1)^2}{t^2}}$$

$$= \left[\left(1 + \frac{t}{\lfloor 1} + \frac{t^2}{\lfloor 2} + \frac{t^3}{\lfloor 3} + \dots\right) - 1\right]^2 = \frac{\left[t + \frac{t^2}{2} + \frac{t^3}{6} + \dots\right]^2}{t^2}$$

$$\boxed{M_{(x)}t = 1 + t + \frac{7}{12}t^2 + \dots}$$

Now, mean $= \bar{x} = \nu_1 = \left[\frac{d}{dt} M_x(t)\right]_{t=0}$

$$= \left[1 + \frac{14}{12}t + \dots\right]_{t=0} = 1$$

$$\nu_2 = \left[\frac{d^2}{dt^2} M_x(t)\right]_{t=0} = \frac{14}{12} = 7/6$$

$$\mu_2 = \nu_2 - \bar{x}^2 = 7/6 - 1$$

$$\boxed{\mu_2 = 1/6}$$

mean $= 1$

Variance $= 1/6$

Que 8) In 800 families with 5 children each, how many families would be expected to have

(i) 3 boys and 2 girls

(2) Atmost 2 girls

(iii) No girl

(iv) either 2 or 3 boys

Soln:-

(i) $800 \times {}^5C_3 \times \left(\frac{1}{2}\right)^3 \times \left(\frac{1}{2}\right)^2 = 250$

(iii) $800 \times P(5) = 800 \times {}^5C_5 \left(\frac{1}{2}\right)^5 \left(\frac{1}{2}\right)^0 = 25$

(iv) $P(\text{either 2 or 3 boys}) = P(r=2) + P(r=3)$

$= P(2) + P(3)$

$= \frac{1}{2^5} \cdot {}^5C_2 + \frac{1}{2^5} \cdot {}^5C_3$

$= 5/8$ per family

Expected no. $= \frac{5}{8} \times 800$

$= 500$ famil.

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Que ④ The probability that a bulb produced by a . . . 5 such bulbs.

Sol^n Let x = no. of false bulbs.
p = probability of a bulb produced by a factory will fuse after 150 days of use →
$\therefore p = 0.05$ and $q = 1-p = 1-0.05 = 0.95$

$p = 0.05$ and $q = 1-p = 1-0.05 = 0.95$
X has a binomial distribution with $n=5$ & $p=0.05$
$\therefore x \sim B(5, 0.05)$
The p.m.f of X is given by
$p(x=x) = n_{C_x} p^x q^{n-x}$
i.e, $p(x) = 5C_x (0.05)^x (0.95)^{5-x}$
$x = 1, 2, 3, \ldots$

⑤ In a test on 2000 electric bulbs - - - estimate the no. of bulbs likely to burn for →
More than 2150 hrs.

Sol^n Let x denote the bulb follows N.D with mean 2040 & SD = 60.
Here $m = 2040$
$\sigma = 60$ $N = 2000$
SD ⇒ $z = \frac{x-\mu}{} = \frac{x-2040}{60}$
P(more than 2150 hrs)
$P(x > 2150)$
when $x = 2150$
$z = \frac{2150-2040}{60} = \frac{110}{60} = 1.833$
$P(x > 2150) = P(z > 1.833)$
$= P(0 < z < \infty) - P(0 < z < 1.833)$
$= 0.5 - 0.4664$
$= 0.0336$
No. of bulbs $= 0.0336 \times 2000$
$= 67.2 \simeq 67$

Que ⑥ Sup
total
Sol^n P

Que ⑧
Sol^n

produced by a

a factory will

$1-0.05$

$= 0.95$

$n=5$ & $p=0.05$

$-x$

ly to

D with

Que 6 Suppose that the longevity of a light bulb is ... find probability that it will last a total of over 19 yrs.

Soln

$$P(X>19 \mid X>12) = \frac{P(X>19 ; X>12)}{P(X>12)}$$

$$= \frac{P(X>19)}{P(X>12)}$$

$$= \frac{\int_{19}^{\infty} 0.125\, e^{-0.125t}\,dt}{\int_{12}^{\infty} 0.125\, e^{-0.125t}\,dt}$$

$$= \frac{\int_{2.375}^{\infty} e^{-u}\,du}{\int_{1.5}^{\infty} e^{-u}\,du} = \frac{\left[-e^{-u}\right]_{2.375}^{\infty}}{\left[-e^{-u}\right]_{1.5}^{\infty}} = 0.417$$

Que 8 Fit a poisson distribution to the following data & calculate theoretical frequencies

Soln

x	f	fx
0	24	0
1	41	41
2	28	56
3	5	15
4	2	8
	100	120

$n=4$

$N=100$

$$\bar{x} = \frac{\Sigma fx}{\Sigma f} = \frac{120}{100} = 1.2$$

$$p = \frac{1.2}{4} = 0.3,\quad q = 1-0.3,\quad \boxed{q=0.7}$$

B.D $P(r) = {}^nC_r\, p^r q^{n-r}$

$= 4C_r (0.3)^r (0.7)^{4-r}$, $r = 0,1,2,3,4$

x	$P(x)$	Expected $N \cdot P(r)$
0	$4C_0(0.3)^0(0.7)^4 = 0.2401$	$100 \times 0.2401 = 24.01$
1	$4C_1(0.3)^1(0.7)^3 = 0.4116$	$100 \times 0.4116 = 41.16$
2	$4C_2(0.3)^2(0.7)^2$	$100 \times 0.2646 = 26.46$
3	$4C_3(0.3)^3(0.7)^1$	$100 \times 0.0756 = 07.56$
4	$4C_4(0.3)^4(0.7)^0$	$100 \times 0.0081 = 0.81$

/100

Que (10) It is given that 2% of electric bulbs manufactured by a company are defective. using poisson distribution find probab[ility] that a sample of 200 bulbs will contain

(i) No defective bulb.

Sol^n (i) Given, $p = \frac{2}{100} = 0.02$, & $n = 200$

$\lambda = np = 200 \times 0.02$

$\boxed{\lambda = 4}$

thus, X is poisson random variable with

$P(X=x) = \frac{e^{-4} 4^x}{x!}$

We want $P(\text{no. defective bulb}) = P(X=0)$

$= \frac{e^{-4} 4^0}{0!} = e^{-4} = 0.0183$

Hence, the probability of 200 bulbs will not contain any defective bulb is 0.0183

(ii) → Two defective bulbs

$= P(X=2)$ $P(X=2)$

$\left[\frac{e^{-4} 4^2}{2!}\right] = \left[\frac{0.0183 \times \cancel{16}^{8}}{\cancel{2}}\right]$

$= (0.0183 \times 8) = 0.1464$

(iii) Atmost three defective bulb

$= P(X > 3)$

$= P(X \leq 3)$

$= \{P(X=0) + P(X=1) + P(X=2) + P(X=3)\}$

$= \left[\frac{e^{-4} 4^0}{0!} + \frac{e^{-4} 4^1}{1!} + \frac{e^{-4} 4^2}{2!} + \frac{e^{-4} 4^3}{3!}\right]$

$= e^{-4} [1 + 4 + 8 + 10.67]$

$= 0.0183 \times 23.67$

$= 0.43316 = 0.4332$ //

Deadlock + and prevention.

3rd unit

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CSE-IV-B

Assignment-05

Solution (1) Discrete wavelet Transform → It has huge number of applications in science engineering, mathematics & CSc. It is used for signal coding, to represent a discrete signal in a more rebundant form, often as a preconditioning for data compression.

(ii) Continuous wavelet transform → Uses inner products to measure the similarity b/w a signal & analyzing funⁿ

(iii) Haar wavelet → It is a sequence of rescaled "square" shaped functions which together form a wavelet family or basis.

(iv) Shannon wavelet → It may be either by real or complex type. It is not well localized in the time domain, but its forier transfer is ~~based~~ limited.

Solution (2) For sum to be divided by 4 or 6
sum can be 4, 6, 8, 12

for sum to 4
Possible outcomes are 13, 22, 31
$P_1 = 3/36$

→ for sum to be 6
Possible outcomes are ~~13, 22, 31~~ 15, 24, ~~33~~ 33, 42, 51
$P_2 = 5/36$

→ For sum to be 8
Possible outcomes = 26, 35, 44, 62, 53
$P_3 = 5/36$

→ For sum to be 12
Possible outcomes are 66
$P_4 = 1/36$

Total probability $= 14/36 \Rightarrow 7/18$

Solution (3) Probability of $A = P(A) = 3/6 = 1/2$
$P(\bar{A}) = 1 - 1/2 = 1/2$
Probability of $B = P(B) = 2/6 = 1/3$
$P(\bar{B}) = 2/3$

Probability of C = $P(C) = 4/4 = 1$

$P(\bar{C}) = 1 - 1 = 0$

Required Probabil = $P[(A \cap B \cap \bar{C}) \cup (A \cap \bar{B} \cap C) \cup (\bar{A} \cap B \cap C) \cup (A \cap B \cap C)]$

Required Probabil = $P(A)P(B)P(\bar{C}) + P(A)P(\bar{B})P(C) + P(\bar{A})P(B)P(C) + P(A)P(B)P(C)$

$= \frac{1}{2} \times \frac{1}{3} \times 0 + \frac{1}{2} \times \frac{2}{3} \times 1 + \frac{1}{2} \times \frac{1}{3} \times 1 + \frac{1}{2} \times \frac{1}{3} \times 1$

$\Rightarrow \frac{1}{3} + \frac{1}{6} + \frac{1}{6} \Rightarrow 2/3$

Que(

Sol^n

Sol (4) → A speak truth 75%

$P(A) = 3/4 \quad P(\bar{A}) = 1/4 \; (1 - 3/4)$

B speak truth 80%

$P(B) = 4/5$

$P(\bar{B}) = 1 - 4/5 = 1/5$

Probability $= P(A)P(\bar{B}) + P(\bar{A})P(B)$

$= \frac{3}{4} \times \frac{1}{5} + \frac{1}{4} \times 4/5$

$= \frac{7}{20} \Rightarrow \frac{7}{20} \times 100\% = 35\%$

(n)

Sol (5) a number is divisible by 99 if it is divisible by both 9 & 11

no. is divisible by 9

$(3+4+2+2+2+1+3+p+q) =$ a multiple of 9

$17 + (p+q) = 18$ or 27

$p+q = 1$ — (1)

$p+q = 10$ — (2)

(11)

no. is divisible by 11

$(q+3+2+2+3) - (p+1+2+4) = 0$ or multiple of 11

$3 + (q-p) = 0$ or 11

$p - q = 3$ — (3)

$q - p = 8$ — (4)

when we solve (2) & (3)

$p = 6.5$ which is not possible

from (2) & (4)

$p = 1 \quad q = 9$

Sol (6) :- $[n^m + a^n]$ ...

m : so, 3...

$[(397$ ... 35...

by 398. Hence

Sol^n (9) $5^5 \times 10^{10} \times$ ...

$10^{10} \times 20^{20}$ ...

$\Rightarrow 10^{10} = 10 \times 1$...

$20^{20} = 20 \times$ ...

$30^{30} = 30 \times$ ...

⋮

$90^{90} = 90 \times$ ...

$100^{100} = 100$ ...

$110^{110} = 1$...

$120^{120} =$ ...

5^5 ...

total zeros ...

Sol (10) one-on...

element...

i.e., th...

onto fun...

-ent ...

Into f...

a bina...

eleme...

one

Many ...

& ...

one

$\cap C) \cup (\bar{A} \cap B \cap C) \cup$

$P(B.) P(C) + P(C\bar{A}) +$
$P(C)$

divisible by

of 11

Sol (6) :- $[n^n + a^n]$ is divisible by $(n+a)$ for all value of n ;

so, $[(397^{3591} + 1) + 4]$ ... $397^{3591} + 1$ is divisible by $(397+1) = 398$

$\Rightarrow$ $[(397^{3591}+1)+4]$ gives remainder 4 when divided by 398.

Hence $\rightarrow$ 4 is remainder

Sol^n (9)

$5^5 \times 10^{10} \times 5^{15} \times \ldots \times 125^{125}$

$10^{10} \times 20^{20} \times 30^{30} \times \ldots \times 90^{90}$

$\Rightarrow 10^{10} = 10 \times 10 \times 10 \ldots \times 10$ time = 10 zeroes.

$20^{20} = 20 \times 20 \times 20 \times \ldots \times 20$ times $\Rightarrow$ 20 zeroes

$30^{30} = 30 \times 30 \times \ldots \times 30$ times $\Rightarrow$ 30 zeroes.

$\vdots$

$90^{90} = 90 \times 90 \times 90 \ldots \times 90$ times $\rightarrow$ 90 zeroes

$100^{100} = 100 \times 100 \times 100 \ldots \times 100$ times $\rightarrow$ 100 zeroes

$110^{110} = 110 \ldots \times 110$ times $\rightarrow$ 110 zeroes

$120^{120} = 120 \times 120 \times 120 \ldots \times 120$ times $\rightarrow$ 120 zeroes

$5^5 \times 15^{15} \times 25^{25} \times 35^{35} \ldots \times 125^{125}$ $\rightarrow$ no zeroes

total zeroes $10+20+30+40+50+60+70+80+90+100+110+120+0 = 880$

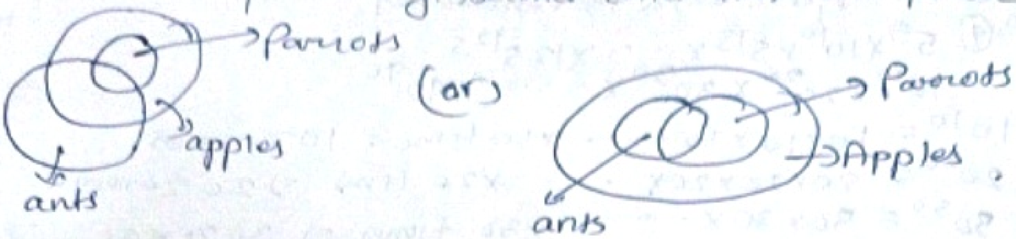
Sol (10) One-one function $\rightarrow$ Special function that maps every element of range to exactly one element of its domain i.e., the outputs never repeat.

onto function $\rightarrow$ It is a function f that maps an element x to every element y.

Into function $\rightarrow$ It is a type of function that establish a binary relation b/w two sets such that every element of first set will associate with exactly one element of codomain.

Many one function $\rightarrow$ It is a special relation b/w two sets where the elements of domain set have more than one image in the range set.

Solution (4) From the Venn diagram we made some assum
-ptions one conclusion all apples are parrots.
→ False.
→ Some ants are apples : True
Therefore only second conclusion are True.



Solution (18) from the venn diagram
Some assumptions on conclusion
All flutes are instruments : false
All harmoniums are flutes : True
Therefore only 2 is True
Hence, correct answer is B