

Chapter 'A'

- A man can send 3 of his sons to 6 different colleges in the to.
 - 12 ways
 - 18 ways
 - 120 ways
 - 720 ways
- $P(n, n-r) =$
 - $n!$
 - $(n-r)!$
 - $\frac{n!}{(n-r)!}$
 - $\frac{n!}{r!}$
- In triangle ABC, $a \sin A - b \sin B$ is equal to
 - $c \sin(A-B)$
 - $c \cos(A-B)$
 - $a^2 + b^2$
 - $a^2 - b^2$
- For any triangle ABC, $\frac{b+c}{a} \sin \frac{A}{2}$ is equal to
 - $\cos \frac{B+C}{2}$
 - $\sin \frac{B+C}{2}$
 - $\sin \frac{B-C}{2}$
 - $\cos \frac{B-C}{2}$
- Euler's form of the complex no. $\frac{1}{i}$ is
 - $e^{\pi/4i}$
 - $e^{3\pi/2i}$
 - $e^{\pi/2i}$
 - $e^{\pi i}$
- If f is continuous function on $[a, b]$ and ϕ is an antiderivatives of f , then $\int_a^b f(x) dx$ is equal to
 - $\phi(x) - \phi(a)$
 - $\phi(b) - \phi(a)$
 - $\phi(a) - \phi(b)$
 - $\phi(b) - \phi(a) + c$
- If $f(x) = x + \frac{1}{x}$ then the value of $\int f(x) dx$ is
 - $x^2 + \log x + c$
 - $\frac{x^2}{2} + \log x + c$
 - $\frac{x}{2} + \log x + c$
 - $\frac{x^2}{2} - \frac{1}{x^2} + c$
- Which one of the following is not correct?
 - $\int \frac{1}{a^2 + x^2} dx = \frac{1}{a} \sin^{-1} \frac{x}{a} + c$

Handwritten notes and corrections:

- For question 2, $\frac{n!}{r!}$ is crossed out and $\frac{n!}{(n-r)!}$ is written.
- For question 3, $c \sin(A-B)$ is crossed out and $c \cos(A-B)$ is written.
- For question 4, $\cos \frac{B-C}{2}$ is crossed out and $\sin \frac{B-C}{2}$ is written.
- For question 5, $e^{\pi/2i}$ is crossed out and $e^{\pi i}$ is written.
- For question 6, $\phi(b) - \phi(a) + c$ is crossed out and $\phi(b) - \phi(a)$ is written.
- For question 7, $\frac{x}{2} + \log x + c$ is crossed out and $\frac{x^2}{2} + \log x + c$ is written.

$$b) \int \frac{1}{\sqrt{x^2 + a^2}} = \log (x + \sqrt{x^2 + a^2}) + c$$

$$c) \int \frac{1}{\sqrt{x^2 + a^2}} dx = \cos h^{-1} \frac{x}{a} + c$$

$$d) \int \frac{1}{x^2 - a^2} dx = \frac{1}{2a} \log \frac{x-a}{x+a} + c$$

Group 'B'

9. a) A person want to buy a car. There are two brands of car available in the market and each brand has 3 variant models and each model comes in five different colours. In how many ways a person can choose a car to buy? [2]

b) Evaluate $\frac{n!}{r!(n-r)!}$ when for any n with $r = 3$? [1]

c) If $\frac{1}{7!} + \frac{1}{8!} = \frac{A}{9!}$ then find the value of A. [2]

Prove that ${}^nP_r = {}^{n-1}P_r + r \times {}^{n-1}P_{r-1}$ [3]

10. a) Define cosine law. [2]

b) In any triangle, prove that $\frac{\cos A}{a} + \frac{a}{bc} = \frac{\cos B}{b} + \frac{b}{ca} = \frac{\cos C}{c} + \frac{c}{ab}$. [3]

Prove that: $4 \left(bc \cos^2 \frac{A}{2} + ca \cos^2 \frac{B}{2} + ab \cos^2 \frac{C}{2} \right) = (a + b + c)^2$. [3]

11. a) Find the product of two complex numbers $z_1 = r_1(\cos \theta_1 + i \sin \theta_1)$ and $z_2 = r_2(\cos \theta_2 + i \sin \theta_2)$. [2]

b) Express $(\sqrt{3} + i)$ in polar form and Euler form. [2+1]

c) State De-moivre's theorem. Using De-moivre's theorem, evaluate $(1 - \sqrt{3} i)^6$. [1+2]

12. a) Evaluate: $\int \frac{1}{x^2 - a^2} dx$ [2]

b) Evaluate: $\int \frac{1}{1+x-x^2} dx$ [3]

c) Evaluate: $\int \frac{(2x+2)}{3+2x-x^2} dx$ [3]