Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur

DEPARTMENT OF MATHEMATICS

B.Sc. – III

(2020 – 2021)

LIST OF ADVANCED LEARNERS

Sr. No.	Name of the student
1	Snehal Shelke
2	Aishwarya Gaikwad
3	Shraddha Asdul
4	Sanchita Kadam
5	Pooja Mane

LIST OF SLOW LEARNERS

Sr. No.	Name of the student
1	Mayur Khandekar
2	Vaibhav Khadekar
3	Sourbh Gaikwad
4	Swati Mali

HEAD,
Department of Mathematics
Karmaveer Bhaurao Patil,
Mahavidyalaya, Pandharpur.

UNIT TESTS

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – IX: Algebra II

Unit Test 1(For advanced learner students)

Q.1. P.T. if R & S are rings & $\theta : R \to S$ preserves both ring operations then $\Theta(R)$ is a Subring of S.

Q.2.P.T. $\|x + y\| \le \|x\| + \|y\|$

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – IX: Algebra II

Unit Test: 1 (For Slow learner students)

Q.1.P. T. $4<\alpha, \beta> = \| \alpha + \beta\|^2 - \|\alpha - \beta\|^2 + i\|\alpha + I\beta\|^2 - i\|\alpha - i\beta\|^2$.

Q.2. P.T. intersection of a two ideals of ring R is an ideal of R.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – X: Complex Analysis

Unit Test: 1 (For advanced learner students)

Q.1. S.T. $v(x, y) = \frac{x}{x^2+y^2}$ is harmonic in a domain D not containing the origin.

Q.2. P.T. if u (x, y) is a harmonic function & v (x, y) is its harmonic conjugate, then the function $\emptyset (x, y) = u (x, y) v (x, y)$ is harmonic.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XI: Integral Calculus

Unit Test: 1 (For advanced learner students)

Q.1.Find the volume of sphere $x^2 + y^2 + z^2 = a^2$ by D.I.

Q.2.S.T. the integral $\int_0^1 \frac{\cos x}{\sqrt{x}}$ converges absolutely.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XI: Integral Calculus

Unit Test: 1 (For Slow learner students)

Q.1.P.T. B (m, n) = $\frac{\sqrt{m}\sqrt{n}}{\sqrt{(m+n)}}$.

Q.2. using double integration find the area between parabolas $y^2 = 4ax, x^2 = 4ay$.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XI: Integral Calculus

Unit Test: 2 (For slow learner students)

Q.1. Examine the convergence of improper integral $\int_0^1 \frac{dx}{x^2}$.

Q.2. Change the order of integration $\int_x^\infty \frac{e^{-y}}{y}$.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XII: Partial Differential Equation

Unit Test: 1 (For advanced learner students)

Q.1.Define the linear partial differential equation and their types.

Q.2.Find the complete and singular integral of $x^2 = z$

x + x y.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XII: Partial Differential equation

Unit Test: 1 (For slow learner students)

Q.1.Find the integral surface of the linear partial differential equation

$x(y^2 + z)p - y(x^2 + z)q = (x^2 - y^2)z$ which contain the straight-line $x + y = 0$, $z = 1$.

Q.2.Find a complete & singular integral of $2xz - px^2 - 2qxy + pq = 0$.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIII: Metric Space

Unit Test: 1 (For advanced learner students)

Q.1. P.T. every convergent sequence in metric space has a unique limit.

Q.2. P.T. $E = (o,1)$ on the real line with absolute value metric is not compact.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIII: Metric Space

Unit Test: 1 (For slow learner students)

Q.1.If it is a linear map from $V_3(R)$ to $V_2(R)$ S.T.

   $T(x, y, z) = (3x - y, 2x + y + z,)$ then find rule for T^{-1}.

Q.2. If A subset of l_2 of points $e_i = (0,0, 0..., o)$ i= 1,2, 3, …

   Then prove that A is bounded not totally bounded.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIV: Numerical Analysis
Unit Test: 1 (For advanced learner students)

Q.1. Define the backward difference and write the backward difference table.

Q.2. solve $\frac{\Delta^2 x^2}{E x^3}$.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIV: Numerical Analysis.
Unit Test: 1 (For slow learner students)

Q.1. Evalute taking as the interval of differencing. $\frac{\Delta^2}{E} \sin x$

Q.2. Define the term forward difference & write the forward table.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIV: Integral Calculus
Unit Test: 1 (For advanced learner students)

Q.1. Evalut $\int_0^\infty \frac{x^4(1+x^3)}{(1+x)^{15}}$

Q.2. Examine the convergence of improper integral $\int_0^1 \frac{dx}{x}$.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XV: Programming in C

Unit Test: 1 (For advanced learner students)

Q.1. Write a program of switch statement explain also?

Q.2. Explain the examples of operators in c.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XV: Programming in C

Unit Test: 1 (For slow learner students)

Q.1. Explain the operators in c.

Q.2. Write a program of If ……. Else statement.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – IX: Algebra II

HOME ASSIGNMENT # 01 (For advanced learner students)

Q. 1: - Define ring (R, +) & P.T. if R is commutative ring with unity, then every maximal Ideal of R is prime ideal.

Q. 2: - If A & B are compact subsets of R then P.T. AXB is compact subset of R.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – IX: Algebra II

HOME ASSIGNMENT # 02 (For advanced learner students)

Q. 1: - If Tx = x^2 $(0 \leq x \leq \frac{1}{3})$ then P.T. T is contradiction on $[0,\frac{1}{3}]$

Q. 2: - P.T. $\exists$ a L.T. T: $R^2 \to R^3$ S.T. T (1,1) = (1,0,2), T (2,3) = (1, -1,4)
What is T (8,11).

Q.3 S.T. the set W = {(a, b, c) \ a – 3b + 4c = 0 is a subspace of $R^3(R)$}

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – IX: Algebra II

HOME ASSIGNMENT # 01 (For slow learner students)

Q. 1: - Let V(R) be a vector space of polynomial with I.P. defined by

$$<f, g> = \int_0^1 f(t)g(t)dt \; ; f(x) = x^2 + x - 4, g(x) = x - 1. \text{ find } <f, g>.$$

Q. 2: - If a, b, c is L.I. vectors in v. s. V then P.T. a + b, b+ c, c + a are L.I.

Q. 3: - P.T. $\|x + y\| \leq \|x\| + \|y\|$.

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – V)

Paper – IX: Algebra II

HOME ASSIGNMENT # 02 (For slow learner students)

Q. 1: - P.T. if R & S are rings & Θ: R$\rightarrow$ S preserves both ring operations then Θ(R)

Is a subring of s.

Q. 2: - P.T. $4 < \alpha, \beta> = \| \alpha + \beta\|^2 - \| \alpha - \beta\|^2 + i\| \alpha + i\beta\|^2 - i\|\alpha - i\beta\|^2$

Q. 3: - P.T. every homomorphic image of commutative ring is a commutative ring

Rayat Shikshan Sanstha's

K.B.P. Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – V)

Paper – X: Complex Analysis

HOME ASSIGNMENT # 01(For Advanced learner students)

Q. 1. Define Harmonic function, Harmonic conjugate.

Q. 2. Verify that the function u (x, y) = x3 – 3xy2 – 5y is harmonic in the entire complex plan.

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – V)

Paper – VIII: Complex Analysis.

Unit Test: 1 (For Slow learner students)

Q.1. Verify the given function is harmonic u (x, y) = 2x – 2xy.

Q.2.Find the harmonic conjugate of u. from the given analytic function.

HOME ASSIGNMENT # 02 (For Advanced learner students)

Q. 1. State & prove Cauchy – Riemann equations.

Q. 2 S.T. the function $f(z) = 2x^2 + y + i(y^2 - x)$ is not analytic at any point.

HOME ASSIGNMENT # 01(For Slow learner students)

Q. 1. Define analytic function?

Q. 2. Solve any five examples on analytic function whose real part is given.

HOME ASSIGNMENT # 02 (For Slow learner students)

Q. 1. P.T. Milne Thomson method.

Q. 2. Solve any five examples on Milne Thomson method.

.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XI: Integral Calculus
HOME ASSIGNMENT # 01 (For advanced learner students)

Q.1: -Examine the convergence of Improper integrals

a) $\int_0^1 \frac{dx}{x^2}$ b) $\int_0^1 \frac{dx}{(1-x^2)^{\frac{1}{2}}}$

Q.2: - Change the order of integration & evaluate $\int_x^\infty \frac{e^{-y}}{y}\, dx\, dy$.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XI: Integral Calculus
HOME ASSIGNMENT # 02 (For advanced learner students)

Q.1: - Solve $\frac{d^2y}{dx^2} + y = 0$ under $y = 1, \frac{dy}{dt} = 0$ when $t = 0$.

Q.2: - Examine the convergence of   a) $\int_1^\infty \frac{x^2+x+1}{x^4+x^2+2}\, dx$

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XI: Integral Calculus
HOME ASSIGNMENT # 01 (For Slow learner students)

Q.1: - Examine the convergence of $\int_1^\infty \frac{dx}{x^{\frac{1}{2}}(1-x)^{\frac{1}{2}}}$

Q.2: - Evaluate $\int_0^\infty \frac{x^4(1+x^5)}{(1+x)^{15}}$

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XI: Integral Calculus

HOME ASSIGNMENT # 02 (For Slow learner students)

Q.1: - Solve $\frac{d^2y}{dx^2} + y = 0$ under $y = 1, \frac{dy}{dt} = 0$ when t = 0.

Q.2. Change the order of integration & evaluate $\int_x^\infty \frac{e^{-y}}{y} dx\, dy$

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XII: Partial Differential Equation

HOME ASSIGNMENT # 01 (For advanced learner students)

Q.1: - Write the charpit's method.

Q.2: - solve any two examples on charpit's method.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – V)
Paper – XII: Partial Differential Equation

HOME ASSIGNMENT # 02 (For advanced learner students)

Q.1. Explain the Lagrange's method.

Q.2: solve any two examples on Lagrange's method.

HOME ASSIGNMENT # 01 (For Slow learner students)

Q.1.Find the complete solution of any five examples on First, second types of Charpit's method.

Q.2: Find the complete solution of any five examples on third, fourth types of Charpit's method.

HOME ASSIGNMENT # 02 (For Slow learner students)

Q.1: - Find particular integral of the following p. d. e. to represent surfaces passing through

The curve $p + q = 1$, $x = 0$, $y^2 = z$.

Q.2: Find the general solution of the differential equation $x^2p + y^2q = (x + y) z$

HOME ASSIGNMENT # 01 (For advanced learner students)

Q.1: -If $< x, d>$ is a metric space then S.T. d_1 is defined by $d_1(x, y) = \frac{d(x,y)}{1+d(x,y)}$ is also a metric

Space.

Q.2: P.T. every convergent sequence in metric space has a unique limit.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIII: Metric Spaces

HOME ASSIGNMENT # 02 (For advanced learner students)

Q.1: Define open subset of M.S. if $< M_1, \rho 1>$, $<M_2, \rho 2>$ be M.S. & f: $M_1 \rightarrow M_2$. then P.T.

F is a continuous on M_1 iff $f^{-1}(G)$ is open in M_1 where G is open in M_2.

Q.2: - Define closed subset of M.S. if $< M_1, \rho 1>$, $<M_2, \rho 2>$ be M.S. & f: $M_1 \rightarrow M_2$. then P.T.

F is a continuous on M_1 iff $f^{-1}(G)$ is open in M_1 where G is open in M_2.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIII: Metric Spaces

HOME ASSIGNMENT # 01 (For Slow learner students)

Q.1: - Let M be any non-empty set. Define on M the function d by

$$d(x, x) = 0; x \in M$$

$$d(x, y) = 1; x, y \in M \ \& \ x \neq y$$

then P.T. $<M, \rho>$ is a M.S.

Q.2 If $< x, d>$ is a metric space then S.T. d_1 is defined by $d_1(x, y) = \frac{d(x,y)}{1+d(x,y)}$ is also a metric

Space.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIII: Metric Spaces

HOME ASSIGNMENT # 02 (For Slow learner students)

Q.1: - P.T. every convergent sequence in metric space has a unique limit.

Q.2. Define closed subset of M.S. if $< M_1, \rho 1>$, $<M_2, \rho 2>$ be M.S. & f: $M_1 \rightarrow M_2$. then P.T.

F is a continuous on M_1 iff $f^{-1}(G)$ is open in M_1 where G is open in M_2.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIII: Metric Spaces

HOME ASSIGNMENT # 01 (For advanced learner students)

Q.1: -S.T. $\Delta = \mu\delta + \frac{\delta^2}{2}$.

Q.2: - S.T. $1 + \frac{\delta^2}{2} = \sqrt{1 + \delta^2\mu^2}$

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIV: Numerical Analysis

HOME ASSIGNMENT # 02 (For advanced learner students)

Q.1: - Write the Newton's forward interpolation formula.

Q.2: - solve any two examples on newton's forward interpolation formula.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIV: Numerical Analysis

HOME ASSIGNMENT # 01 (For Slow learner students)

Q.1: - Write the Newton's backward interpolation formula.

Q.2: - solve any two examples on newton's backward interpolation formula.

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XIV: Numerical Analysis

HOME ASSIGNMENT # 02 (For Slow learner students)

Q.1: Define the forward difference formula & write the difference table.

Q.2: Define the backward difference formula & write the difference table.

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XV: C programming

HOME ASSIGNMENT # 01 (For advanced learner students)

Q. 1: - Write a C – program to find the sum $S = \sum \frac{1}{i^2}$; i = 1, 2, 3, 4

Q. 2: - Write a C – program to find the c.d.f. for Poisson distribution using do…while loop.

Q. 3: - Write a C – program to list the numbers from 1 to 500 which are divisible by 9.

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XV: C programming

HOME ASSIGNMENT # 02 (For advanced learner students)

Q. 1: - Write a C – program to find mean and variance of given data.

X	:	1	2	3	4	5
F	:	7	10	12	8	3

Q. 2: - Write a C – program to find the value of 15! By using recursive and non-recursive functions.

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur
Department of Mathematics
B.Sc. Part – III (SEM – VI)
Paper – XV: C programming

HOME ASSIGNMENT # 01 (For slow learner students)

Q. 1: - Explain relational operators and relational expressions in C.

Q. 2: - Explain the keywords and identifiers in C.

Q. 3: - Write a note on if…else statement.

Q. 4: - Write a C program to find sum of first 5 odd numbers using while statement.

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – VI)

Paper – XV: C programming

HOME ASSIGNMENT # 02 (For slow learner students)

Q. 1: - Explain definition, use and declaration of function.

Q. 2: - Explain 'functions with arguments and return values.

Q. 3: - Write a note on declaration and initialization of two-dimensional array.

Q. 4: - Write a note on pointers.

Rayat Shikshan Sanstha's

K.B.P. Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – VI)

Paper – XVI: Integral Transform

HOME ASSIGNMENT # 01 (For Advanced learner students)

Q. 1 If L $\{F(t)\}$ = f(p) then P.T. L$\{F(at)\}$ = $\frac{1}{a} f(\frac{p}{a})$

Q. 2. Find L $\{\frac{\cos \sqrt{t}}{\sqrt{t}}\}$

Q. 3. Using convolution theorem to find L-1$\{\frac{1}{p(p^2+4)^2}\}$

Rayat Shikshan Sanstha's

K.B.P. Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – VI)

Paper – XVI: Integral Transform

HOME ASSIGNMENT # 02 (For Advanced learner students)

Q. 1. Find a) L $\{\frac{\sinh t}{t}\}$ b) L $\{e^t \sin t\}$

Q. 2. Find a) L$^{-1}\{\frac{1}{p^3(p^2+1)}\}$ b) L-1$\{\frac{2p+1}{p(p+1)}\}$

Rayat Shikshan Sanstha's

K.B.P. Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – VI)

Paper – XVI: Integral Transform

HOME ASSIGNMENT # 01 (For Slow learner students)

Q. 1. Find a) $L\left\{\frac{sinht}{t}\right\}$ b) $L\left\{e^t \sin t\right\}$

Q. 2. Find a) $L^{-1}\left\{\frac{1}{p^3(p^2+1)}\right\}$ b) $L^{-1}\left\{\frac{2p+1}{p(p+1)}\right\}$

Q. 3. Using convolution find $L^{-1}\left\{\frac{1}{(p-2)(p^2+1)}\right\}$

Rayat Shikshan Sanstha's

K.B.P. Mahavidyalaya, Pandharpur

Department of Mathematics

B.Sc. Part – III (SEM – VI)

Paper – XVI: Integral Transform

HOME ASSIGNMENT # 02 (For Slow learner students)

Q. 1. P.T. $L\left\{\frac{\partial y}{\partial t}\right\} = py\,(x\,p) - y\,(x,0).$

Q. 2. Using convolution theorem to find $L^{-1}\left\{\frac{1}{p(p^2+4)^2}\right\}$

Q. 3. Using Heaviside expansion to find $L^{-1}\left\{\frac{1}{(p-1)(p^2+1)^2}\right\}$

HEAD,
Department of Mathematics,
Karmaveer Bhaurao Patil,
Mahavidyalaya, Pandharpur