

PYQSide

JEE MAIN INTEGRALS — PYQS

Max. Marks: 204

Questions: 51

Section A (MCQ)

Q.1 The value of the integral

$$\int_0^2 \frac{\sqrt{x(x^2+x+1)}}{(\sqrt{x+1})(\sqrt{x^4+x^2+1})} dx \text{ is equal to :}$$

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) $\frac{1}{3}\log_e(3-2\sqrt{2})$ (2) $\frac{2}{3}\log_e(4+\sqrt{2})$
 (3) $\frac{2}{3}\log_e(3+2\sqrt{2})$ (4) $\frac{1}{3}\log_e(1+6\sqrt{2})$

Scan or tap for the full solution



Q.2 The value of the integral $\int_{-\pi/4}^{\pi/4} \left(\frac{32\cos^4 x}{1+e^{\sin x}} \right) dx$ is :

[JEE Main 2026 (Online) 6th April Morning Shift]

- (1) $4\pi + 2$ (2) $3\pi + 8$ (3) $3\pi + 4$ (4) $4\pi + 3$

Scan or tap for the full solution



Q.3 The value of the integral $\int_{-1}^1 \left(\frac{x^3 + |x| + 1}{x^2 + 2|x| + 1} \right) dx$ is equal to : [JEE Main 2026 (Online) 6th April Evening Shift]

- (1) $3\log_e 2$ (2) $2\log_e 2$ (3) $5\log_e 3$ (4) $3\log_e 3$

Scan or tap for the full solution



Q.4 The value of the integral $\int_0^\infty \frac{\log_e(x)}{x^2 + 4} dx$ is:

[JEE Main 2026 (Online) 5th April Morning Shift]

- (1) $\frac{\pi \log_e(2)}{2}$ (2) $\frac{\pi \log_e(2)}{4}$
 (3) $1 + \pi \log_e(2)$ (4) $2 + \pi \log_e(2)$

Scan or tap for the full solution



Q.5 The value of the integral $\int_{\pi/6}^{\pi/3} \left(\frac{4 - \operatorname{cosec}^2 x}{\cos^4 x} \right) dx$ is :

[JEE Main 2026 (Online) 5th April Morning Shift]

- (1) $\frac{11}{\sqrt{3}}$ (2) $\frac{16}{\sqrt{3}}$ (3) $\frac{32}{3\sqrt{3}}$ (4) $\frac{64}{3\sqrt{3}}$

Scan or tap for the full solution



Q.6 Let $(2^{1-a} + 2^{1+a}), f(a), (3^a + 3^{-a})$ be in A.P. and α be the minimum value of $f(a)$. Then the value of the integral $\int_{\log_e(\alpha-1)}^{\log_e(\alpha)} \frac{dx}{(e^{2x} - e^{-2x})}$ is :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) $\frac{1}{2}\log_e\left(\frac{4}{3}\right)$

(2) $\frac{1}{4}\log_e\left(\frac{4}{3}\right)$

(3) $\frac{1}{2}\log_e\left(\frac{8}{5}\right)$

(4) $\frac{1}{4}\log_e\left(\frac{8}{5}\right)$

Scan or tap for the full solution



Q.7 Let $f: [1, \infty) \rightarrow \mathbb{R}$ be a differentiable function defined as $f(x) = \int_1^x f(t) dt + (1-x)(\log_e x - 1) + e$. Then the value of $f(f(1))$ is :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) $(1 + e^e)$

(2) $(1 + e)$

(3) $(1 + e + e^e)$

(4) $1 + 2e$

Scan or tap for the full solution



Q.8 Let $\int_{-2}^2 (|\sin x| + [x \sin x]) dx = 2(3 - \cos 2) + \beta$, where $[\cdot]$ is the greatest integer function. Then $\beta \sin\left(\frac{\beta}{2}\right)$ equals: [JEE Main 2026 (Online) 4th April Morning Shift]

(1) 1

(2) 2

(3) 4

(4) 8

Scan or tap for the full solution



Q.9 If $\alpha = 1$ and $\beta = 1 + i\sqrt{2}$, where $i = \sqrt{-1}$ are two roots of the equation $x^3 + ax^2 + bx + c = 0$, $a, b, c \in \mathbb{R}$, then $\int_{-1}^1 (x^3 + ax^2 + bx + c) dx$ is equal to : [JEE Main 2026 (Online) 4th April Evening Shift]

(1) -2

(2) -4

(3) -8

(4) -10

Scan or tap for the full solution



Q.10 The integral $\int_0^1 \cot^{-1}(1+x+x^2) dx$ is equal to :

[JEE Main 2026 (Online) 4th April Evening Shift]

(1) $2\tan^{-1} 2 + \frac{1}{2}\log_e\left(\frac{5}{4}\right) + \frac{\pi}{2}$

(2) $2\tan^{-1} 2 + \frac{1}{2}\log_e\left(\frac{5}{4}\right) - \frac{\pi}{2}$

(3) $2\tan^{-1} 2 - \frac{1}{2}\log_e\left(\frac{5}{4}\right) + \frac{\pi}{2}$

(4) $2\tan^{-1} 2 - \frac{1}{2}\log_e\left(\frac{5}{4}\right) - \frac{\pi}{2}$

Scan or tap for the full solution



Q.11 Let $[.]$ denote the greatest integer function. Then the value of $\int_0^3 \left(\frac{e^x + e^{-x}}{[x]!} \right) dx$ is :

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1) $e^2 + e^3 - \frac{1}{e^2} - \frac{1}{e^3}$ (2) $\frac{1}{2} \left(e^2 + e^3 - \frac{1}{e^2} - \frac{1}{e^3} \right)$
 (3) $e^2 + e^3 - \frac{1}{2e^2} - \frac{1}{2e^3}$ (4) $\frac{1}{2} (e^2 + e^3) - \frac{1}{e^2} - \frac{1}{e^3}$

Scan or tap for the full solution 

Q.12 The value of $\int_0^{20\pi} (\sin^4 x + \cos^4 x) dx$ is equal to:

[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) $\frac{15\pi}{2}$ (2) 25π (3) 15π (4) $\frac{25\pi}{2}$

Scan or tap for the full solution 

Q.13 Let $f(x) = \int \left(\frac{16x+24}{x^2+2x-15} \right) dx$. If $f(4) = 14 \log_e(3)$ and $f(7) = \log_e(2^\alpha \cdot 3^\beta)$, $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to :

[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) 31 (2) 37 (3) 39 (4) 41

Scan or tap for the full solution 

Q.14 Let f be a polynomial function such that $f(x^2 + 1) = x^4 + 5x^2 + 2$, for all $x \in \mathbb{R}$. Then $\int_0^3 f(x) dx$ is equal to

[JEE Main 2026 (Online) 28th January Morning Shift]

- (1) $\frac{33}{2}$ (2) $\frac{5}{3}$ (3) $\frac{27}{2}$ (4) $\frac{41}{3}$

Scan or tap for the full solution 

Q.15 If $\int \left(\frac{1-5\cos^2 x}{\sin^5 x \cos^2 x} \right) dx = f(x) + C$, where C is the constant of integration, then $f\left(\frac{\pi}{6}\right) - f\left(\frac{\pi}{4}\right)$ is equal to

[JEE Main 2026 (Online) 28th January Morning Shift]

- (1) $\frac{1}{\sqrt{3}}(26 - \sqrt{3})$ (2) $\frac{4}{\sqrt{3}}(8 - \sqrt{6})$
 (3) $\frac{1}{\sqrt{3}}(26 + \sqrt{3})$ (4) $\frac{2}{\sqrt{3}}(4 + \sqrt{6})$

Scan or tap for the full solution 

Q.16 Let $f(x) = \int \frac{dx}{x^{2/3} + 2x^{1/2}}$, be such that $f(0) = -26 + 24 \log_e(2)$. If $f(1) = a + b \log_e(3)$, where $a, b \in \mathbb{Z}$, then $a + b$ is equal to :

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) -5 (2) -11 (3) -18 (4) -26

Scan or tap for the full solution 

Q.17 Let $[.]$ denote the greatest integer function. Then

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{12(3 + [x])}{3 + [\sin x] + [\cos x]} \right) dx$$

is equal to :

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) $12\pi + 5$ (2) $11\pi + 2$ (3) $15\pi + 4$ (4) $13\pi + 1$

Scan or tap for the full solution 

Q.18 Let $f(t) = \int \left(\frac{1 - \sin(\log_e t)}{1 - \cos(\log_e t)} \right) dt$, $t > 1$.

If $f(e^{\pi/2}) = -e^{\pi/2}$ and $f(e^{\pi/4}) = \alpha e^{\pi/4}$, then α equals

[JEE Main 2026 (Online) 24th January Morning Shift]

- (1) $1 + \sqrt{2}$ (2) $-1 - 2\sqrt{2}$
 (3) $-1 - \sqrt{2}$ (4) $-1 + \sqrt{2}$

Scan or tap for the full solution 

Q.19 Let $f(x) = \int \frac{(2-x^2) \cdot e^x}{(\sqrt{1+x})(1-x)^{3/2}} dx$. If $f(0) = 0$, then $f\left(\frac{1}{2}\right)$ is equal to:

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $\sqrt{2e} - 1$ (2) $\sqrt{2e} + 1$
 (3) $\sqrt{3e} - 1$ (4) $\sqrt{3e} + 1$

Scan or tap for the full solution 

Q.20 The value of the integral $\int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{dx}{1 + \sqrt[3]{\tan 2x}}$ is :

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $\frac{\pi}{3}$ (2) $\frac{\pi}{18}$ (3) $\frac{\pi}{6}$ (4) $\frac{\pi}{12}$

Scan or tap for the full solution 

Q.21 Let $I(x) = \int \frac{3dx}{(4x+6)(\sqrt{4x^2+8x+3})}$ and

$$I(0) = \frac{\sqrt{3}}{4} + 20. \quad \text{If } I\left(\frac{1}{2}\right) = \frac{a\sqrt{2}}{b} + c, \quad \text{where}$$

$a, b, c \in \mathbb{N}$, $\gcd(a, b) = 1$, then $a + b + c$ is equal to

: [JEE Main 2026 (Online) 23rd January Evening Shift]

- (1) 30 (2) 29 (3) 28 (4) 31

Scan or tap for the full solution 

Q.22 The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{1}{[x]+4} \right) dx$, where $[\cdot]$ denotes the greatest integer function, is

[JEE Main 2026 (Online) 22nd January Morning Shift]

- (1) $\frac{1}{60}(21\pi - 1)$ (2) $\frac{1}{60}(\pi - 7)$
 (3) $\frac{7}{60}(\pi - 3)$ (4) $\frac{7}{60}(3\pi - 1)$

Scan or tap for the full solution



Q.23 The value of $\int_{-\pi/6}^{\pi/6} \left(\frac{\pi + 4x^{11}}{1 - \sin(|x| + \pi/6)} \right) dx$ is equal to:

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) 8π (2) 4π (3) 2π (4) 6π

Scan or tap for the full solution



Q.24 The integral $\int_{-1}^3 (|\pi^2 x \sin(\pi x)|) dx$ is equal to:

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) $2 + 3\pi$ (2) $4 + \pi$ (3) $1 + 3\pi$ (4) $3 + 2\pi$

Scan or tap for the full solution



Q.25 Let $f(x)$ be a positive function and

$$I_1 = \int_{\frac{1}{2}}^1 2x f(2x(1-2x)) dx \text{ and}$$

$I_2 = \int_{-1}^2 f(x(1-x)) dx$. Then the value of $\frac{I_2}{I_1}$ is equal to _____

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) 12 (2) 9 (3) 6 (4) 4

Scan or tap for the full solution



Q.26 The integral $\int_0^{\pi} \frac{(x+3)\sin x}{1+3\cos^2 x} dx$ is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

- (1) $\frac{\pi}{\sqrt{3}}(\pi+1)$ (2) $\frac{\pi}{3\sqrt{3}}(\pi+6)$
 (3) $\frac{\pi}{\sqrt{3}}(\pi+2)$ (4) $\frac{\pi}{2\sqrt{3}}(\pi+4)$

Scan or tap for the full solution



Q.27 The value of

$$\int_{-1}^1 \frac{(1 + \sqrt{|x|-x})e^x + (\sqrt{|x|-x})e^{-x}}{e^x + e^{-x}} dx \text{ is equal to}$$

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) $1 + \frac{2\sqrt{2}}{3}$ (2) $1 - \frac{2\sqrt{2}}{3}$
 (3) $2 + \frac{2\sqrt{2}}{3}$ (4) $3 - \frac{2\sqrt{2}}{3}$

Scan or tap for the full solution



Q.28 Let $f(x) + 2f\left(\frac{1}{x}\right) = x^2 + 5$ and

$2g(x) - 3g\left(\frac{1}{2}\right) = x, x > 0$. If $\alpha = \int_1^2 f(x) dx$, and $\beta = \int_1^2 g(x) dx$, then the value of $9\alpha + \beta$ is :

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 0 (2) 10 (3) 1 (4) 11

Scan or tap for the full solution



Q.29 Let $f(x) = \sqrt{x^3 \sqrt{3-x^2}}$ dx. If $5f(\sqrt{2}) = -4$, then $f(1)$ is equal to

[JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) $-\frac{6\sqrt{2}}{5}$ (2) $-\frac{8\sqrt{2}}{5}$ (3) $-\frac{2\sqrt{2}}{5}$ (4) $-\frac{4\sqrt{2}}{5}$

Scan or tap for the full solution



Q.30 Let the domain of the function

$f(x) = \log_2 \log_4 \log_6 (3+4x-x^2)$ be (a, b) . If

$$\int_0^{b-a} [x^2] dx = p - \sqrt{q} - \sqrt{r}, p, q, r \in \mathbb{N},$$

$\gcd(p, q, r) = 1$, where $[\cdot]$ is the greatest integer function, then $p + q + r$ is equal to

[JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) 10 (2) 11 (3) 9 (4) 8

Scan or tap for the full solution



Q.31 The integral $\int_0^{\pi} \frac{8x dx}{4\cos^2 x + \sin^2 x}$ is equal to

[JEE Main 2025 (Online) 3rd April Evening Shift]

- (1) $2\pi^2$ (2) $4\pi^2$ (3) π^2 (4) $\frac{3\pi^2}{2}$

Scan or tap for the full solution



Q.32 Let (a, b) be the point of intersection of the curve $x^2 = 2y$ and the straight line $y - 2x - 6 = 0$ in the second quadrant. Then the integral $I = \int_a^b \frac{9x^2}{1+5^x} dx$ is equal to :

[JEE Main 2025 (Online) 2nd April Evening Shift]

- (1) 27 (2) 18 (3) 24 (4) 21

Scan or tap for the full solution



Q.33 $4 \int_0^1 \left(\frac{1}{\sqrt{3+x^2} + \sqrt{1+x^2}} \right) dx - 3 \log_e(\sqrt{3})$ is equal to : [JEE Main 2025 (Online) 2nd April Evening Shift]

- (1) $2 - \sqrt{2} - \log_e(1 + \sqrt{2})$
 (2) $2 + \sqrt{2} + \log_e(1 + \sqrt{2})$
 (3) $2 + \sqrt{2} - \log_e(1 + \sqrt{2})$
 (4) $2 - \sqrt{2} + \log_e(1 + \sqrt{2})$

Scan or tap for the
full solution



Q.34 The integral $80 \int_0^{\frac{\pi}{4}} \left(\frac{\sin \theta + \cos \theta}{9 + 16 \sin 2\theta} \right) d\theta$ is equal to :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) $3 \log 4$ (2) $4 \log 3$ (3) $6 \log \frac{4}{3}$ (4) $2 \log 3$

Scan or tap for the
full solution



Q.35 If $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{96x^2 \cos^2 x}{(1 + e^x)} dx = \pi(\alpha\pi^2 + \beta)$, $\alpha, \beta \in \mathbb{Z}$, then $(\alpha + \beta)^2$ equals

[JEE Main 2025 (Online) 28th January Morning Shift]

- (1) 196 (2) 100 (3) 64 (4) 144

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full solution



Q.36 Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a twice differentiable function such that $f(2) = 1$. If $F(x) = xf(x)$ for all $x \in \mathbb{R}$, $\int_0^2 xF'(x) dx = 6$ and $\int_0^2 x^2 F''(x) dx = 40$, then $F'(2) + \int_0^2 F(x) dx$ is equal to:

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) 13 (2) 11 (3) 9 (4) 15

Scan or tap for the
full solution



Q.37 If $f(x) = \int \frac{1}{x^{1/4}(1 + x^{1/4})} dx$, $f(0) = -6$, then $f(1)$ is equal to :

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) $4(\log_e 2 - 2)$ (2) $\log_e 2 + 2$
 (3) $2 - \log_e 2$ (4) $4(\log_e 2 + 2)$

Scan or tap for the
full solution



Q.38 Let f be a real valued continuous function defined on the positive real axis such that $g(x) = \int_0^x tf(t) dt$. If

$g(x^3) = x^6 + x^7$, then value of $\sum_{r=1}^{15} f(r^3)$ is :

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) 270 (2) 340 (3) 310 (4) 320

Scan or tap for the
full solution



Section B (Numerical)

Q.39 If $\int_{\pi/6}^{\pi/4} \left(\cot \left(x - \frac{\pi}{3} \right) \cot \left(x + \frac{\pi}{3} \right) + 1 \right) dx = \alpha \log_e (\sqrt{3} - 1)$, then $9\alpha^2$ is equal to _____.

[JEE Main 2026 (Online) 8th April Evening Shift]

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full solution



Q.40 If $\alpha = \int_0^{2\sqrt{3}} \log_2(x^2 + 4) dx + \int_2^4 \sqrt{2x - 4} dx$, then α^2 is equal to _____.

[JEE Main 2026 (Online) 2nd April Morning Shift]

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full solution



Q.41 The value of $\sum_{r=1}^{20} \left(\left| \sqrt{\pi \left(\int_0^r x |\sin \pi x| dx \right)} \right| \right)$ is _____.

[JEE Main 2026 (Online) 28th January Morning Shift]

Scan or tap for the
full solution



Q.42 If $f(x)$ satisfies the relation $f(x) = e^x + \int_0^1 (y + xe^y) f(y) dy$, then $e + f(0)$ is equal to _____.

[JEE Main 2026 (Online) 24th January Evening Shift]

Scan or tap for the
full solution



Q.43 The number of elements in the set $S = \{x : x \in [0, 100] \text{ and } \int_0^x t^2 \sin(x-t) dt = x^2\}$ is _____.

[JEE Main 2026 (Online) 23rd January Evening Shift]

Scan or tap for the
full solution



Q.44 If $\int (\sin x)^{-\frac{11}{2}} (\cos x)^{-\frac{5}{2}} dx = -\frac{p_1}{q_1} (\cot x)^{\frac{9}{2}} - \frac{p_2}{q_2} (\cot x)^{\frac{5}{2}} - \frac{p_3}{q_3} (\cot x)^{\frac{1}{2}} + \frac{p_4}{q_4} (\cot x)^{-\frac{3}{2}} + C$, where p_i and q_i are positive integers with $\gcd(p_i, q_i) = 1$ for $i = 1, 2, 3, 4$ and C is the constant of integration, then $\frac{15p_1p_2p_3p_4}{q_1q_2q_3q_4}$ is equal to _____.

[JEE Main 2026 (Online) 22nd January Morning Shift]

Scan or tap for the
full solution



Q.45 Let $[.]$ be the greatest integer function. If $\alpha = \int_0^{64} (x^{1/3} - [x^{1/3}]) dx$, then $\frac{1}{\pi} \int_0^{\alpha \pi} \left(\frac{\sin^2 \theta}{\sin^6 \theta + \cos^6 \theta} \right) d\theta$ is equal to _____.

[JEE Main 2026 (Online) 22nd January Evening Shift]

Scan or tap for the
full solution



Q.46 $6\int_0^{\pi} |(\sin 3x + \sin 2x + \sin x)| dx$ is equal to _____.

[JEE Main 2026 (Online) 21st January Morning Shift]

Scan or tap for the full solution 

Q.47 Let $[\cdot]$ denote the greatest integer function and $f(x) = \lim_{n \rightarrow \infty} \frac{1}{n^3} \sum_{k=1}^n \left[\frac{k^2}{3^x} \right]$. Then $12 \sum_{j=1}^{\infty} f(j)$ is equal to _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

Scan or tap for the full solution 

Q.48 If $\int_0^1 4\cot^{-1}(1 - 2x + 4x^2) dx = a \tan^{-1}(2) - b \log_e(5)$, where $a, b \in \mathbb{N}$, then $(2a + b)$ is equal to _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

Scan or tap for the full solution 

Q.49 If $\int \left(\frac{1}{x} + \frac{1}{x^3} \right) \left(\sqrt[23]{3x^{-24} + x^{-26}} \right) dx = -\frac{\alpha}{3(\alpha+1)} (3x^\beta + x^\gamma)^{\frac{\alpha+1}{\alpha}} + C$, $x > 0$, $(\alpha, \beta, \gamma \in \mathbb{Z})$, where C is the constant of integration, then $\alpha + \beta + \gamma$ is equal to _____.

[JEE Main 2025 (Online) 7th April Evening Shift]

Scan or tap for the full solution 

Q.50 If $\int \frac{(\sqrt{1+x^2} + x)^{10}}{(\sqrt{1+x^2} - x)^9} dx = \frac{1}{m} \left((\sqrt{1+x^2} + x)^n (n\sqrt{1+x^2} - x) \right) + C$ where C is the constant of integration and $m, n \in \mathbb{N}$, then $m + n$ is equal to _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

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Q.51 Let $[\cdot]$ denote the greatest integer function. If $\int_0^{e^3} \left[\frac{1}{e^x - 1} \right] dx = \alpha - \log_e 2$, then α^3 is equal to _____.

[JEE Main 2025 (Online) 2nd April Morning Shift]

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ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	3	2	2	2	3	2	1	2	3	4	2
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	3	3	1	2	2	2	3	3	4	4	4
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	2	3	4	2	1	4	1	1	1	3	1
Ques.	34	35	36	37	38						
Ans.	2	2	2	1	3						

Section B (Numerical)

Ques.	39	40	41	42	43	44	45
Ans.	12	192	210	2	16	16	36
Ques.	46	47	48	49	50	51	
Ans.	17	2	9	19	379	8	