B.SC part I.
BY —

B.Sc.I

Objective Question

Topic Hyperbolic Function (Trigonometry)

1. Hyperbolic Functions are Wholly
   (I) imaginary (II) Wholly real
   (III) May be imaginary or real (IV) Only real

2. Basic hyperbolic Functions are
   (I) tanhθ, cothθ (II) Sinhθ coshθ
   (III) Sechθ, cosechθ (IV) None of these

3. $\frac{e^{\theta} + e^{-\theta}}{2}$ is called
   (I) Hyperbolic sine of θ (II) Hyperbolic Cos of θ
   (III) Hyperbolic tan of θ (IV) Hyperbolic ct of θ

4. $\frac{e^{2\theta} + 1}{2e^{\theta}}$ is denoted by
   (I) Sinhθ (II) coshθ
   (III) tanhθ (IV) None of these

5. $\frac{e^{2\theta} - 1}{e^{2\theta} + 1}$ is denoted by
   (I) cothθ (II) Sinhθ
   (III) tanhθ (IV) None of these

6. ~~The quantity~~ cothθ is referred to
   (I) $\frac{e^{\theta} + e^{-\theta}}{e^{\theta} - e^{-\theta}}$ (II) $\frac{e^{2\theta} + 1}{e^{2\theta} - 1}$ (III) $\frac{1 + e^{-2\theta}}{1 - e^{-2\theta}}$ (IV) All of above.

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7. $\lim_{\theta \to \infty} \sinh\theta$ =

(I) $-\infty$ (II) $+\infty$ (III) 0 (IV) 1

8 $\lim_{\theta \to \infty} \cosh\theta$ =

(I) ∞ (II) 1 (III) 0 (IV) $-\infty$

9 $\sinh\theta$ =

(I) $\sum_{n=0}^{\infty} \frac{\theta^{2n}}{\lfloor 2n}$ (II) $\sum_{n=0}^{\infty} \frac{\theta^{2n+1}}{\lfloor 2n+1}$ (III) $\sum (-1)^n \frac{\theta^{2n}}{\lfloor 2n}$

(IV) $\sum_{n=0}^{\infty} (-1)^n \frac{\theta^{2n+1}}{\lfloor 2n+1}$

(10) $\sinh\theta$ is an

(I) Even Function (II) odd Function

(III) Neither Even nor odd (IV) None of these

(11) $\tanh\theta$ is an.

(I) Even Function (II) odd function

(III) Neither Even nor odd (IV) None of these

12. $f(\theta) - f(-\theta) = 0$

$\Rightarrow$ (I) $f(\theta)$ is an odd Function (II) $f(\theta)$ is an even function

(III) Neither Even Nor odd (IV) None of these

13. $\sinh(\log y)$ =

(I) $\frac{y - y^{-1}}{2}$ (II) $\frac{y + y^{-1}}{2}$ (III) $\frac{y - y^{-1}}{y + y^{-1}}$

(IV) $\frac{y + y^{-1}}{y - y^{-1}}$

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) $\tanh(\log y) =$

(I) $\frac{y+y^{-1}}{y-y^{-1}}$ (II) $\frac{y-y^{-1}}{2}$ (III) $\frac{y+y^{-1}}{2}$

(IV) $\frac{y-y^{-1}}{y+y^{-1}}$

(15) Hyperbolic Functions are periodic (I) having real periods (II) having imaginary period (III) its period may be real or imaginary

(16) Periods of $\sinh x$ and $\cosh x$ are

(I) πi (II) $2\pi i$ (III) $(2n+1)\pi i$

(IV) None of these

17 the value of $e^{2n\pi i}$ is

(i) (-1) (II) 1

(III) 0 (IV) None of these

18 the value of $\sinh x + \cosh x$ is equal to

(I) e^{-x} (II) e^{x}

(III) 1 (IV) None of these

19. the value of

$\cosh^2 x - \sinh^2 x$ is

(I) $\cosh 2x$ (II) 1

(III) -1 (IV) None of these

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(20) General value of $\log i$ is

(i) 0 (ii) $\frac{4n+1}{2}\pi i$

(iii) $\frac{4n+1}{2}\pi$ (iv) $\pi\frac{i}{2}+2n\pi$

21. The Principal value of $\tanh^{-1}x$

(i) $\frac{1}{2}\log\frac{1+x}{1-x}$ (ii) $\frac{1}{2}\log\frac{1-x}{1+x}$

(iii) $n\pi i+\frac{1}{2}\log\frac{1-x}{1+x}$ (iv)

22. The principal value of $\sinh^{-1}x$ is

(i) $\log[x+\sqrt{x^2-1}]$ (ii) $\log[x+\sqrt{x^2+1}]$

(iii) $\frac{1}{2}\log\frac{1+x}{1-x}$ (iv) None of these

23. The principal value of $\coth^{-1}x$ is

(i) $\log[x+\sqrt{x^2-1}]$ (ii) $\log[x+\sqrt{x^2+1}]$

(iii) $\frac{1}{2}\log\frac{1+x}{1-x}$ (iv) None of these

24. The General value of ~~$\sinh^{-1}x$~~ $\coth^{-1}x$ is

(i) $2n\pi\pm\log(x+\sqrt{x^2-1})$ (ii) $n\pi i+(-1)^n\log[x+\sqrt{x^2+1}]$

(iii) $n\pi i+\frac{1}{2}\log\frac{1+x}{1-x}$ (iv) None of these.

25. $\sin\theta=$

(i) $\theta\prod_{r=1}^{r=\infty}\left[1-\frac{\theta^2}{r^2\pi^2}\right]\cdots$ (ii) $\prod_{r=1}^{\infty}\left[1-\frac{4\theta^2}{(2r-1)^2\pi^2}\right]$

(iii) $\theta\prod_{r=1}^{\infty}\left[1+\frac{\theta^2}{r^2\pi^2}\right]$ (iv) $\prod_{r=1}^{\infty}1+\frac{4\theta^2}{(2r-1)^2\pi^2}$

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(26) $\cosh\theta =$

(I) $\prod_{r=1}^{\infty}\left(1+\frac{4\theta^2}{(2r-1)^2\pi^2}\right)$ (II) $\prod_{r=1}^{\infty}\left(1-\frac{4\theta^2}{(2r-1)^2\pi^2}\right)$

(III) $\theta\prod_{r=1}^{\infty}\left(1-\frac{\theta^2}{r^2\pi^2}\right)$ (IV) $\theta\prod_{r=1}^{\infty}\left(1+\frac{\theta^2}{r^2\pi^2}\right)$

(27) $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\cdots\cdots =$

(I) $\frac{\pi^2}{6}$ (II) $\frac{\pi^4}{90}$ (III) $\frac{\pi^4}{96}$ (IV) $\frac{\pi^2}{8}$

(28) $\sum_{r=1}^{\infty}\frac{1}{r^4} =$

(I) $\frac{\pi^2}{6}$ (II) $\frac{\pi^4}{90}$ (III) $\frac{\pi^4}{96}$ (IV) $\frac{\pi^2}{8}$

(29) $\sum_{r=1}^{\infty}\frac{1}{(2r-1)^2} =$

(I) $\frac{\pi^2}{6}$ (II) $\frac{\pi^2}{8}$ (III) $\frac{\pi^4}{90}$ (IV) $\frac{\pi^4}{96}$

(30) $\sum\frac{1}{(2r-1)^4} =$

(I) $\frac{\pi^4}{96}$ (II) $\frac{\pi^4}{90}$ (III) $\frac{\pi^2}{8}$ (IV) $\frac{\pi^2}{6}$

(31) $\operatorname{cosec}\theta =$

(I) $4\pi\sum_{r=1}^{\infty}\frac{(-1)^{r-1}(2r-1)}{(2r-1)^2\pi^2-4\theta^2}$ (II) $\frac{1}{\theta}+2\theta\sum\frac{(-1)^r}{\theta^2-\pi^2r^2}$

(III) $\sum\frac{1}{r^4}$ (IV) $\sum\frac{1}{r^2}$

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Theory of Equation

1. Relation Between the roots and Co-efficient of Equations →

32. If $a_0 x^n + a_1 x^{n-1} + a_2 x^{n-2} + \cdots + a_{n-1} x + a_n = 0$ Where $a_0 \neq 0$ has the roots α_k $1 \leq k \leq n$ then

Sum of all Roots is

(I) $(-1)\frac{\text{Coefficient of } x^{n-1}}{\text{Co-efficient of } x}$ (II) $(-1)^2 \frac{a_2}{a_0}$

(III) $(-1)^3 \frac{a_3}{a_0}$ (IV) $(-1)^n \frac{a_n}{a_0}$

33. Let $x^3 + px^2 + qx + r = 0$ be a Cubic equation then $\Sigma\alpha\beta$ = Sum of Product of two roots taken at a time is

(I) $-p$ (II) q (III) $-r$ (IV) $-q$

34. Let $a_0 x^3 + a_1 x^2 + a_2 x + a_3 = 0$ be a Cubic equation and α, β, γ are its roots then

(I) $\Sigma\alpha = (-1)\frac{a_1}{a_0}$ (II) $\Sigma\alpha\beta = (-1)^2 \frac{a_2}{a_0}$

(III) $\alpha\beta\gamma = (-1)^3 \frac{a_3}{a_0}$ (IV) All are correct.

35. Which is correct
When $a_0 x^4 + a_1 x^3 + a_2 x^2 + a_3 x + a_4 = 0$

(I) $\Sigma\alpha$ = Sum of all roots $= (-1)\frac{a_1}{a_0}$

(II) $\Sigma\alpha\beta$ = Sum of Product of two roots taken at a time $= (-1)^2 \frac{a_2}{a_0}$

(III) $\Sigma\alpha\beta\gamma$ = Sum of Product of three roots Taken at a

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$= (-1)^3 \frac{a_3}{a_0}$

(iv) $\alpha\beta\gamma\delta = (-1)^4 \frac{a_4}{a_0}$ (v) All above.

(36) The Equation $x^3 - 5x^2 - 16x + 80 = 0$ has two of roots are equal in magnitude but opposite in sign, then the values are.

(i) $-5, 4, 4$ (ii) $5, -4, -4$ (iii) $5, 4, -4$

(iv) none.

(37) The cubic $2x^3 - 9x^2 + 12x + \lambda = 0$ has two Equal roots, then find the λ and all the roots

(i) $\lambda = -4$, roots be $2, -2, \frac{1}{2}$.

(ii) $\lambda = -4$ roots be $2, 2, \frac{1}{2}$

(iii) $\lambda = -4$ and $1, 1, 5/2$

(iv) $\lambda = -4$ and $1, 1, 5/2$

(40) In $\Sigma \alpha^3 \beta^2 \gamma$ the order and weight is respectively

(i) 3, 3

(ii) 3, 6

(iii) 6, 3

(iv) None.

(38) In a Symmetric function the sum of the Exponents of its Term is called

(i) Its order (ii) Weight of the Function

(39) the highest Power of an argument in a Symmetric function is called its

(i) weight of the Function (ii) order of the function

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