Question Bank – Mathematics

Class: 2nd year

Multiple Choice Questions

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CHAPTER : 1

1. $\frac{e^{2x}-1}{2e^{2x}}$ is equal to:

a. Sinx
b. cosx
c. sinhx
d. coshx

2. $\lim_{\theta \to 0} \frac{1-\cos p\theta}{1+cosq\,\theta}$ equals to:

a. 0
b. $\frac{p}{q}$
c. $\frac{p^2}{q^2}$
d. $\frac{q^2}{p^2}$

3. x=3 cost, y=3 sin*t* represent:

a. line
b. circle
c. parabola
d. hyperbola

4. $\lim_{x\to 0} \frac{\sin 3x}{\sin 2x}$ is equal to:

a. $\frac{2}{3}$
b. $\frac{\mathbf{3}}{\mathbf{2}}$
c. $\frac{1}{6}$
d. $\frac{1}{4}$

5. If (x) = x^2 – x then f(–2) is equal to:

a. 2
b. 6
c. 0
d. –6

6. If $\lim_{x\to\infty} \frac{f(x)-1}{x} = ln\ a\ ; a > 0$

a. a^{-x}
b. a^x
c. $\boldsymbol{e^{-x}}$
d. e^x

7. $\lim_{x\to\infty} (1 + \frac{x}{2})^{\frac{1}{x}}$ equals:

a. e
b. e^{-1}
c. e^2
d. $\sqrt{e}$

8. $\frac{d}{dx}\ e^{f(x)}$ equals:

a. $e^{f\prime(x)}$
b. $\boldsymbol{e^{f(x)}\,.f'(x)}$
c. $\frac{f'(x)}{e^x}$
d. $\frac{e^{f(x)})}{f\prime(x)}$

9. $\lim_{x\to 2} \frac{x^5-32}{x-2}$ equals:

a. 40
b. 60
c. 80
d. 120

10. $\lim_{\theta\to 0} \frac{\sin 7\ \theta}{\theta}$ is equal to:

a. $\frac{1}{7}$
b. 7
c. 1
d. $\frac{2}{7}$

11. If $f(x) = x^2$, then domain of f is:

a. Real number
b. Integer
c. Rational number
d. Irrational

12. 2 sin h x =

a. $\mathbf{e^x - e^{-x}}$
b. $e^x + e^{-x}$
c. $\frac{ex - e^{-x}}{2}$
d. $\frac{ex + e^{-x}}{2}$

13. $\lim_{\theta\to 0} \frac{sin^2\theta}{\theta}$:

a. 0
b. 1
c. ∞
d. 2

14. $x = at^2$, $y = 2at$ are the parametric equations of:

a. Ellipse
b. Circle
c. Parabola
d. Hyperbola

15. $\lim_{n\to\infty} (\frac{5n+1}{5n})^n$ = :

a. $\mathbf{e^{1/5}}$
b. e^5
c. e^{-5}
d. $e^{-1/5}$

16. Let $f(x) = x^2 + \cos x$, then f(x) is:

a. Odd function
b. Constant function
c. Even function
d. Neither even nor odd function

17. If at least one vertical line meets the curve at more than two points, then curve is:

a. A function
b. Not a function
c. One-to-one function
d. Onto function

CHAPTER : 2

1. $\frac{d}{dx}\left(\frac{x^2-4}{x-2}\right)$ equals to:

a. 0 **b. 1**
c. x+2 d. x-2

2. $\frac{d}{dx}(\tan x)$ is equals to:

a. ln cosx b. –lnsinx
c. $-sec^2x$ **d. $\boldsymbol{sec^2x}$**

3. The differential co-efficient of e^{sinx} equals:

a. $\boldsymbol{e^{snx}.cosx}$ b. $e^{snx}.sinx$
c. $e^{snx-1}.cosx$ d. $e^{snx-1}.sinx$

4. If y = ln(sinx),then $\frac{dy}{dx}$ equals:

a. tanx **b. cotx**
c. –tanx d. –cotx

5. If $f(x+h)=2^{x+h}$,then $f'(x)$ equals to:

a. $\frac{2^x}{ln^2}$ b. 2^{x+h}
c. $\boldsymbol{2^x.ln2}$ d. 2^x

6. $\cosh^{-1}$ x = :

a. ln(x+ $\sqrt{x^2+1}$) **b. ln(x+ $\sqrt{\boldsymbol{x^2-1}}$)**
c. $\frac{1}{2}\ln\left(\frac{1+x}{1-x}\right)$ d. $\frac{1}{2}\ln\left(\frac{x+1}{x-1}\right)$

7. If $f(x)=x^{2/3}$ then $f'(8)$= :

a. $\frac{1}{2}$ b. $\frac{2}{3}$
c. $\frac{\boldsymbol{1}}{\boldsymbol{3}}$ d. 3

8. $\frac{d}{dx}$ (cos x) = :

a. cos x b. $Sec^{-2}x$
c. –sin x d. Sec^2 x

9. If 4y + 3x +7 = 0 then $\frac{dy}{dx}$ is :

a. $\frac{3}{4}$ **b.** $-\frac{3}{4}$

c. $-\frac{4}{3}$ d. $\frac{2}{3}$

10. If y = lnx then $\frac{dy}{dx}$ = :

a. $-\frac{1}{x}$ **b.** $\mathbf{x^{-1}}$

c. x d. -2x

11. If y = sin 3x then y_2 = :

a. 3cos 3x b. 9cos 3x

c. -9sin 3x d. 9sin 3x

12. If y = x^3 then dy = :

a. x^3dx **b. $3x^2$ dx**

c. $\frac{x^4}{4}dx$ d. x dx

13. $\lim_{\delta x \to 0} \frac{f(x+\delta x)-f(x)}{\delta x}$ is equal to:

a. f (0) b. f′ (a)

c. f′(x) d. f′(0)

14. $\frac{d}{dx}x^n$ is equal to:

a. nx^{n-1} b. x^{n-1}

c. $\frac{x^{n+1}}{n}$ d. nx^{n+1}

15. If f(x) = cos x then f′(0) is equal to:

a. 0 b. –1

c. 1 d. $\frac{1}{2}$

16. $\frac{d}{dx}\sin h^{-1}x$ is equal to:

a. $\frac{1}{\sqrt{1-x^2}}$ b. $\frac{-1}{\sqrt{1-x^2}}$

c. $\frac{1}{\sqrt{1+x^2}}$ d. $\frac{-1}{\sqrt{1+x^2}}$

17. If f(x) = e^{ax} then f′(x) is equal to:

a. $\frac{e^{ax}}{a}$ b. $-\frac{e^{ax}}{a}$

c. **a e^{ax}** d. –a e^{ax}

18. $\frac{d}{dx}[\ln x]$ is equal to:

a. X **b.** $\frac{\mathbf{1}}{\boldsymbol{x}}$

c. x^2 d. $\frac{1}{x^2}$

19. Derivative of $\sin h^{-1} x$ w.r.t x equals:

a. $\frac{1}{\sqrt{1-x^2}}$ b. $\frac{-1}{\sqrt{1-x^2}}$

c. $\frac{\mathbf{1}}{\sqrt{\mathbf{1+x^2}}}$ d. $\frac{-1}{\sqrt{1+x^2}}$

20. $\frac{d}{dx}(e^{\cos x})$ equals:

a. –sin x $e^{\cos x}$ b. sin x $e^{\cos x}$

c. cos x $e^{\sin x}$ d. –cos x $e^{\sin x}$

21. If f(x + h) = cos (x+h), then f′(x) equals:

a. cos x b. –cos x

c. sin x **d. – sin x**

22. If y = sec $\left(\frac{3\pi}{2}-x\right)$, then y_1 equals:

a. cosec x cot x b. -cosec x cot x

c. sec x tan x d. -sec x tan x

23. $\frac{d}{dx}\tan h^{-1} x$ equals:

a. $\frac{1}{1+x^2}$ b. $\frac{1}{x^2-1}$

c. $\frac{\mathbf{1}}{\mathbf{1-x^2}}$ d. $\frac{1}{\sqrt{x^2-1}}$

24. The expression *ln* (x+ $\sqrt{x^2}+1$) equals:

a. sin $h^{-1} x$ b. cos $h^{-1} x$

c. tan $h^{-1} x$ d. cosec $h^{-1} x$

25. The differential co-efficient of e $^{\sin x}$ is:

a. e $^{\sin x}$. cos x b. e $^{\sin x}$. sin x

c. e $^{\cos x}$. cos x d. sin x . e $^{\sin x-1}$

26. If $f(x) = 2^x$, then $f'(x) =$:

a. 2^{x-1} **b. $2^x \ln 2$**

c. $\frac{2^x}{\ln 2}$ d. $\frac{\ln 2}{2^x}$

27. If $f'(c) = 0$, then $f(x)$ has relative maxima at $x = c$, if:

a. $f'(c) < 0$ b. $f'(c) = 0$

c. $f'(c) > 0$ d. $f'(c) \geq 0$

28. If $y = \ln(\sin x)$, then $\frac{dy}{dx}$ equals:

a. $\tan x$ **b. $\cot x$**

c. $-\tan x$ d. $-\cot x$

29. $\frac{d}{dx}(a^x)$ is:

a. $\frac{\ln a}{a^x}$ b. $\frac{a^x}{\ln a}$

c. a^x **d. $a^x \ln a$**

30. If $y = \frac{1}{x^2}$, then $\frac{dy}{dx}$ at $x = -1$ is:

a. 2 b. 3

c. $\frac{1}{3}$ d. 4

31. $f(x) = f(0) + f'(0)\,x + \frac{f''(0)}{2!}x^2 +$ ---------- $+ \frac{f^n(0)}{n!} +$ ---------- is called:

a. Taylor series b. Binomial series

c. Laurent series **d. Maclaurin series**

32. $\frac{1}{1+x^2}$ is derivative of:

a. $\sin^{-1} x$ b. $\sec^{-1} x$

c. $\tan^{-1} x$ d. $\cot^{-1} x$

33. $\frac{d}{dx}(\sec x)$ is:

a. $\sec^2 x$ b. $-\sec x \; x \; \tan x$

c. $\sec x \; x \; \tan x$ d. $\sec x \; \cot x$

34. $\frac{d}{dx}\cot^2 2x =$:

a. $4 \cot 2x \operatorname{cosec} 2x$ **b. $-4 \cot 2x \operatorname{cosec}^2 2x$**

c. $4 \cot^2 2x \operatorname{cosec} 2x$ d. $-4 \cot 2x$

35. $\frac{d}{dx}\ e^{x+h}$

a. $\frac{e^{x+h}}{\ln h}$
b. $\frac{e^{x+h}}{\ln x}$
c. $\boldsymbol{e^{x+h}}$
d. he^{x+h}

36. If f(x) = cos x then f' $(\frac{\pi}{2})$ = :

a. 1
b. 0
c. $\frac{1}{2}$
d. -1

37. $\frac{d}{dx}\ (x^2+1)^2$ = :

a. 1- $\frac{1}{2x}$
b. 1+ $\frac{1}{2x}$
c. 0
d. 1- $\boldsymbol{\frac{1}{x^2}}$

38. $\frac{d}{dx}\ (\sqrt{x}-\frac{1}{\sqrt{x}})^2$ = :

a. $2(x^2+1)$
b. $\frac{(x^2+1)^3}{3}$
c. $2x\ (x^2+1)$
d. $4x\ (x^2+1)$

39. If f(x) = cos h x then $f(x)^2 - f'(x)^2$ = :

a. 0
b. 1
c. $\boldsymbol{\frac{1}{2}}$
d. 2^2

40. $\frac{d}{dx}\ ((\ln x)^m)^k$:

a. $\boldsymbol{\frac{mk}{x}\ (\ln x)^{mk-1}}$
b. $\frac{k}{x^m}\ (\ln x)^{k-1}$
c. $\frac{1}{x^{mk}}$
d. $\frac{mk}{x}$

41. $\frac{d}{dx}(\sqrt{x}-\frac{1}{\sqrt{x}})^2$:

a. $1-\frac{1}{2x}$
b. $1+\frac{1}{x^2}$
c. 0
d. $\boldsymbol{1-\frac{1}{x^2}}$

42. If y = cos x, u = sin x then $\frac{dy}{dx}$ =:

a. cos x
b. –cot x
c. –tan x
d. –cosec x

43. $a_0 + a_1 + a_2x_2 +$---------- $+ a_nx^n +$ -------- is:

a. Maclaurin's series
b. Taylor series
c. Power series
d. Binomial series

44. $\frac{d}{dx}\ sin^{-1}\ x =$:

a. $\frac{1}{\sqrt{1+x^2}}$
b. $\cos^{-1} x$
c. $\mathbf{\frac{1}{\sqrt{1-x^2}}}$
d. $\frac{1}{\sqrt{1-x}}$

45. The order of the differential equation $\frac{d^2y}{dx^2} - \frac{dy}{dx} + 2x = 0$ is:

a. 2
b. 1
c. 0
d. 3

46. $\cos h^2 x - \sin h^2 x =$:

a. 1
b. -1
c. 0
d. 2

47. If f(x) has second derivative at "c" such that f′(c) = 0 and f″(c) < 0 then "c" is a point of:

a. Maxima
b. Minima
c. Zero point
d. Point of inflection

48. If $y = \sqrt{1 - x^2}$, $0 < x < 1$ then $\frac{dy}{dx} =$:

a. $\sqrt{x^2 - 1}$
b. $\frac{1}{\sqrt{x^2-1}}$
c. $\frac{x}{\sqrt{1-x^2}}$
d. $\mathbf{\frac{-x}{\sqrt{1-x^2}}}$

49. If $y = e^{\sin x}$, then $\frac{dy}{dx} =$:

a. $e^{\sin x}$
b. $\mathbf{e^{\sin x} \cos x}$
c. $e^{\sin x} + \cos x$
d. $-e^{\sin x} \cos x$

50. $\frac{d}{dx} \cos h\ x =$:

a. –sin hx
b. sec hx
c. –sec hx
d. sin hx

51. Solution of $\frac{dy}{dx} = \frac{-y}{x}$ *is*:

a. $\frac{x}{y} = c$

b. $\frac{y}{x} = c$

c. y = cx

d. xy = c

52. If x = f(θ), $y = g\ (\theta), then\ \frac{dy}{dx}$:

a. $\boldsymbol{\frac{dy}{d\theta}\frac{d\theta}{dx}}$

b. $\frac{dx}{d\theta}\frac{d\theta}{dy}$

c. $\frac{d\theta}{dy}\frac{dx}{d\theta}$

d. $\frac{dy}{d\theta}\frac{dx}{d\theta}$

53. $\frac{d}{dx}\log_a x =$

a. $\frac{1}{x}$

b. x *ln* x - x

c. $\frac{1}{x}\ln a$

d. $\boldsymbol{\frac{1}{x \ln a}}$

54. $\frac{d}{dx}\sec hx =$:

a. sec hx tan h x

b. -sec hx tan h x

c. $\tan h^2$ x

d. $\sec h^2$ x

CHAPTER : 3

1. $\int \frac{1}{x.lnx} dx$

a. ln(lnx)+c
b. lnx+c
c. ln($\frac{1}{2}$)+c
d. ln($\boldsymbol{ln\frac{1}{x}}$)+c

2. Anti-derivative of cotx is equals to
a. ln cosx +c
b. ln sinx +c
c. -ln cosx +c
d. -ln sinx+c

3. $\int_0^3 \frac{1}{x^2+9}$ dx equals:
a. $\frac{12}{\pi}$
b. $\boldsymbol{\frac{\pi}{12}}$
c. $-\frac{12}{\pi}$
d. $-\frac{\pi}{12}$

4. Solution of y.dx+ x.dx =0 is equal to:
a. x.y = *constant*
b. $\frac{x}{y} = constant$
c. x+y = constant
d. x-y = constant

5. $\int (2x+3)^{1/2}$ dx is equal to:
a. $\frac{1}{2}(2x+3)^{\frac{1}{2}}$ +c
b. $\frac{2}{3}(2x+3)^{\frac{3}{2}}$ +c
c. $\frac{1}{3}(2x+3)^{\frac{1}{2}}$ +c
d. $\boldsymbol{\frac{1}{3}(2x+3)^{\frac{3}{2}}}$ **+c**

6. $\int e^x \left(\frac{1}{x} + lnx\right)$ dx equals:
a. e^{-x}lnx +c
b. $e^{-x}.\ \frac{1}{x} + c$
c. $e^x.\ \frac{1}{x} + c$
d. $\boldsymbol{e^x}$. *ln*x +c

7. For n $n \neq -1, \int (f(x))^n f'(x)dx =$:
a. $\frac{f\prime(x)}{n} + c$
b. $\frac{(f(x))^{n-1}}{n-1}$
c. $\boldsymbol{\frac{(f(x))^{n+1}}{n+1} + c}$
d. $(f(x))^{n+1}$ +c

8. $\int \frac{e^{tan^{-1}x}}{1+x^2} dx$:
a. $e^{\sec x}$+c
b. $e^{\tan x} + c$
c. $e^{cot^{-1}x} + c$
d. $\boldsymbol{e^{tan^{-1}x} + c}$

9. $\int \frac{-1}{x\sqrt{x^2-1}}\, dx =$:

a. $tan^{-1}x + c$ **b.** $\boldsymbol{cosec^{-1}x + c}$

c. $sec^{-1}x + c$ d. $sin^{-1}x + c$

10. $\int \sec x\, dx =$:

a. $\boldsymbol{\ln|\sec x + \tan x| + c}$ b. $\ln|\text{cosec}\, x - \cot x| + c$

c. $\ln|\sec x - \tan x| + c$ d. $-\ln|\text{cosec}\, x + \cot x| + c$

11. $\int_{-\pi}^{\pi} \sin x\, dx =$:

a. 0 b. 6

c. 8 d. 16

12. The integration is the reverse process of:

a. Induction **b. Differentiation**

c. Tabulation d. Sublimation

13. $\int \sin x\, dx$ is equal to:

a. cos x b. sin x

c. –sin x **d. –cos x**

14. $\int \frac{f'(x)}{f(x)}\, dx$ is equal to:

a. *l*n x **b. *l*n f(x)**

c. *l*n f′(x) d. f(x)

15. $\int \sec x \tan x\ dx$ is equal to:

a. tan x b. sec^2 x

c. tan^2 x **d. sec x**

16. $\int_0^1 x^3\, dx$ is equal to:

a. 4 b. –4

c. $\boldsymbol{\frac{1}{4}}$ d. $\frac{-1}{4}$

17. Solution of differential equation, $\frac{dy}{dx} = y\ is$:

a. ce^x b. ce^{-x}

c. e^x d. e^{-x}

18. $\int \sin x \, dx$ is equal to:

a. cos x
b. –cos x
c. sin x
d. –sin x

19. $\int \frac{1}{1+x^2} dx$ is equal to:

a. $\tan^{-1} x$
b. $\tan^{-1} x^2$
c. $\cot^{-1} x$
d. $\cot^{-1} x^2$

20. $\int_a^b x \, dx$ equals:

a. $\frac{b-a}{2}$
b. $\frac{b+a}{2}$
c. $\frac{\boldsymbol{b^2-a^2}}{\boldsymbol{2}}$
d. $\frac{b^2_+ a^2}{2}$

21. $\int \frac{1}{x.\ln x} dx$ equals:

a. $\ln(\ln x)$
b. $\ln x$
c. $x \ln x$
d. $\frac{ln}{x}$

22. $\int_1^4 \sqrt[3]{x}$ dx is equal to:

a. 1
b. 4
c. 14
d. 41

23. $\int e^{2x}(-\sin x + 2\cos x) \, dx$ equals:

a. $e^{2x} \sin x$
b. $e^{2x} \cos x$
c. $-e^{2x} \sin x$
d. $-e^{2x} \cos x$

24. $\int_0^{\pi/4} \frac{sec^2 x}{1+\tan x} dx$:

a. 1
b. 2
c. ln 2
d. $\ln \sqrt{2}$

25. $\int (2x+3)^{1/2} dx$ equals:

a. $\frac{1}{2}(2x + 3)^{1/2} dx$
b. $\frac{2}{3}(2x + 3)^{3/2} + c$
c. $\frac{1}{3}(2x + 3)^{1/2} + c$
d. $\frac{1}{3}(2x + 3)^{3/2} + c$

26. The solution of differential equation $\frac{dy}{dx} = sec^2 x$ is:

a. y = cos x + c
b. y = sec x + c
c. $y = \cos^2 x + c$
d. y = tan x + c

27. Anti-derivative of cot x, equals:

a. ln (cos x) + c
b. ln (sin x) + c
c. $-\text{cosec}^2 x + c$
d. ln (sec x) + c

28. $\int_{-\pi}^{\pi} \sin x \, dx$ is equal to:

a. 0
b. 6
c. 8
d. 16

29. $\int \sin 3x \, dx$ is:

a. $\frac{\cos 3x}{3} + c$
b. $\mathbf{-\frac{\cos 3x}{3} + c}$
c. $3\cos 3x + c$
d. $-3\cos 3x + c$

30. $\int_{-1}^{3} x^3 \, dx$ is:

a. 20
b. 40
c. 30
d. 60

31. $\int \tan x \, dx$ is:

a. ln sec x + c
b. ln cosec x + c
c. ln sin x + c
d. ln cot x + c

32. $\int_a^b f(x)dx$ is:

a. $-\int_a^b f(x)dx$
b. $\mathbf{-\int_b^a f(x)dx}$
c. $\int_{-b}^{-a} f(x)dx$
d. $\int_{-b}^{+a} f(x)dx$

33. $\int \frac{x}{x+2} \, dx$ = :

a. ln (x + 2) + c
b. x + 2 ln (x + 2) + c
c. x - 2 ln (x + 2) + c
d. x - ln (x + 2) + c

34. $\int e^x (\ln x + \frac{1}{x}) \, dx$ = :

a. $e^x . \frac{1}{x} + c$
b. $\frac{e^x}{ln\, x} + c$
c. $\frac{e^x}{ln\, a} + c$
d. $\mathbf{e^x}$ ln x + c

35. $\int_0^1 \frac{1}{1+x^2} \, dx$ =:

a. 0
b. $\frac{\pi}{2}$
c. $\mathbf{\frac{\pi}{4}}$
d. $\frac{\pi}{3}$

36. $\int \sec x \, dx =$:

a. $\sec x \tan x + c$
b. $\sec^2 x \tan x + c$
c. $\ln(\sec x - \tan x + c$
d. $\boldsymbol{\ln(\sec x + \tan x + c}$

37. $\int \tan x \, dx =$:

a. ln cot x + c
b. ln cos x + c
c. ln sin x + c
d. ln sec x + c

38. $\int e^x \left[\frac{1}{1+x^2} + \tan^{-1}x\right] dx =$:

a. $e^x \tan x + c$
b. $\frac{ex}{1+x^2} + c$
c. $e^x \sin x + c$
d. $\boldsymbol{e^x \tan^{-1} x + c}$

39. $\int_0^{\pi/2} \sin^3 x \cos x \, dx =$:

a. $\frac{1}{2}$
b. $\frac{2}{3}$
c. $\boldsymbol{\frac{1}{4}}$
d. $\frac{1}{9}$

40. The solution of $\frac{dy}{dx} = -y$ is:

a. $y = e^2x$
b. $\boldsymbol{y = ce^{-x}}$
c. $y = e^x$
d. ce^x

41. $\int \frac{1}{f(x)} \times f'(x) \, dx =$:

a. ln x + c
b. ln [f'(x) + c]
c. $\frac{1}{f(x)} + c$
d. ln |f(x)| + c

42. $\int 3^x \, dx =$:

a. $3^x + c$
b. $3^x + \ln 3 + c$
c. $\boldsymbol{\frac{3^x}{\ln 3} + c}$
d. $3 \ln 3^x + c$

43. $\int_0^{\pi/2} \cos x \, dx =$:

a. 0
b. 1
c. 2
d. 3

44. $\int sec^2 x \, dx$:

a. tan x
b. $\frac{sec^3 x}{3}$
c. $\tan^2$
d. sec x tan x

45. Domain of $f(x) = x^2 + 1$:

a. R
b. R – {1}
c. R – {-1}
d. [1, ∞]

46. $\int \sin x \cos x \, dx$:

a. $\frac{1}{2}\cos 2x$
b. $-\frac{1}{2}\cos 2x$
c. $\frac{\boldsymbol{sin^2 x}}{\boldsymbol{2}}$
d. $\frac{cos^2 x}{2}$

47. $\int \frac{1}{\frac{x}{\sqrt{x^2-1}}} \, dx$:

a. $sin^{-1}x$
b. $tan^{-1}x$
c. $\boldsymbol{sec^{-1}x}$
d. $cosec^{-1}x$

CHAPTER : 4

1. Slope of line perpendicular to line 2x-3y+1=0 is equal to:

a. $\frac{3}{2}$ **b.** $-\frac{3}{2}$

c. $\frac{2}{3}$ d. $-\frac{2}{3}$

2. X- coordinate of centroid of triangle ABC with A (-2,3) ; B (-4,1); C (3,5) equals to:

a. -1 b. 1

c. 3 d. -3

3. For any point (x,y) on x-axis:

a. y = 0 b. y = –1

c. y = 1 d. y = 2

4. The point of concurrency of medians of triangle is called:

a. In-centre **b. Centroid**

c. Circumcentre d. Orthocenter

5. The point of intersection of medians of a triangle is called:

a. In-centre b. **Centroid**

c. Circumcentre d. Orthocenter

6. The distance of point P (1,6) from the line 6x – 4y + 9 = 0 is:

a. 49 b. $\frac{49}{52}$

c. $\frac{\sqrt{49}}{52}$ **d.** $\frac{\mathbf{49}}{\sqrt{\mathbf{52}}}$

7. Slope intercept form of line equals:

a. $y - y_1 = m(x-x_1)$ b. $\frac{x}{a} + \frac{y}{b} = 1$

c. $x\cos\theta + y\sin\theta = p$ **d. y = mx + c**

8. Point of interception of lines x -2y + 1 = 0 and 2x – y + 2 = 0

a. (1, 0) b. (0, 1)

c. (-1, 0) d. (0, -1)

9. Distance between (1,2) and (2,1) is:

a. 1 b. 2

c. $\sqrt{2}$ d. 0

10. The line y = mx + c, will be tangent to the parabola $y^2 = 4ax$ if:

a. $c = -am^2$ **b.** $\boldsymbol{c = \frac{a}{m}}$

c. $c = a(1 + m^2)$ d. $c = \frac{m}{a}$

11. Equation of the line parallel to x + 3y – 9 = 0:

a. 3x –y –9 =0 **b. 3x + 9y +7 =0**

c. 2x –6y –18 =0 d. x –3y +9 =0

12. ax + by + c = 0, will represent equation of straight line parallel to y-axis if:

a. a = 0 **b. b = 0**

c. c = 0 d. a = 0, c = 0

13. If a straight line is parallel to y-axis, then its slope is:

a. -1 b. 0

c. 1 **d. Undefined**

14. A linear equation in two variables represents:

a. Circle b. Ellipse

c. Hyperbola **d. Straight line**

15. The centroid of the triangle whose vertices are (3, -5), (-7, 4) and (10, -2) is:

a. (-2, -2) b. (-2, 2)

c. (2, -1) d. (0, 0)

16. Two lines represented by $ax^2 + 2hxy + by^2 = 0$ are parallel if:

a. $\mathbf{h^2 – ab = 0}$ b. $h^2 + ab = 0$

c. a + b = 0 d. a - b = 0

17. If m_1 and m_2 are slopes of two lines then lines are perpendicular if:

a. $m_1 m_2 = q$ **b.** $\mathbf{m_1 m_2 + 1 = 0}$

c. $m_1 m_2 - 1 = 0$ d. $m_1 + m_2 = 0$

18. The distance between the points (0, 0) and (1, 2) is:

a. 0 b. 2

c. $\sqrt{3}$ **d.** $\mathbf{\sqrt{5}}$

19. Two non-parallel lines intersect each other:

a. 1 point b. 0 point

c. ∞ points d. 2 points

20. The equation of horizontal line through (a,b) is:

a. $y = a$ **b. $y = b$**

c. $x = a$ d. $x = b$

21. The two lines $a_1x + b_1y = c$; $a_2x + b_2y = c_2$ are parallel if:

a. $a_1 - a_2 = 0$ b. $a_1 - b_1 = 0$

c. $a_1b_1 - a_2b_2 = 0$ **d. $a_1b_2 - a_2b_1 = 0$**

22. The inclination of $x = y$ is:

a. 30° b. 60°

c. 45° d. 180°

23. If the line $(3x - y + 5) + k(2x - 3y - 4) = 0$ is parallel to y- axis, then k=:

a. $-\frac{1}{3}$ b. $-\frac{1}{4}$

c. $-\frac{1}{5}$ d. 0

24. If α is the inclination of the line *l*, then $\frac{x-x_1}{\cos\alpha} = \frac{y-y_1}{\sin\alpha} = r$ (say) is called:

a. Point slope form b. Normal form

c. Symmetric form d. Intercept form

25. The centroid of a triangle divides each median in ratio:

a. 2:1 b. 1:2

c. 2:3 d. 1:1

26. The perpendicular distance of line $3x + 4y - 10 = 0$ from the origin is:

a. b. 1

c. $\frac{1}{2}$ **d. 2**

27. The straight line $y = mx + c$ is tangent to the eclipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ if:

a. $c^2 = a^2m^2 - b^2$ b. $c^2 = b^2m^2 + a^2$

c. $c^2 = b^2m^2 - a^2$ **d. $c^2 = a^2m^2 + b^2$**

28. If α is the inclination of a line *"l"*, then it must be true that:

a. $0 \leq \alpha < \frac{\pi}{2}$ b. $\frac{\pi}{2} \leq \alpha < \pi$

c. $0 \leq \alpha < \pi$ d. $0 \leq \alpha < 2\pi$

29. Horizontal line through (7, -9) is:

a. x = 7
b. x = -9
c. y = 7
d. y = -9

30. Equation of line bisecting II and IV quadrant:

a. y = x
b. y = -x
c. $y = \frac{1}{x}$
d. x + y = 1

31. Joint equations of two lines is $ax^2 + 2hxy + by^2 = 0$, if θ is angle between them, then tan θ =:

a. $\frac{2\sqrt{h^2+ab}}{a+b}$
b. $\frac{\mathbf{2\sqrt{h^2-ab}}}{\mathbf{a+b}}$
c. $\frac{\sqrt{h^2+ab}}{a+b}$
d. $\frac{\sqrt{h^2-ab}}{a+b}$

32. Set of all points equidistant from a fixed point form:

a. Ellipse
b. Parabola
c. Hyperbola
d. Circle

33. Distance of (x_1, y_1) from line ax + by + c = 0 is:

a. $\frac{\mathbf{ax_1\ by_1+c}}{\sqrt{\mathbf{a^2+b^2}}}$
b. $\frac{ax_1\ by_1-c}{\sqrt{a^2+b^2}}$
c. $\frac{ax_1\ by_1+c}{\sqrt{a+b}}$
d. $\frac{ax_1\ by_1-c}{\sqrt{a+b}}$

CHAPTER : 5

1. Point (1,2) lies in the region of inequality:

a. $2x+y>5$ b. $2x+y \geq 5$

c. $2x+y<3$ **d. $2x+y<3$**

2. x = 4 is the solution of inequality:

a. $x+3>0$ b. $x-3<0$

c. $-2x+3>0$ d. $x+3<0$

3. (1, 0) is the solution of inequality:

a. $7x+2y<8$ b. $x-3y<0$

c. $3x+5y<6$ d. $-3x+5y>2$

4. A function which is to be maximized or minimized is called:

a. Exponential function b. Linear function

c. Quadratic function **d. Objective function**

5. Solution set of inequality $2x < 3$ is:

a. $(\infty, \frac{3}{2})$ b. $(\frac{3}{2}, \infty)$

c. (∞, ∞) d. $(-\frac{3}{2}, \frac{3}{2})$

6. A function which is to be maximized or minimized is called:

a. Subjective function b. Quantitative function

c. Objective function d. Qualitative function

7. (1,0) is solution of inequality:

a. $9x+2y<8$ **b. $-x+3y<0$**

c. $3x+5y<6$ d. $3x+5y>4$

8. $ax + b < c$ is :

a. Linear inequality b. Identity

c. Equation d. Not inequality

9. The feasible solution which maximizes or minimizes the objective function is called:

a. Exact solution **b. Optimal solution**

c. Final solution d. Objective solution

10. System of linear inequalities involved in the problem is called:

a. Coefficients b. Solution

c. Problem constraints d. Boundaries

CHAPTER : 6

1. The center of circle $(x+3)^2 + (y-2)^2 = 16$ equals:

a. (-3,2) b. (3,-2)
c. (3,2) d. (-3,-2)

2. The eccentricity of $\frac{y^2}{4} - x^2 = 1$ equals:

a. $\frac{2}{\sqrt{5}}$ b. $-\frac{2}{\sqrt{5}}$
c. $\frac{\sqrt{5}}{2}$ d. $-\frac{\sqrt{5}}{2}$

3. The radius of circle $x^2 + y^2 + 2gx + 2fy + c = 0$ is:

a. $\sqrt{g^2 + f^2}$ b. $\sqrt{g^2 - f^2 + c}$
c. $\sqrt{g + f^2 + c}$ **d.** $\sqrt{\boldsymbol{g^2 + f^2} - \boldsymbol{c}}$

4. The vertex of parabola $(x-1)^2 = 8(y+2)$ is:

a. (1, –2) b. (0, 1)
c. (–1, –2) d. (1, 2)

5. The set of all points in the plane that are equally distant from a fixed point is called:

a. Ellipse b. Parabola
c. Hyperbola **d. Circle**

6. The parabola of $x^2 = y$ passes through a point:

a. $\left(\frac{1}{2}, \frac{1}{2}\right)$ b. $\left(\frac{1}{4}, \frac{1}{2}\right)$
c. $\left(\frac{\boldsymbol{1}}{\boldsymbol{2}}, \frac{\boldsymbol{1}}{\boldsymbol{4}}\right)$ d. $\left(\frac{1}{2}, \frac{-1}{2}\right)$

7. Equation of axis of a parabola $x^2 = 4ay$ is:

a. x = 0 b. x = a
c. y = 0 d. y = a

8. Length of tangent from (0,1) to $x^2 + y^2 + 6x - 3y + 3 = 0$ is called:

a. 2 b. 3
c. 4 **d. 1**

9. Length of latus rectum of ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is:

a. $\frac{9}{2}$ b. $\frac{9}{4}$

c. $\frac{16}{9}$ d. $\frac{9}{16}$

10. Centre of the circle $(x - 1)^2 + (y + 3)^2 = 3$ is:

a. (-1, -3) b. (-1, 3)

c. (1,3) **d. (1, -3)**

11. The eccentricity e of the hyperbola is:

a. e = 0 b. e < 1

c. e > 1 d. e = 1

12. x = a sec θ, y = b tan θ represents the parametric equations of:

a. Circle b. Parabola

c. Ellipse **d. Hyperbola**

13. Length of each latus rectum of an ellipse is:

a. $\frac{2a^2}{b}$ b. $\frac{a^2}{b}$

c. $\frac{2b^2}{a}$ d. $\frac{b^2}{a}$

14. If the ends of the diameter of the circle are (0,1) and (2,3), then its area is:

a. π **b. 2π**

c. 4π d. 8π

15. The directrix of the parabola $x^2 = -8y$ is:

a. x + 2 = 0 b. x - 2 = 0

c. y + 2 = 0 **d. y - 2 = 0**

16. The equation $x^2 + y^2 + 2gx + 2fy + c = 0$ represents a circle with centre:

a. (-g, -f) b. (+g, -f)

c. (f, g) d. (0,0)

17. Axis of the parabola $x^2 = 4ay$ is:

a. y = 0 **b. x = 0**

c. x = y d. x = 1

18. For ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, (a > b)$, then eccentricity e = :

a. $\frac{\sqrt{a^2 - b^2}}{a}$

b. $\frac{\sqrt{a^2 + b^2}}{a}$

c. $\frac{\sqrt{b^2 - a^2}}{a}$

d. $\frac{\sqrt{b^2 - a^2}}{b}$

19. Focal chord perpendicular to axis parabola is called:

a. Latus Rectum

b. Eccentricity

c. Vertex

d. Axis

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CHAPTER : 7

1. Work done by constant force $\underline{F}$ during displacement $\underline{d}$ is equal to:

a. **$\underline{F}.\underline{d}$**
b. $\underline{F} \times \underline{d}$
c. $r \times \underline{F}$
d. $\underline{F} \times r$

2. $2\underline{i}. (2\underline{j} \times \underline{k})$ equals:

a. 0
b. 2
c. 4
d. 6

3. Magnitude of vector $2\hat{\imath} + 3\hat{\jmath} + 4\hat{k}$ is:

a. 29
b. $\sqrt{\mathbf{29}}$
c. 28
d. $\sqrt{28}$

4. $\hat{\imath} \times \hat{\imath} =$:

a. 1
b. 2
c. 0
d. –1

5. A vector with magnitude 1 is called:

a. Null vector
b. Unit vector
c. Zero vector
d. Constant vector

6. J. (k x i) is equal to:

a. 0
b. –1
c. 1
d. 2

7. Moment of Force vector $\underline{F}$ about ($\underline{r}$) is:

a. **$\underline{r} \times \underline{F}$**
b. $\underline{F} \times \underline{r}$
c. $\underline{r} . \underline{F}$
d. $\underline{F} . r$

8. $2\underline{i} . (2\underline{j} \times \underline{k})$ equals:

a. 4
b. 3
c. 2
d. 1

9. $(\hat{\imath} \times \hat{k}) \times \hat{\jmath}$ equals:

a. -1
b. 0
c. 1
d. ∞

10. If α, β, γ be the direction angles of a vector then $\cos^2\alpha + \cos^2\beta + \cos^2\gamma$ equals:

a. -1
b. 0
c. 1
d. 2

11. The angle between the vectors $2\bar{\imath} + 3\bar{\jmath} + \bar{k}$ *and* $2\bar{\imath} - \bar{\jmath} - \bar{k}$ is:

a. 90° b. 45°
c. 60° d. 30°

12. $\hat{\jmath}$ x $\hat{k}$ is equal to :

a. $-\hat{\imath}$ **b. $\hat{\imath}$**
c. 0 d. 1

13. An angle in a semi-circle is:

a. Right angle b. Obtuse angle
c. Reflective angle d. 0°

14. 2i . j x 2k =:

a. 0 b. 2
c. 1 **d. 4**

15. If vectors $2\hat{\imath} + \hat{\jmath} + \hat{k}$ and $\hat{\imath} - 4\hat{\jmath} + \alpha$k are perpendicular, then $\alpha =$:

a. 1 **b. 2**
c. 3 d. 4

16. [a b a] is equal to:

a. 1 b. a
c. 0 d. b

17. The direction cosines of y- axis are:

a. (0, 1, 0) b. (1, 0, 0)
c. (0, 0, 1) d. (0, 0, 0)

18. Length of the vector 2i – j -2k is:

a. 2 b. 4
c. 3 d. 5

19. Projection of vector $\underset{u}{\rightarrow}$ on vector $\underset{v}{\rightarrow}$ is:

a. $\frac{\vec{u}.\vec{v}}{|v|}$ b. $\frac{\vec{u}.\vec{v}}{|u|}$
c. $\frac{\vec{u}X\vec{v}}{|v|}$ d. $\frac{\vec{u}X\vec{v}}{|u|}$

20. If $\vec{v}$ is any vector, then vector of magnitude 5 opposite to $\vec{v}$ is :

a. $5\vec{v}$ b. $-5\vec{v}$
c. $5\frac{\vec{v}}{|v|}$ **d. $-5\frac{\vec{v}}{|v|}$**