Government of Karnataka
Department of Technical Education

C-25 Diploma Curriculum

Engineering Mathematics for Engineering Programmes

Second semester

(Effect from the AY 2025-26)

Government of Karnataka

DEPARTMENT OF TECHNICAL EDUCATION

Curriculum Structure

II Semester Scheme of Studies- Diploma in _____Engineering

Sl. No.	Teaching Department	Course Code	Course Name	Hours per week			Total Contact Hours /week	Credits	CIE Marks		Theory SEE Marks		Practice SEE Marks		Total Marks
				L	T	P			Max	Min	Max	Min	Max	Min	
Integrated Courses															
1	SC	24SC21I	Engineering Mathematics-II	4	0	4	8	6	50	20	50	20	-	-	100

L: Lecture: T: Tutorial: P: Practice: **SC-Science: Theory (Whole Class)::Practical(Batch wise)::I-Integrated (Both theory & Practice-Batch wise)**

- *For Engineering Mathematics-II, Theory for whole class and Practice batch wise.*

Integrated Course Template (T+P)

Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION

Program	Engineering	**Semester**	II
Course Name	Engineering Mathematics-II	**Type of Course**	Integrated
Course Code	**25SC21I**	**Contact Hours**	8 hours/week (104 hours/semester)
Teaching Scheme	L: T:P- 4:0:4	**Credits**	6
CIE Marks	50	**SEE Marks**	50

1. Rationale:
This course is designed to give a comprehensive coverage at an introductory level to the subject of Straight Lines, Differential Calculus and Applications, Integration and Definite Integrals and Applications.

2. Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Identify the various linear models and interpret the visualizations in MS excel and GeoGebra
CO-02	Apply the basic rules of differentiation.
CO-03	Apply the basic concepts of differentiation in one dimensional motion of a particle and compares the actual results with the results obtained at GeoGebra.
CO-04	Evaluate the integrals with basic integrands and compares results with the results obtained at GeoGebra.
CO-05	Evaluate definite integrals pertaining to area and volume. Also Compares the results with the result obtained at GeoGebra.

3. Course Content

WEEK	CO	PO (L3-highly mapped)	Theory (4 Hours per week)	Practice (4 Hours per week)
1	1	1,4,7	**Straight Lines: -** Introduction of Slope ($m = \tan\theta$) and Intercepts of a straight line, Problems	**Practice-1:** To find the slope of randomly drawn straight lines on a graph sheet manually for minimum 5 straight lines.
	1	1,4,7	Different forms of equation of straight lines (without proof), a) Slope – Intercept form b) Slope – Point form c) Two-point form d) Intercepts form Problems on Slope – Intercept form	

	1	**1,4,7**	Problems on Slope – Point form (one point form)	**Practice-2:** To visualize the sign convention of the slopes of the straight lines manually on a graph sheet.
	1	**1,4,7**	Problems on Two-point form	
2	**1**	**1,4,7**	Problems on Intercepts form	**Practice-4:** Collect two variable data (online or off line) and obtain the linear approximation for the same in MS Excel. Hence interpolate or extrapolate few data.
	1	**1,4,7**	Problems continued on above forms	
	1	**1,4,7**	General form of equation of straight line (ax+by+c=0). Finding slope, x-intercept and y-intercept of a line	**Practice-5:** Plot minimum 3 straight lines at GeoGebra graphing calculator and compare the results with theoretical inferences.
	1	**1,4,7**	Conditions for two straight lines to be parallel & perpendicular and Problems	
3	**1**	**1,4,7**	Equation of a straight line parallel to the given straight line and passing through a point and Problems	**Practice-6:** To visualize and record the data gathered by the straight lines plotted at GeoGebra graphing calculator**.** Hence conclude the conditions for parallelism and perpendicularity of lines(y=mx+c).
	1	**1,4,7**	Problems continued	
	2	**1,4,7**	**DIFFERENTIAL CALCULUS: -** Definition of derivative. Derivative of Constant(K), x^n by the method of first principle.	**Practice-7**: Introduction to CAS (Computer Algebra System) tool in GeoGebra.
	2	**1,4,7**	Derivative of e^{ax} by the method of first principle.	
4	**2**	**1,4,7**	List of standard derivatives (Algebraic, trigonometric, exponential and logarithmic).	**Practice-8:** To verify the method of first principles in MS excel constraint to $f(x) = x^2$ and $f(x) = x^3$ at x=1.
	2	**1,4,7**	Derivative of a function with scalar multiple. Sum rule of differentiation. Difference rule of differentiation	
	2	**1,4,7**	Problems continued.	**Practice-8:** Find the derivatives of the standard functions in GeoGebra.
	2	**1,4,7**	Product rule of differentiation. (product of two functions)	
5	**2**	**1,7**	Product rule of differentiation. (product of three functions)	**Practice-9:** Find the derivatives of the sum and the difference in GeoGebra. Compare the result with the theoretical inference.
	2	**1,7**	Quotient rule of differentiation.	
	2	**1,7**	Composite rule (chain of two functions only) of differentiation.	**Practice-10:** Find the derivatives of product functions in GeoGebra. Compare the result with the theoretical inference.
	2	**1,7**	Problems on Composite rule.	
6	**2**	**1,4,7**	Successive differentiation up to second order and simple problems	**Practice-11:** Find the derivatives of quotient functions in GeoGebra. Compare the result with the theoretical inference.
	2	**1,4,7**	Problems continued	

	3	**1,4,7**	**Applications of Derivatives:** Tangent: Finding the slope of tangent to the curve.	**Practice-12:** To derive the equations of tangent at three distinct points from the plots obtained in GeoGebra.
	3	**1,4,7**	Equation of the tangent to the curve at a point and problems.	
7	**3**	**1,4,7**	Normal: Finding the slope of Normal to the curve.	**Practice-13:** To derive the equations of normal at three distinct points from the plots obtained in GeoGebra.
	3	**1,4,7**	Equation of the Normal to the curve at a point and problems.	
	3	**1,4,7**	Derivative as a rate measure: Velocity of a particle or a body and problems	**Practice-14:** To determine the velocity and acceleration for well-defined distance function and tabulate the velocity and acceleration in an interval in GeoGebra.
	3	**1,4,7**	Problems continued on velocity of a particle or a body	
8	**3**	**1,4,7**	Acceleration of a particle or a body and problems	
	3	**1,2,4,7**	Problems continued on acceleration of a particle or a body	
	4	**1,2,4,7**	**Integral calculus**:- Definition of Integration and list of formulae (Algebraic, trigonometric and exponential)	**Practice-15:** Evaluate the standard integrals in GeoGebra.
	4	**1,2,4,7**	Rules of integration (without proof) with examples	
9	**4**	**1,4,7**	Problems on Rules of integration for algebraic functions	**Practice-16:** Evaluate the integrals with the integrands as sum and difference of all functions in GeoGebra.
	4	**1,4,7**	Problems continued	
	4	**1,4,7**	Problems involving trigonometric functions	
	4	**1,4,7**	Problems continued	
10	**4**	**1,4,7**	Integration by substitution method of the forms $\int f(x)^n f'(x)\,dx$, $\int \frac{f'(x)}{f(x)}dx$ simple problems	**Practice-17:** Evaluate the integrals with the integrands as product of algebraic and trigonometric (ILATE) in GeoGebra. Compare the result with the theoretical inference.
	4	**1,4,7**	Problems on integration by substitution method	
	4	**1,4,7**	Problems on integration by substitution method continued	
	4	**1,4,7**	Integration by parts:(ILATE RULE) $\int x\sin x\,dx$, $\int x\cos x\,dx$	
11	**4**	**1,4,7**	Integration by parts: $\int x\sec^2 x\,dx$, $\int x\,\mathrm{cosec}^2 x\,dx$, $\int x e^x dx$	**Practice-19:** Evaluate the integrals with the integrands as product of algebraic and exponential functions (ILATE) in GeoGebra. Compare the result with the theoretical inference.
	4	**1,4,7**	Integration by parts: $\int \log x\,dx$, $\int x\log x\,dx$, $\int x^2 \log x\,dx$	

	5	**1,2,4,7**	**Definite Integrals and Applications:-** Definition and simple problems on definite integrals	**Practice-20:** Evaluate the integrals with the integrands as product of algebraic and logarithmic functions (ILATE) in GeoGebra. Compare the result with the theoretical inference.
	5	**1,2,4,7**	Problems on definite integrals of algebraic functions	
12	**5**	**1,2,7**	Problems on definite integrals of trigonometric functions	**Practice-21:** To evaluate the area under the given curve and the volume generated by rotating the curve y=f(x) about x -axis in GeoGebra.
	5	**1,2,7**	Problems on definite integrals using substitution method	
	5	**1,2,7**	Problems continued	
	5	**1,2,7**	Problems continued	
13	**6**	**1,2,4,7**	**Applications of Integration**: Simple problems on finding the area bounded by the curve and x – axis. Problems.	**Practice-22:** Visualization Solids generated by rotating the curves about fixed axes in GeoGebra. (DEMONSTRATION)
	6	**1,2,4,7**	Problems continued.	
	6	**1,2,4,7**	Finding the volume of solid generated by revolving the curve about x – axis. Problems	
	6	**1,2,4,7**	Problems continued.	

4. References:

1. Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, New Delhi.
2. Engineering Mathematics by Reena Garg, Khanna Publishing House, New Delhi.
3. Calculus and Analytical Geometry by G. B. Thomas and R. L. Finney, Addison and Wesley Publisher.
4. NCERT Mathematics Books of Class XI and XII.
5. Deepak Singh, Mathematics-I, Khanna Book Publishing Co. (P) Ltd.
6. Garima Singh, Mathematics-II, Khanna Book Publishing Co. (P) Ltd.

Web-based/Online Resources:

i) https://www.youtube.com/watch?v=Yp-RERSe8Yk – To find derivatives using CAS in GeoGebra
ii) https://www.youtube.com/watch?v=1Cu4iw6jv6Y –To plot tangent to the curve in GeoGebra
iii) https://www.youtube.com/watch?v=sh5KutnKo9Q – To evaluate indefinite and definite integrals
iv) https://www.youtube.com/shorts/ZNCBgVjgPDY - To demonstrate the solid of revolution.

5. CIE and SEE Assessment Methodologies

Sl.No	Assessment	Test Week	Duration (minutes)	Max marks	
1.	CIE-1 Theory Test	4	90	50	Average of all CIE=50 Marks
2.	CIE-2 Practice Test	7	180	50	
3	CIE-3 Theory Test	10	90	50	
4.	CIE-4 Practice Test	13	180	50	
5	CIE-5 Portfolio evaluation of all the activities through Rubrics	1-13		50	
Total Continuous Internal Evaluation (CIE)					50 Marks
Semester End Examination (SEE) -Theory			180	100	50 (100 marks scaled down to 50 marks)
				Total Marks	**100 Marks**
Minimum marks to pass in CIE & SEE is 40% individually					

6. CIE Theory Test:

CIE 1(at the end of 4th week)

Program	**_____ Engineering**		**Semester**	**II**
CourseName	Engineering Mathematics-II		**Marks**	**50**
Course Code	**25SC21I**		**Duration**	**90 min**

Section A
(Answer any seven questions, each question carries 5 marks)

Q. No.	Questions	CL	CO	PO
1			1	
2			1	
3			1	
4			1	
5			1	
6			1	
7			1	
8			1	
9			1	
10			1	
Section B **(Answer any three questions, each question carries 5 marks)**				
11			2	
12			2	
13			2	
14			2	
15			2	

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

CIE 3(at the end of 10th week)

Program	**_____ Engineering**	**Semester**	**II**
CourseName	Engineering Mathematics-II	**Marks**	**50**
Course Code	**25SC21I**	**Duration**	**90 min**

Section A **(Answer any two questions, each question carries 5 marks)**				
Q. No.	**Questions**	**CL**	**CO**	**PO**
1			2	
2			2	
3			2	
Section B **(Answer any three questions, each question carries 5 marks)**				
4			3	
5			3	
6			3	
7			3	
8			3	
Section C **(Answer any five questions, each question carries 5 marks)**				
9			4	
10			4	
11			4	
12			4	
13			4	
14			4	
15			4	
16			4	

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

7. CIE Practice Test

Program	**Engineering**			**Semester**	**II**
CourseName	Engineering Mathematics-II			**Test**	**II/IV**
Course Code	**25SC21I**	**Duration**	**180 min**	**Marks**	**50**
Name of the Course Coordinator:					
Questions				**CO**	**Marks**
a. **OR** **b.**					**50**
Scheme of assessment **a) Observation** **b) Conduction** **c)Result and Output** **d) Viva**					**10** **20** **10** **10**
				Total Marks	**50**

Note: ***For CIE-II Practice Test : 01 to 12 : For CIE – IV Practice Test : 13 to 22***

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

8. Suggestive Activities:

The List is only shared as an Example and not inclusive of all possible activities of the course. Student and Faculty are encouraged to choose activities that are relevant to the topic and on the availability of such resources at their institution.

Note: Minimum 3 suggested activities should be done.

Sl. No.	Suggestive Activities
01	Write the application of system of linear equations in real life with neat diagrams and printed pictures.
02	Plot both standard functions and their derivatives in GeoGebra and document the plots obtained.
03	Plot the graphs for different f(x) in any GeoGebra graphing tool and record the maxima and minima at different interval and submit in the document with neat pictures.
04	Apply the concept of derivatives to study the rate measure like velocity, acceleration and retardation etc.
05	Apply CAS tool in Geogebra to find the area between any two arbitrary curves and present the graphical inferences obtained.

9. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1	Knowledge	Poor knowledge About the subject	Normal knowledge about the subject	Good knowledge about the subject	Very good knowledge about the subject	Excellent knowledge about the subject	10
2	Problems solving ability	Solved minimum number of problems with maximum mistakes	Solved minimum number of problems	Solved problems with few mistakes	Solved maximum number of problems	Solved all problems in neat manner	10
3	Strategies and Procedure	Hardly uses an effective strategy to solve problems.	Rarely uses an effective strategy to solve problems.	Sometimes use an effective strategy to solve problems but does not do it consistently.	Typically, uses an effective strategy to solve the problem(s).	Typically, uses an efficient and effective strategy to solve the problems	8
4	Completion	Several of the problem are not completed	Only 30% of thequestion are answered correctly	Only 50% of thequestions are answered correctly	Only 75% of the questions areanswered correctly	All assignment questions are answered correctly	8
5	Neatness and Organization	The work appears sloppy and unorganized. It is hardly to know what information goes together.	The work appears sloppy and unorganized.	The work is presented in an organized fashion but may be hard to read at times.	The work is presented in a neat and organized fashion that is usually easy to read.	The work is presented in a neat, clear, organized fashion that is easy to read.	6
	Total Marks= 10+10+8+8+6 =42						**42**

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

11. Equipment/software list with Specification for a batch of 30 students

Sl. No.	Particulars	Specification	Quantity
01	Computers	12th Generation, Intel Core I3, Graphic card, RAM 16GB, Storage: 1TB	30
02	Operating System and Software	Windows 10, MS Office, MS excel, GeoGebra	For all PC
03	Internet	High speed Internet	For all PC
04	Printer	Wireless Multifunctioning printer	05
05	Projector	High resolution, wifi enabled	01
06	UPS	As per standards	6KV

Practice Problems:

***Straight Lines*:**

1. Find the equation of line passing through the point $(3,4)$ having slope 5.
2. Find the equation to the straight line cutting off y – intercept 5 units and making an inclination 135°.
3. Find the slope of straight line whose inclination with x – axis is 45^{0}.
4. Find the slope of line passing through the points $(2,4)$ and $(8,7)$.
5. Find equation of straight line whose slope is 3 units and y - intercept is 4.
6. Find the equation of straight line passing through the point $(-3,9)$ and having the slope -1.
7. Find the equation of the straight line passing through $(2,3)$ and having slope 5.
8. Find the equation of line passing through the point $(6,8)$ and having slope 2.
9. Write the standard form of equation of straight line with
   a) One point (x_1, y_1) having slope m.
   b) Two points (x_1, y_1) and (x_2, y_2).
10. Find the equation of line joining the points $(3,2)$ and $(-1,5)$.
11. Find the equation of straight line passing through two points $(2,5)$ and $(3,7)$.
12. Find the equation of straight line passing through two points $(0,5)$ and $(4,6)$.
13. Find the equation to the straight line passing through the point $(5,2)$ and $(-3,3)$, hence find the slope of the line.
14. Find the equation to the straight line passing through the point $(4,-3)$ and $(2,1)$.
15. Write the standard form of straight line
    a) General form
    b) Having slope m and y - intercept c.
16. Find equation of straight line passing through the point $(1,2)$ which makes an angle 45^{O} to the x - axis.
17. Find the equation of straight line passing through the point $(1,2)$, which is parallel to the line $2x-3y+1=0$.
18. Find the equation to the straight line passing through the point $(4,3)$ and parallel to the line $3x+5y-3=0$.
19. Find equation of line parallel to $2x+y-3=0$ which passes through the point $(2,3)$.

20. Find the equation to the straight line passing through the point $(5,2)$ and parallel to $4x-3y+1=0$.
21. Find equation of straight line passing through the point $(5,6)$ and having slope of 3 units by writing its standard form.
22. Find the equation of straight line whose x- intercept and y- intercepts are 3 and 4 units respectively
23. Show that the two lines $2x+y-4=0$ and $6x+3y+10=0$ are parallel.
24. Show that the lines $3x+2y-1=0$ and $2x-3y+5=0$ are perpendicular.
25. Find the value of *k*, if the lines $(14+k)x+4y-3=0$ and $8x-3y+1=0$ are perpendicular.
26. Find the equation of the line passing through the point $(-3,2)$ and parallel to the line $4x-y+7=0$.
27. Find equation of line passing through the point $(1,2)$ and parallel to the line $2x-3y+1=0$
28. Find equation of line passing through the point $(2,3)$ and parallel to the line $5x-4y+4=0$.
29. Find the slope and x- intercept of line $3x+4y+7=0$.
30. Find the intercepts of the line $3x+5y-15=0$
31. Find x- intercept and y- intercept of line $2x+4y+5=0$.
32. Find the slope, *x*-intercept and *y*-intercept of the line $2x+3y-11=0$.

***Differential Calculus*:**

1. If $y=x^3+3\cos x+4e^x+2$ then find $\frac{dy}{dx}$
2. If $y=e^x+7^x-4\log x+\tan x$ then find $\frac{dy}{dx}$
3. If $y=e^{2x}+\cos x+3\log x-\frac{1}{x}+\sin^{-1}x+3$ then find $\frac{dy}{dx}$
4. If $y=x^3+\sin x-\log x-\sqrt{x}+\tan^{-1}x+5$ then find $\frac{dy}{dx}$
5. If $y=xe^x$ then find $\frac{dy}{dx}$
6. If $y=2x^3+3x^2+5x$ then find $y_1(0)$.
7. If $y=3e^{3x}+\frac{3}{x}-4\cos x+\log x$ find $\frac{dy}{dx}$.
8. Find $\frac{dy}{dx}$ if $y=6x^3-3\cos x+4\cot x+2e^{-x}-\frac{5}{x}$
9. If $y=x^2+2x+3$ then find $\frac{d^2y}{dx^2}$
10. If $y=\log(\sin x)$ then find $\frac{dy}{dx}$
11. If $y=\log(\sec x+\tan x)$ then find $\frac{dy}{dx}$.
12. Find $\frac{d^2y}{dx^2}$ *at* $x=\pi$ given that $y=\sin x$.
13. Differentiate $\log\sqrt{x}$ w.r.t x.
14. Differentiate $\sin^2 x$ w.r.t x.

15. If $y = \sqrt{\cos x}$ then find $\frac{dy}{dx}$.

16. Find $\frac{dy}{dx}$ given that $y = x \log x$.

17. If $y = x \sin x$ then find $\frac{dy}{dx}$.

18. If $y = \frac{1+x^2}{1-x^2}$ then find

19. If $y = \frac{1+\sin x}{1-\sin x}$ then find $\frac{dy}{dx}$.

20. If $y = \frac{2+x}{2-x}$ find $\frac{dy}{dx}$.

21. If $y = e^{3x} + e^{-2x}$ then find $\frac{d^2y}{dx^2}$.

22. If $y = A\cos mx + B\sin mx$ then prove that $\frac{d^2y}{dx^2}$ at $x = 0$

23. If $y = ae^{x} + be^{-x}$ then prove that $\frac{d^2y}{dx^2}$ at $x = 0$.

Applications of differential calculus:

24. Find the equation to the tangent to the curve $y = 2x^2 - 3$ at $(1,3)$.

25. Find the equation to the tangent to the curve $y = 3x^2 + 4x$ at $(1,2)$.

26. Find the equation to the normal to the curve $y = x^2 + 1$ at $(1,2)$.

27. Find the equation of the normal to the curve $y = 2x^3 - 5x^2 + 8x - 6$ at the point $(1,-1)$.

28. Find the slope of the tangent to the curve $y = x^2 - 3x + 2$ at (1, 0).

29. Find slope of tangent and normal to the curve $y = x^3 - x$ at the point $(2,3)$

30. Find equation of tangent to the curve $y = x^2 + x$ at the point $(1,2)$

31. The displacement of a particle moving along a straight line is $S = t^3 - 2t^2 - 4t + 20$ meters. Find the velocity when t=3 secs.

32. The equation of motion is given by $S = 3t^2 + 4t + 6$, find the velocity after 2 seconds.

33. The equation of motion of the particle is $S = t^3 - 2t^2 + 4$ in meter. Find the velocity when $t = 2$ seconds.

34. The displacement of a particle *S* meters moving along a straight line is $S = 4t^3 - 2t^2 + t$. Find the velocity when $t = 2$ secs.

35. If $S = 6t^3 - 5t^2 + 4$ is the displacement of a particle in time *'t'* sec, find its velocity at $t = 2$ sec.

36. The displacement of a particle in time *'t'* seconds is given by $s = t^3 - 6t^2 - 8$. Find the velocity after 3 seconds.

37. If s is the distance traversed in meters by a particle in time t sec and $s = 4t^3 - 6t^2 + t - 7$, find the velocity and acceleration when t=2 sec.

***Integration*:**

1. Integrate $e^x + \frac{1}{1+x^2} - \sin x + x^3$ w .r. t. x
2. Integrate $\sec^2 x - e^{4x} + x^5 - \frac{1}{x}$ w .r .t. x
3. Integrate $x^4 - e^{-2x} + \cos x - 100$ w .r .t. x
4. Evaluate $\int \left(\sin 2x + \frac{2}{x} + e^x + 3\sec^2 x + 5 \right) dx$.
5. Evaluate $\int \left(x^2 (1+x) \right) dx$
6. Evaluate $\int (x \log x)\, dx$
7. Evaluate $\int cos^2 x\, dx$
8. Evaluate $\int sin^3 x\, dx$
9. Evaluate $\int \frac{2x+1}{x^2+x+1} dx$
10. Evaluate $\int (x^2 + x + 9)^{10} (2x+1) dx$
11. Evaluate $\int \frac{e^x}{1+e^x} dx$
12. Evaluate $\int \frac{1-\cos 2x}{\sin 2x} dx$
13. Evaluate $\int \frac{(x+1)(x-5)}{x} dx$
14. Evaluate $\int \frac{2x-4}{x^2-4x+11} dx$
15. Evaluate the integral $\int x\, e^x\, dx$ using integration by parts.
16. Evaluate the integral $\int x\, sinx\, dx$ using integration by parts.

***Definite Integrals and Applications*:**

1. Evaluate $\int_0^1 (2x+1)(x-3)\, dx$
2. Evaluate $\int_0^{\pi/2} \sin^3 x dx$.
3. Evaluate $\int_0^{\pi/2} \cos^3 x dx$.
4. Evaluate $\int_0^{\pi/2} \sin x dx$.
5. Evaluate. $\int_0^1 x e^x dx$
6. Evaluate $\int_0^1 (x+2)(x-5)\, dx$.

7. Evaluate $\int_0^1 \left(3x - 6x + 2\right) dx$
8. Show that $\int_0^{\frac{\pi}{4}} tan^2 x \ sec^2 x \, dx = \frac{1}{3}$.
9. Find the area bounded by the curve $y = 3x$, the x – axis and the ordinates between $x = 1$ and $x = 2$.
10. Find the area bounded by the curve $y = x - 5$, the x-axis, the coordinates between $x = 0$ and $x = 5$.
11. Find the area bounded by the curve $y = x^2 + 1$, x-axis and the ordinates $x = 1$, $x = 3$.
12. Find the area bounded by the curve $y = 4x^3$, x – axis and the ordinates $x = 0$ and $x = 2$.
13. Find the area bounded by the curve $y = 3x^2 + 2x$, x – axis and ordinates $x = 0$ and $x = 1$.
14. The curve $y^2 = x + 2$ is rotated about x –axis .Find the volume of solid generated by revolving the curve between $x = 2$ & $x = 5$.
15. With the use of definite integrals find the area bounded by the curve $y = x^3 - 2$, x-axis and $x = 0$ & $x = 1$.
16. Find the area bounded by the curve $y = 4x - x^2 - 3$, x-axis and ordinates $x = 1$ and $x = 3$
17. Find the volume generated by rotating the curve $y^2 = x^3 - 2$ above x-axis between coordinates $x = 0$ and $x = 2$.
18. Find the volume generated by rotating the curve $y = x + 2$ about x – axis between $x = 0$ and $x = 2$.
19. Find the volume of the solid generated by revolving the curve $y^2 = 3x^2 - 2x + 1$ about x – axis and ordinates $x = 0$ and $x = 2$.
20. Find the volume of the solid generated by rotating the curve $y = x + 1$ about x – axis between $x = 0$ and $x = 2$.