Pabna University of Science & Technology
Department of Computer Science and Engineering
B. Sc. Engineering Examination 1st Year 1st Semester-2019
Course Title: Communicative English. Course No: HUM 1101
Time: 3.00 hours [Answer any Three from each PART]

PART A **Marks 35**

1.a) What is plagiarism? Mention and discuss different parts of a technical report. 8
b) Write a newspaper report on Rohingya crisis. $3\frac{2}{3}$

2.a) Fill in the table by putting words in the empty cells according to their parts of speech 5

Verb	Noun	Adjective
(i)	brotherhood	brotherly
democratize	(ii)	democratic
(iii)	danger	X
(iv)	formation	formative
Resist	Resistance	(v)

b) The scientist believes that computers will become more intelligent than human being. Some people find it as a positive while others think it is a negative development. Discuss both points and give your own opinion. Give reasons for your answer and include any relevant examples from your own knowledge on experience. Write at least 250 words. $6\frac{2}{3}$

3. Write an essay on any one of the following: $11\frac{2}{3}$
(a) Bangabandhu Satellite: A new dimension in Telecommunication Sector.
(b) Information and Communication Technology (according to the given guidelines)
(i)Introduction (ii) Definition (iii) The use of Computers, the Internet, video etc. (iv) Contribution of private sectors to ICT (v) Conclusion

4. What is thesis statement? Write an essay on Brain drain. $11\frac{2}{3}$

PART B **Marks 35**

5.a) Write a memo announcing a Seminar that will be held in your institute. 6
b) Suppose, you have bought some electronic goods from Samsung, but they are not working well, Now, write a complaint letter. $5\frac{2}{3}$

6.a) What is a topic sentence? Write a paragraph on "Facebook obsession". 6
b) What is restatement sentence? Amplify the statement – Child is the father of a nation. $5\frac{2}{3}$

7.a) How does scanning differ from Skimming? Discuss the SQRRR strategy of reading comprehension. 6
b) Amplify the idea contained in any one of the following: $5\frac{2}{3}$
(i)A little learning is a dangerous thing (ii) A thing of beauty is a joy forever.

8.a) How do you express yourself in the following situations? 5
(i) Seeking permission (ii) Saying goodbye (iii) Expressing surprise (iv) Apologizing for more important things.

b) Draft a tender notice for the supply of some Computers for the department of CSE. $6\frac{2}{3}$

Pabna University of Science and Technology

Department of Computer Science and Engineering

B. Sc. Engineering 1st Year 1st Semester Examination -2019

Course Title: Computer Fundamentals

Course No: CSE-1101

Time: 3:00 hours (For PART-A and PART-B)

Full Marks: 35

N.B: (i) Answer any **Three** questions.
(ii) Separate answer script must be used for answering the questions of PART-A.
(iii) Figures in the right margin indicate marks.

PART A

1. (a) Why a Computer is different from all other electronic devices? Sketch the block diagram of a digital computer and explain role of each parts. 5.67

   (b) Differentiate between the term Analog and Digital with proper example. 2

   (c) What do you mean by Machine Cycle? Explain all phases of machine cycle. 4

2. (a) How Keyboard works? Clearly mention the category of keys of a keyboard. 5.67

   (b) What is cache Memory? What is the differences between Primary cache and secondary cache? 3

   (c) What do you mean by truth table? Draw the logic diagram of the expression: 3
   Z=((A'+B'+C')'A + (B'.C+A'.B)'.C')A'

3. (a) What is number system? Calculate the value of X and Y, when $X_7=Y_5=83.25_{10}$ and justify your answer. 4.67

   (b) How are OMR devices used for recognizing the characters in the documents to be scanned? 3

   (c) Write down short notes on: 4
   (1) HDMI Port
   (2) VGA Port

4. (a) What is the difference between Algorithm and Flowchart? Explain with a proper example, 3

   (b) What is programming language? Shortly describe its classification. 4.67

   (c) What do you mean by Database Management System? Describe the elements of database. 4

Pabna University of Science and Technology

Department of Computer Science and Engineering

B. Sc. Engineering 1st Year 1st Semester Examination -2019

Course Title: Computer Fundamentals

Course No: CSE-1101

Time: 3:00 hours (For PART-A and PART-B)

Full Marks: 35

N.B: (i) Answer any **Three** questions.
(ii) Separate answer script must be used for answering the questions of PART-B.
(iii) Figures in the right margin indicate marks.

PART B

5	(a)	What is Software? Explain the major categories of computer software.	4
	(b)	What do you mean by Operating System? Describe the major functions of operating system.	3.67
	(c)	Package software makes our work comfortable. Do you agree or not? Critically discuss with example.	4
6	(a)	Give a comparative discussion between Data Communication and Computer Networks. Show the process of data communication through MODEM.	3
	(b)	Explain about LAN, MAN and WAN.	4.67
	(c)	What is network topology? Explain Star Topology mentioning its merits and demerits.	4
7	(a)	Mention some specific aspects of Digital Bangladesh that can increase the public service of our country.	3
	(b)	What do you mean by Cyber Crime? What are the major cybercrime areas? Explain.	4
	(c)	Define computer virus. How do they infect and spread in a Computer System? Explain at least three categories of viruses on the basis of their mode of existence. Give three examples of computer viruses.	4.67
8	(a)	Suppose you want to buy a desktop computer. List the hardware items with their specification (power/size/brand) and their price (approximately).	4
	(b)	What is the difference between Internet and Intranet? Describe some services of Internet.	4
	(c)	What do you mean by ecommerce? Discuss its advantages and disadvantages.	3.67

Pabna University of Science & Technology

Department of Computer Science & Engineering

B.Sc. Engineering 1st Year 1st Semester Examination' 2019

Course No: PHY 1101 Course Title: Physics

Time: 3:00 hours Full Marks: 70

N.B. i) Answer any ***Three*** *questions out of Four from each part.*

ii) ***Separate answer script*** *must be used for answering the questions of each part.*

iii) Figures in the right margin indicate marks.

PART - A

1. (a) What is matter? Discuss about different types of matter. 3.67

   (b) Explain covalent and ionic bonds in solid with necessary figures. 8

2. (a) Describe Thomson's atomic model and its limitations. 5

   (b) Explain Rutherford's atomic model based on the observation of alpha-scattering experiment. 3

   (c) What are the limitations of Rutherford's atomic model? 3.67

3. (a) Show that the energy of the n-th orbit of hydrogen atom is $E_n = \frac{-13.6}{n^2}$ eV 7.67

   where the symbols have their usual meanings.

   (b) Calculate the energy required to excite the hydrogen atom from the ground state (n=1) to the first excited state (n=2). [Given $m = 9.1 \times 10^{-31} kg, e = 1.6 \times 10^{-19} C, \varepsilon_0 = 8.85 \times 10^{-12} \frac{C^2}{N\text{-}m^2}$ and $h = 6.624 \times 10^{-34} J - s$] 4

4. (a) What are the characteristics of simple harmonic motion? 4

   (b) The equation of a simple harmonic oscillation is $x(t) = A\cos(\omega t + \varphi)$. Show that the total energy is constant. 5

   (c) What is de-Broglie wave? 2.67

PART - B

5	1.	(a)	Write a short note on nature of light.	4
		(b)	Explain corpuscular theory, wave theory, electromagnetic wave theory, and quantum theory of light.	7.67
6	2.	(a)	What is coherent source? Mention some methods to produce coherence of light.	2.67
		(b)	State the conditions under which two sources of light can produce interference.	4
		(c)	What do you mean by wave particle of duality? Derive a relationship expression between the wave parameters and particle parameters.	5
7	3.	(a)	Distinguish between Fresnel and Fraunhofer classes of diffraction.	5
		(b)	What is diffraction grating? Explain transmission and reflection and gratings.	5
		(c)	What is grating constant?	1.67
8	4.	(a)	Why X-rays are used for crystal structure? Explain briefly.	5
		(b)	Define plane polarized light and circularly polarized light. How they are produced and detected?	6.67

Pabna University of Science and Technology
Department of Computer Science and Engineering
B. Sc. (Engineering) Examination 1st Year 1st Semester - 2018
Course Name: Physics
Course No.: PHY-1101

Time: 03(Three) hours Marks: 70

[Answer any 03(three) questions from each PART]

Part A

1. a) What do you mean by X-ray diffraction? $2\frac{2}{3}$
   b) Explain the different types of bonds in solids. 3
   c) Deduce Bragg's law of X-ray diffraction. 6

2. a) Write down the postulates of Bohr atom model. $2\frac{2}{3}$
   b) Derive an expression for the radius in the nth orbit of Hydrogen atom from Bohr atom model. 6
   c) Draw the energy spectrum of Hydrogen atom. 3

3. a) Define Simple harmonic motion. $1\frac{2}{3}$
   b) Write down the characteristics of simple harmonic motion. 3
   c) Show that the mean Kinetic and potential energies of simple harmonic vibrating systems are equal. 7

4. a) What are beats? $2\frac{2}{3}$
   b) Explain graphically their formation of beats. 3
   c) Show that the number of beats per second is equal to the difference between the frequencies of the two sources sounded together. 6

Pabna University of Science and Technology
Department of Computer Science and Engineering
B. Sc. (Engineering) Examination 1st Year 1st Semester - 2018
Course Name: Physics
Course No.: PHY-1101

Time: 03(Three) hours Marks: 70

[Answer any 03(three) questions from each PART]

Part B

1. a) State and explain Doppler's effect. $3\frac{1}{2}$
   b) Derive an expression for the apparent frequency received by a stationary observer when the source of sound is in motion. 5
   c) A person is standing near a railway track and a train is moving with a speed of 36 Km/h is approaching him. The apparent pitch of the whistle as heard by the person is 700 hertz. Calculate the actual frequency of the whistle. Velocity of sound =350m/s. 3

2. a) What is interference of light? $1\frac{1}{2}$
   b) Discuss the important conditions for the interference of light. 3
   c) Describe Young's double slit experiment and show that the distance between two consecutive bright fringes are equal. 7

3. a) What do you mean by diffraction of light? $1\frac{1}{2}$
   b) Distinguish between Interference and diffraction. 3
   c) Derive an expression for intensity pattern of Fraunhoffer diffraction by single slit. 7

4. a) What is meant by the term polarization of light? $2\frac{1}{2}$
   b) A biprism is placed 10cm from a slit illuminated by a source of light of wavelength 6000°A. Calculate the fringe width at a distance of 100cm from the biprism. 4
   c) Discuss the construction of Nicole prism. 5

Pabna University of Science and Technology

Department of Computer Science and Engineering

B. Sc. Engineering 1st Year 1st Semester Examination -2019

Course Title: Differential Calculus and Co-ordinate Geometry

Course No: MATH-1101

Time: 3:00 hours (For PART-A and PART-B)

Full Marks: 35

N.B: (i) Answer any **Three** questions.
(ii) Separate answer script must be used for answering the questions of PART-A.
(iii) Figures in the right margin indicate marks.

PART A

1. (a) Define limit of a function. Distinguish between $\lim_{x\to a} f(x)$ and $f(a)$. 04

   (b) What do you mean by continuity of a function? A function $f(x)$ is defined as 05

   $$f(x) = \begin{cases} x^2 \text{ when } 0 < x < 1 \\ x \text{ when } 1 \le x < 2 \\ \frac{1}{4}x^2 \text{ when } 2 \le x < 3 \end{cases}$$

   Discuss the continuity at $x = 1$ and $x = 2$.

   (c) If $\sin y = x \sin(a + y)$, prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$ $2\frac{2}{3}$

2. (a) Differentiate $\cos^{-1}\frac{1-x^2}{1+x^2}$ w. r. to $\tan^{-1}\frac{2x}{1-x^2}$ 04

   (b) If $f(x) = \left(\frac{a+x}{b+x}\right)^{a+b+2x}$, show that $f'(0) = \left(2\log\frac{a}{b} + \frac{b^2-a^2}{ab}\right).\left(\frac{a}{b}\right)^{a+b}$ 06

   (c) Give the physical significance of $\frac{dy}{dx}$. $1\frac{2}{3}$

3. (a) If $y = \frac{1}{x^2+a^2}$, find y_n $3\frac{2}{3}$

   (b) State Leibnitz's theorem. If $y = e^{\tan^{-1}x}$ then show that 05

   $$(1 + x^2)y_{n+2} + (2nx + 2x - 1)y_{n+1} + n(n + 1)y_n = 0$$

   (c) Evaluate $\lim_{x\to 0}(\cot^2 x)^{\sin x}$ 03

4. (a) State and prove Euler's theorem on homogeneous function. 04

   (b) Verify Euler's theorem for the function $x^3 + y^3 + 3x^2y + 3xy^2$ $3\frac{2}{3}$

   (c) If $V = 2\cos^{-1}\left(\frac{x+y}{\sqrt{x}+\sqrt{y}}\right)$, show that $x\frac{\delta V}{\delta x} + y\frac{\delta V}{\delta y} + \cot\frac{V}{2} = 0$ 04

Full Marks: 35

Pabna University of Science and Technology

Department of Computer Science and Engineering

B. Sc. Engineering 1st Year 1st Semester Examination -2019

Course Title: Differential Calculus and Co-ordinate Geometry

Course No: MATH-1101

Time: 3:00 hours (For PART-A and PART-B)

N.B: (i) Answer any **Three** questions.
(ii) Separate answer script must be used for answering the questions of PART-B.
(iii) Figures in the right margin indicate marks.

PART B

5 (a) Find the co-ordinate of a point when the origin is shifted to another point $O'(a,b)$ where the direction of axes remains unaltered. 3

(b) If by the rotation of the rectangular axes about the origin, the expression $ax^2 + 2hxy + by^2$ changes to $a'x'^2 + 2h'x'y' + b'y'^2$ then prove that $a + b = a' + b'$ and $ab - h^2 = a'b' - h'^2$ $5\frac{2}{3}$

(c) Determine the equation of the curve $x^2 - y^2 - 2\sqrt{2}x - 10\sqrt{2}y + 2 = 0$ after rotating of axis through 45^0. 3

6 (a) Prove that homogeneous equation of second degree $ax^2 + 2hxy + by^2 = 0$ represents a pair of straight lines, real or imaginary, passing through the origin. 05

(b) For what values of λ the equation $12x^2 - 10xy + 2y^2 + 11x - 5y + \lambda = 0$ represents a pair of straight lines. $1\frac{2}{3}$

(c) If one of the lines $ax^2 + 2hxy + by^2 = 0$ be coincide with one of the lines $a'x^2 + 2h'xy + b'y^2 = 0$ prove that 05

$$(ab' - a'b)^2 = 4(a'h - ah')(bh' - b'h).$$

7 (a) Find the equation of the tangent to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ at the point (x_1, y_1) on its circumference. 3

(b) Find the equation of the circle which passes through $(4,2)$ and cuts the circles $x^2 + y^2 - 3x - 4y + 5 = 0$ and $3x^2 + 3y^2 - 7x + 8y + 11 = 0$ orthogonally. 5

(c) Show that the circle on the chord $x\cos\alpha + y\sin\alpha - p = 0$ of the circle $x^2 + y^2 - a^2 = 0$ as diameter is $x^2 + y^2 - a^2 - 2p(x\cos\alpha + y\sin\alpha - p) = 0$ $3\frac{2}{3}$

8 (a) If a chord of the parabola $y^2 = 4ax$ subtend a right angle at the vertex, the tangents as its extremities meet on the line $x + 4a = 0$. $5\frac{2}{3}$

(b) Show that the locus of the middle points of chords of constant length $2c$ of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $\left(\frac{x^2}{a^2} + \frac{y^2}{b^2} - 1\right)\left(\frac{x^2}{a^4} + \frac{y^2}{b^4}\right) + \frac{c^2}{a^2b^2}\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right) = 0$ 06

Pabna University of Science & Technology

Department of Computer Science & Engineering

B.Sc. Engineering 1st Year 1st Semester Examination'2018

Course No: MATH 1101 Course Title: Differential Calculus and Coordinate Geometry

Time: 3:00 hours Full Marks: 70

*N.B. i) Answer any **Three** questions out of Four from each part*

*ii) **Separate answer script** must be used for answering the questions of each part*

iii) Figures in the right margin indicate marks

PART - A

1. (a) Find the domain and range of the function $f(x) = |x-3|/(x-3)$. Also draw the graph of it. 5.67

   (b) Discuss the continuity and differentiability of the function 6

$$f(x) = \begin{cases} x^2 ; 0 < x < 1 \\ x \ ; 1 \le x < 2 \\ x^{3/4} ; 2 \le x < 3 \end{cases}$$

2. (a) Find (any two) $\frac{dy}{dx}$ when 6

   i) $y = (sinx)^x + (cosx)^{10x} + x^{10} + 10^x$

   ii) $y = cot^{-1}(\sqrt{1+x^2} - x)$

   iii) $x = asec^2\theta \ ; \ y = atan^3\theta$

   (b) Evaluate $\lim_{x\to 0}(cot^2x)^{sinx}$ 5.67

3. (a) State the mean value theorem. Verify the Rolle's and mean value theorems for the function $f(x) = x^2$ in the interval [-1, 1]. 5.67

   (b) State the Leibnitz's theorem. If $y = sin^{-1}x$ then show that 6

$$(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - n^2y_n = 0$$

4. (a) How can you define a function is homogeneous or not? If $v = sin^{-1}\left\{\frac{x^2+y^2}{x+y}\right\}$ then show that $xv_x + yv_y = tanv$ using Eulen's theorem. 4

   (b) Define tanget and normal of a curve. Find the condition that the two curves 4.67

$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and $\frac{x^2}{a'^2}+\frac{y^2}{b'^2}=1$ cut orthogonally.

(c) Show that the maximum value of xy subject to the condition $3x+4y=5$ is 25/48. 3

PART - B

1. (a) Discuss about the coordinate when the rotation of axes at θ with changing the origin. 4.67

(b) Determine the equation of the curve $2x^2+3y^2-8x+6y+7=0$ 7

(i) when the origin is transferred to the point (2,-1)

(ii) after rotating of axis through 90^0

2. (a) What types of equation will represent by the equation $ax^2+2hxy+by^2=0$? Find the angle between them. 4

(b) Find the area of a triangle which formulated by $ax^2+2hxy+by^2=0$ and $ex+my+n=0$ 4

(c) If $ax^2+2hxy+by^2+2gx+2fy+c=0$ represents two parallel straight lines if $\frac{a}{h}=\frac{h}{b}=\frac{g}{f}$ 3.67

3. (a) How do you construct a circle? Find the length of chord of circle $x^2+y^2=16$ and (2, 1) is the middle point of the chord. 3.67

(b) Find the condition that two circles cut orthogonally. Using it, find the value of λ when the circles $x^2+y^2+3\lambda x+9=0$ and $2x^2+2y^2+4x+9y+2=0$ cut orthogonally. 4

(c) Find the equation of a circle whose diameter is the common chord of the circles $x^2+y^2+2x+3y+1=0$ and $x^2+y^2-4x+3y+2=0$ 4

4. (a) Construct the equation of parabola. Find eccentricity, focus, equation directrix, major axis, minor axis of $\frac{(x-2)^2}{25}+\frac{(y-3)^2}{16}=1$ 6

(b) Find the equation of hyperbola whose focus (1,-1) and directrix is $4x+3y+1=0$ and eccentricity $\sqrt{3}$. 5.67

Pabna University of Science & Technology
Department of Computer Science and Engineering
B.Sc. Engineering Examination 1st Year 1st Semester-2015
Course Title: Differential Calculus and Co-ordinate Geometry
Course No: MATH-1101
Time: 3:00 hours

NB:
i. Answer any **Six** questions taking **Three** from each parts (PART- A and PART-B). Full Marks: 70
ii. Figures in the right margin indicate marks.

PART-A

1. a. Define function and its domain and range. 2
   b. Sketch the graph of the function $f(x) = |x| + |x-1|$. Also find its domain and range. 4
   c. What do you mean by continuity of a function at a point? Discuss the continuity of the following function at x=0. $5\frac{2}{3}$

$$f(x) = \begin{cases} x\cos(1/x) & ; \quad x \neq 0 \\ 0 & ; \quad x = 0 \end{cases}$$

2. a. Sketch the graph of $y = \log_a x,\ x > 0,\ a > 0$ 3
   b. Define differentiability of a function. Show that the function 1+4=5

$$f(x) = \begin{cases} 3 + 2x & when \quad -\frac{3}{2} < x \leq 0 \\ 3 - 2x & when \quad 0 < x \leq \frac{3}{2} \end{cases}$$

is not differentiable at x=0.

   c. Evaluate $\lim_{x\to 0}(\sin x)^x$. $3\frac{2}{3}$

3. a. State and prove the Leibnitz's theorem. 1+4=5
   b. If $y = \sin(m\sin^{-1}x)$ show that $(1-x^2)y_{n+2} = (2n+1)xy_{n+1} + (n^2 - m^2)y_n$ 4
   c. Expand $\tan^{-1}x$ in powers of $\left(x - \frac{\pi}{4}\right)$. $2\frac{2}{3}$

4. a. State and prove Euler's theorem on homogeneous function of two variables. 1+4=5
   b. Show that the functions $u=x+y-z,\ v=x-y+z,\ w=x^2+y^2+z^2-2yz$ are not independent of one another. 2
   c. State the Rolle's theorem. Verify Rolle's theorem for the function $f(x)=(x-2)(x-3)(x-4)$ in the interval [2,3]. $4\frac{2}{3}$

Math 1103, Part-A, Exam-2016

Pabna University of Science & Technology
Department of Electrical and Electronic Engineering
B.Sc. Engineering 1st Year 1st Semester Examination-2016
Course Title: Mathematics-I
Course No: MATH-1103

Time 3:00 hours — Full Marks: 70(35+35)

N.B: (i) Answer any three questions out of four for the each part.
(ii) Separate Answer script must be used for answering the questions of PART-A & PART-B.
(iii) Figures in the right margin indicate marks.

PART-A

1. (a) What is function? Define even and odd functions with examples. 03

(b) Define domain and range of a function with examples. $2\frac{2}{3}$

(c) Find the domain and range for the following functions: 06

(i) $f(x) = \frac{x^2+x+1}{x^2-6x+8}$

(ii) $f(x) = \sqrt{x^2+x-12}$

(iii) $f(x) = \tan x$

2. (a) What do you know about the limit of a function? 02

(b) Let, 06

$$f(x) = \begin{cases} \frac{1}{x+2}; when\ x < -2 \\ x^2; when -2 < x \leq 3 \\ \sqrt{x+13}; when\ x > 3 \end{cases}$$

Find,
(i) $\lim_{x\to -2^-} f(x)$, (ii) $\lim_{x\to 0} f(x)$, (iii) $\lim_{x\to 3} f(x)$

(c) Explain, why is the absolute value function not differentiable? $3\frac{2}{3}$

3. (a) Why is a differentiable function necessarily continuous? $2\frac{2}{3}$

(b) A function $(x) = \begin{cases} x^2 \sin(1/x); & x \neq 0 \\ 0 & ; x = 0 \end{cases}$. Show that f(x) is differentiable at $x = 0$ but $f'(x)$ is not continuous at $x = 0$ 05

(c) Find the n^{th} derivative of $y = e^{ax}\sin(bx + c)$. 04

4. (a) State Mean Value Theorem and apply it to prove that $|\sin x - \sin y| \leq |x - y|$ 04

(b) Find the maximum and minimum value of $f(x) = x^4 - 8x^3 + 22x^2 - 24x + 5$ $3\frac{2}{3}$

(c) State Euler's theorem for a homogeneous function of two variables and apply it to prove that $x\frac{\delta u}{\delta x} + y\frac{\delta u}{\delta y} = \sin 2u$, where $u = \tan^{-1}\left(\frac{x^3+y^3}{x+y}\right)$ 04

Page 1 of 2

PART-B

1. (a) If f is continuous on [a ,b] and F is any anti-derivative of f on [a , b] than show that $\int_a^b f(x)dx = F(b) - F(a)$ $5\frac{2}{3}$

   (b) Evaluate(any two) 06

   (i) $\int_0^1 tan^{-1}(\sqrt{x})\,dx$, (ii) $\int_0^{\frac{\pi}{2}} \frac{\sqrt{tanx}dx}{1+\sqrt{tanx}}$,(iii) $\int_{\frac{-\pi}{4}}^{\frac{\pi}{2}} sin^{15}xdx$.

2. (a) Show that the area between the parabola $y^2 = 4x$ and the straight line $y = 2x - 4$ is 9. $4\frac{2}{3}$

   (b) Define Beta and Gamma function. Show that $(m,n) = \frac{\Gamma m\,\Gamma n}{\Gamma(m+n)}$. 04

   (c) Solve $\int_0^1 \frac{x^6 dx}{\sqrt{1-x^2}}$, using Gamma definition. 03

3. (a) Explain improper integrals. Transform the improper integral of the 2nd kind $\int_1^2 \frac{dx}{\sqrt{x(2-x)}}$ into the improper integral of the first kind. $6\frac{2}{3}$

   (b) Obtain a reduction formula for $\int sin^n xdx$ 05

4. (a) Prove that, $\int_0^{2a} f(x)dx = 2\int_0^a f(x)\,dx$ if f(2a-x) = f(x) 05

   (b) Find the area of surface of the solid formed by the revolution of the curve $x = a(\theta - sin\theta)$, $= (1 - cos\theta)$, a > 0, about the line y=0. $6\frac{2}{3}$