13. Find the number of ways of forming a committee of 4 members out of 6 boys and 4 girls such that there is atleast one girl in the committee.

14. Resolve $\frac{x^2+13x+15}{(2x+3)(x+3)^2}$ into partial fractions.

15. Show that $\frac{5}{1\cdot2\cdot3}+\frac{7}{3\cdot4\cdot5}+\frac{9}{5\cdot6\cdot7}+\ldots=\log_e\left(\frac{8}{e}\right)$.

16. If $A=\begin{bmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{bmatrix}$ then show that $A^n=\begin{bmatrix}\cos n\theta & \sin n\theta\\ -\sin n\theta & \cos n\theta\end{bmatrix}$ for all positive integers.

17. In a class of 60 boys and 20 girls, half of the boys and half of the girls know cricket. Find the probability of a person selected from the class is either a boy or a person who knows cricket.

SECTION - C

5 × 7 = 35

LONG ANSWER TYPE QUESTIONS

Attempt **any 5** questions. Each question carries **7** marks.

18. Solve the equation $x^4-5x^3+5x^2+5x-6=0$, the product of two roots being 3.

19. Find the values of x, a and n if the 2nd, 3rd and 4th terms in $(x+a)^n$ are 240, 720 and 1080 respectively.

20. Show that $1+\frac{n}{2}+\frac{n(n-1)}{2\cdot4}+\frac{n(n-1)(n-2)}{2\cdot4\cdot6}+\ldots=1+\frac{n}{3}+\frac{n(n+1)}{3\cdot6}+\frac{n(n+1)(n+2)}{3\cdot6\cdot9}+\ldots$

21. Solve the equations by Gauss Jordan method.
$2x-y+3z=9,\ x+y+z=6,\ x-y+z=2$.

22. If a, b, c are all different and $\begin{vmatrix}a & a^2 & 1+a^3\\ b & b^2 & 1+b^3\\ c & c^2 & 1+c^3\end{vmatrix}=0$ then show that $abc=-1$.

23. Three boxes B_1, B_2, B_3 contain 2 white, 1 black and 2 red balls; 3 white, 2 black and 4 red balls; 4 white, 3 black and 2 red balls respectively. A die is rolled and B_1 is selected if the number is 1 or 2; B_2 if the number is 3 or 4; B_3 if the number is 5 or 6. If a ball is drawn from the box, thus selected then find the probability that the ball is from box B_2 when it is a black ball.

24. In a city 10 accidents take place in a span of 50 days. Assuming that the number of accidents follows Poisson distribution, find the probability that there will be 3 or more accidents in a day.