

Roll No. _____



Y-2101

B. C. A. (Part III) EXAMINATION, 2015

Paper First

CALCULUS AND GEOMETRY

Time : Three Hours]

[Maximum Marks : 50

Note : All questions are compulsory. Attempt any *two* parts from each question. All questions carry equal marks.

Unit—I

1. (a) If $f : [a, b] \rightarrow \mathbb{R}$ is bounded, then prove that for any partition P of $[a, b]$, $L(P, f)$ and $U(P, f)$ are bounded.
- (b) Let $f(x) = x$ on $[0, 1]$, then show that f is R-integrable on $[0, 1]$ and :

$$\int_0^1 f(x) dx = \frac{1}{2}$$

- (c) State and prove the Fundamental theorem on Integral Calculus.

Unit—II

2. (a) Discuss the maximum or minimum value of :

$$u = x^3 y^2 (1 - x - y)$$

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- (b) Find the minimum value of $u = x^2 + y^2 + z^2$ when $ax + by + cz = p$.
- (c) Find the three positive numbers whose sum is 30 and whose product is maximum.

Unit—III

3. (a) Test the convergence of the integral :

$$\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$$

- (b) Test the convergence of

$$\int_0^2 \frac{\log x}{\sqrt{2-x}} dx$$

- (c) Test for convergence of the integral :

$$\int_{\alpha}^{\beta} \frac{dx}{\sqrt{(x-\alpha)(\beta-x)}} \quad (\beta > \alpha)$$

Unit—IV

4. (a) Prove that the equation :

$$ax^2 + by^2 + cz^2 + 2ux + 2vy + 2wz + d = 0$$

represents a cone of :

$$\frac{u^2}{a} + \frac{v^2}{b} + \frac{w^2}{c} = d.$$

- (b) If the plane $2x - y + cz = 0$ cuts the cone $yz + zx + xy = 0$ in perpendicular lines, then find the value of c .

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- (c) Find the equation of right circular cylinder whose radius is 3 and axis is :

$$\frac{x-1}{2} = \frac{y-3}{2} = \frac{z-5}{-1}$$

Unit—V

5. (a) Prove that two points on the conic $\frac{l}{r} = 1 + e \cos \theta$

whose vectorial angles are α and β respectively will be the extremities of a diameter if

$$\frac{e+1}{e-1} = \tan \frac{\alpha}{2} \tan \frac{\beta}{2}.$$

- (b) PSP' is a focal chord of a conic, prove that the angle between the tangent at P and P' is $\tan^{-1} \left(\frac{2e \sin \alpha}{1-e^2} \right)$ where α is the angle between the chord and the major axis.
- (c) In a conic, prove that the sum of the reciprocals of two perpendicular focal chords is constant.

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Y-2102

B. C. A. (Part III) EXAMINATION, 2015

Paper Second

DIFFERENTIAL EQUATION AND FOURIER SERIES

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt any *two* parts from each question. All questions carry equal marks.

Unit—I

1. (a) Solve :

$$\frac{dy}{dx} = \frac{x+y}{x-y}$$

(b) Solve :

$$\sin x \frac{dy}{dx} + 3y = \cos x$$

(c) Solve :

$$y = 3x + a \log p$$

Unit—II

2. (a) Find the orthogonal trajectories of the family of curves :

$$ax^2 + y^2 = 1$$

[2]

(b) Solve :

$$\frac{d^2y}{dx^2} - 5 \frac{dy}{dx} + 6y = e^{4x}$$

(c) Solve :

$$x^2 \frac{d^2y}{dx^2} + 7x \frac{dy}{dx} + 13y = \log x$$

Unit—III

3. (a) Solve :

$$x^2 p + y^2 q = z^2$$

(b) Solve :

$$\frac{\partial^2 z}{\partial x^2} - a^2 \frac{\partial^2 z}{\partial y^2} = x$$

(c) Solve :

$$pq = xy$$

Unit—IV

4. (a) Obtain Fourier series of the function $(x + x^2)$ in the interval $-\pi < x < \pi$.
- (b) Find a Fourier series of $f(x) = x \cos x$ in the range $(-\pi, \pi)$.
- (c) Obtain Fourier series representing the function $f(x) = x$ in the interval $0 < x < 2\pi$.

Unit—V

5. (a) Discuss the convergence of Fourier series.
- (b) What are the operations on Fourier series ? Discuss in detail.
- (c) Discuss Gibbs phenomenon with examples.

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Y-2103

B. C. A. (Part III) EXAMINATION, 2015

Paper Third

COMPUTER SYSTEM ARCHITECTURE

Time : Three Hours]

[Maximum Marks : 50

Note : Answer any *two* parts from each question. All questions carry equal marks.

1. (a) Convert the following :

(i) $(2F59)_{16} = ()_{10}$

(ii) $(725.25)_8 = ()_2$

(b) Perform the following binary arithmetic operations :

(i) $(1000100)_2 - (1010100)_2$

(ii) Divide $(11001)_2$ by $(101)_2$

(c) What are error detection and correction codes ? Explain each one in brief.

2. (a) Simplify the Boolean expressions to a minimum number of literals :

(i) $ABC + A\bar{B}C + AB$

(ii) $\overline{(A+B)}(\bar{A} + \bar{B})$

[2]

- (b) Draw a circuit of full adder and also discuss its working.
- (c) Explain the working of J-K flip-flop.
- 3. (a) Define microprocessor. Explain the application of microprocessor.
- (b) What are the special registers in a typical computer ?
- (c) Explain common bus organization of basic computer with diagram.
- 4. (a) Describe the basic I/O operations of modern processors.
- (b) Discuss the DMA driven data transfer technique.
- (c) Explain the handshake control of data transfer during input and output operation.
- 5. (a) Explain semi-conductor memory cell.
- (b) Describe the concept of virtual memory in detail.
- (c) Explain associative mapping of cache memory.

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B. C. A. (Part III) EXAMINATION, 2015

Paper Fourth

PROGRAMMING IN JAVA

Time : Three Hours]

[Maximum Marks : 100

[Minimum Pass Marks : 40

Note : Attempt any *two* parts from each question. All questions carry equal marks.

Unit—I

1. (a) Discuss the features of Java and define JVM.
- (b) What is method overriding ? Explain method overriding with suitable example.
- (c) Explain string and string buffer class.

Unit—II

2. (a) What are interfaces ? Explain variable in interface.
- (b) What is inheritance in JAVA ? Explain in detail.
- (c) Discuss packages in JAVA.

Unit—III

3. (a) Write a program which generate and trap the array index out of bound exception.

[2]

- (b) What is multithreading ? What is thread priority ? Discuss.
- (c) Explain the use of try, throw, catch and finally block with example code.

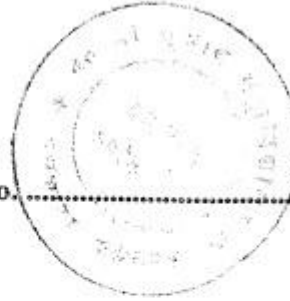
Unit—IV

- 4. (a) Explain Input/Output stream in Java.
- (b) Write in short about TCP/IP server socket.
- (c) Explain the procedure for setting the JDBC connectivity with backend databases.

Unit—V

- 5. (a) What is applet ? Explain life cycle of applet.
- (b) What is listener ? Explain mouse motion listener with suitable example.
- (c) Write short notes on the following :
 - (i) AWT
 - (ii) Delegation event model

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B. C. A. (Part III) EXAMINATION, 2015

Paper Fifth

COMPUTER OPERATING SYSTEM

Time : Three Hours]

[Maximum Marks : 100

[Minimum Pass Marks : 40

Note : Attempt any *two* parts from each Unit. All questions carry equal marks.

Unit—I

1. (a) What are the fundamental services of operating system ?
(b) What are batch processing and real time systems ?
(c) What is spooling ? What are various views of operating system ?

Unit—II

2. (a) What is process control block ? Explain various types of schedulers.
(b) Find average waiting time, response time for pre-emptive shortest job first algorithm for the following :

Process	CPU Burst	Arrival
P ₁	5	0
P ₂	3	1
P ₃	4	2

[2]

- (c) Explain master/slave scheduling and multiprocessor scheduling algorithms.

Unit—III

- 3. (a) Explain any *two* disk scheduling algorithms.
- (b) What do you mean by fragmentation ? What are its various types ?
- (c) Explain any *two* page replacement algorithms with the help of suitable example.

Unit—IV

- 4. (a) What are various methods for free space management ?
- (b) Explain various file allocation methods.
- (c) What are various types of files ? Explain file systems.

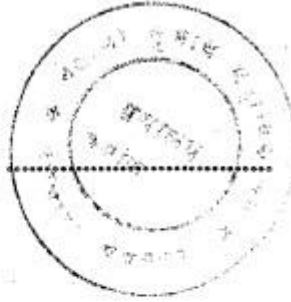
Unit—V

- 5. (a) What are various necessary conditions for deadlock to occur ?
- (b) Explain Banker's algorithm.
- (c) What are various methods through which a system can recover from deadlock ?

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B. C. A. (Part III) EXAMINATION, 2015

Paper Sixth

SOFTWARE ENGINEERING

Time : Three Hours]

[Maximum Marks : 100

[Minimum Pass Marks : 40

Note : Attempt any *two* parts from each question. All questions carry equal marks.

Unit—I

1. (a) What are the principles of software engineering ?
Explain software crises. 10
- (b) Explain waterfall model and spiral model with their advantages and disadvantages. 10
- (c) What quality should be in a software product ?
What is the use of software development process models ? 10

Unit—II

2. (a) What do you mean by software metrics ? Explain size oriented metrics. 10
- (b) Explain COCOMO model with example. 10
- (c) Compare size oriented metrics and function oriented metrics. 10

[2]

Unit—III

3. (a) What do you mean by structured analysis ? Draw DFD for a computerized library management module. 10
- (b) Explain data dictionary and what is the use of data dictionary in software development process. 10
- (c) What are the use and importance of SRS ? Explain with example. 10

Unit—IV

4. (a) What are the principles of software design ? Explain top down and bottom up strategies. 10
- (b) What are the rules of good programming style ? How can we verify code of a system ? 10
- (c) Explain partitioning and abstraction. 10

Unit—V

5. (a) Explain black box testing. Which one is better- black box testing or white box testing ? 10
- (b) Explain level of testing. 10
- (c) What are the testing fundamentals ? How can you define software testing ? 10

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B. C. A. (Part III) EXAMINATION, 2015

Paper Seventh

MULTIMEDIA TOOLS AND APPLICATION

Time : Three Hours]

[Maximum Marks : 50

[Minimum Pass Marks : 20

Note : Attempt any *two* parts from each Unit. All questions carry equal marks.

Unit—I

1. (a) What is Multimedia ? State and explain the basic components of multimedia.
- (b) Explain the working of OLE concept in multimedia.
- (c) Explain features and limitations of any *five* image file formats.

Unit—II

2. (a) What do you understand by Digital Sound ? Explain WAV and MP3 sound file format.
- (b) Explain how to create a simple animation using flash.

[2]

- (c) What is animation ? Write principle and applications of animation.

Unit—III

3. (a) Differentiate between analog and digital video. Write a brief note on digitization of analog and digital video.
- (b) What do you understand by video editing ? Describe the functions of quick time movie maker tool.
- (c) Explain various video standards.

Unit—IV

4. (a) What are the key factors in selecting CD based multimedia authoring tools ?
- (b) Explain testing and distribution of multimedia product.
- (c) What are the common major formats of CDs and DVDs ? What are the skills required for multimedia development team ?

Unit—V

5. (a) Explain dynamic and embedded font technique with example.
- (b) How do you perform image map in HTML ? How do you insert audio clip in a web page ?
- (c) What is meant by "Streaming Video" ? Write the steps to create streaming videos.



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B. C. A. (Part III) EXAMINATION, 2015

Paper Eighth

FINANCIAL MANAGEMENT AND ACCOUNTANCY

Time : Three Hours]

[Maximum Marks : 50

[Minimum Pass Marks : 20

Note : Attempt all the *five* questions. *One* question from each Unit is compulsory. All questions carry equal marks.

Unit—I

1. What is Accounting ? Outline the need for accounting and briefly describe the objects of accounting.

Or

The following trial balance appeared on 31st March, 2014 in the books of a trader :

	₹		₹
Stock (1 April, 2013)	2,200	Sales	15,800
Purchases	12,000	Commission	670
Freight on goods	140	Interest	40
Wages after deduction tax	400	Capital	9,000

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Salaries	1,600	Creditors	1,540
Taxes and Insurance	400	Bills payable	450
General Exp.	800		
Bad debts	250		
Cash	200		
Bank	2,000		
Drawings	690		
Debtors	2,100		
Buildings	4,720		
	27,500		27,500

From the above adjustments prepare final accounts for the year 2014 :

- Salaries ₹ 150 and taxes ₹ 50 have yet to be paid but insurance ₹ 50 are prepaid.
- Goods worth ₹ 120 were returned by a customer and taken into stock but no entry therefore was made into books.
- Commission ₹ 150 has been received in advance in respect of next year.
- Depreciate building by 10%.
- Make a provision for bad debts at 3% on debtors.
- Value of stock on 31st March, 2014 was ₹ 3,500.
- Tax deducted from wages amount to ₹ 10.
- Goods-in-transit ₹ 200.

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Unit—II

2. What ratios would you use to measure :

- Profitability
- Liquidity
- Solvency

of a concern ? Give formulae for computing these ratios.

Or

From the following particulars prepare a cost sheet, showing cost and profit per article sold :

Materials used	₹ 30,000
Wages	₹ 10,000
Machines worked	10000 hours
Machine hour rate	₹ 4 per hour
Office overheads	5% of works cost
Selling expenses	₹ 2 per article
Articles produced	10000
Articles sold	5000 @ ₹ 15 per article

Unit—III

3. The following information relates to X Co. Ltd. :

	₹
Sales	5,00,000
Variable costs	3,75,000
Gross profit	1,25,000
Fixed overheads	37,500
Net profit	87,500

Calculate :

P. T. O.

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- (i) P/V ratio
- (ii) Break-even point
- (iii) Net profit from sales of ₹ 7,00,000.
- (iv) Margin of safety when sales are ₹ 5,00,000.
- (v) Required sales to earn a profit of ₹ 1,00,000.

Or

Using the informations given below draw a profit/volume graph :

Sales volume (2000 units)	₹ 50,000
Variable costs	₹ 30,000
Fixed costs	₹ 10,000

Unit—IV

4. What do you understand by Budgeting ? What is the purpose of budgeting ? What are the essentials of effective budgeting system ?

Or

In a firm the forecasts relating to wages, factory expenses and administrative expenses are as follows :

Expenses	December	January	February	March
Wages	4800	6000	6400	6800
Factory Expenses	1000	1000	1200	1400
Administrative Exp.	600	600	700	700

The time-lag in payment of wages is 1/8 month, in case of factory expenses 1/4 month and that in case of administrative expenses 1/2 month. Estimate the

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amount of wages, factory expenses and administrative expenses payable in each month January to March.

Unit—V

5. What is variable costing ? Explain how variable costing is a tool of decision-making.

Or

2000 units are introduced into a process at a cost of ₹ 30,000. The total additional expenditure incurred in the process is ₹ 15,000. Of the units introduced, 10 percent are normal waste in course of manufacture. The wasted units possess a scrap value of ₹ 9 each. Due to abnormal causes, only 1680 units are produced. How would you write the process account showing the abnormal wastage ?

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B. C. A. (Part III) EXAMINATION, 2015

Paper Ninth

(Foundation Course)

ENGLISH LANGUAGE

Time : Three Hours]

[Maximum Marks : 50

[Minimum Pass Marks : 20

Note : Attempt all questions.

Unit—I

1. Answer any *three* of the following questions in about 200 words each : 10
 - (a) Write a summary of the short story 'Death of a Clerk' in your own words.
 - (b) Write a summary of the essay 'Bores' in your own words.
 - (c) Write a summary of the essay 'Information Technology' in your own words.
 - (d) Write the story of the mouse and the snake from the point of view of the poet (in the first person) who saw everything happening ?
 - (e) Write an essay on the 'Importance of Cows' in India.

Unit—II

2. Write an essay on any *one* of the following : 10

- (a) Students and politics
- (b) Superstitions in India
- (c) The day when everything went wrong
- (d) Man—the slave of science

Unit—III

3. Write a precis of the following passage and give a suitable title : 5

A man may usually be known by the books he reads as well as by the company he keeps, for there is a companionship of books as well as of men; and one should always live in the best company whether it be of books or of men. A good book may be among the best of friends. It is the same today as it was before and it will be the same ever. It is not apt to change. Books are the most patient companions and like good friends, do not turn their back upon us in time of need. They always receive us with the same kindness, amuse us and instruct us in youth and comfort and console us in age."

Unit—IV

4. Read the following passage carefully and answer the questions that follow : 5

Alzheimer's disease impairs a person's ability to recall memories both distant and as recent as a few hours before. Although there is no cure yet for the illness, there may be hope for a cure with a protein called

nerve growth factor. The protein is produced by nerve cells in the same region of the brain where Alzheimer's occurs. Based on this relationship, scientists from the university of Sweden and the University of California at San Diego designed an experiment to test whether doses of nerve growth factors could service the effects of memory loss caused by Alzheimer's. Using a group of rats with impaired memory the scientists gave half of the rats doses of nerve growth factor while giving the other half a blood protein as a placebo, thus creating a control group. At the end of the four week test, the rats given the nerve growth factor performed equally to rats with normal memory abilities. While experiments do not show that nerve growth factor can stop the general process of deterioration caused by Alzheimer's they do show potential as a means to slowing the process significantly.

Questions :

- (i) Where is nerve growth factor produced in the body ?
- (ii) What is Alzheimer's ?
- (iii) Which two university designed an experiment to study this disease ?
- (iv) What was given to the rats by the scientists ?
- (v) Give a suitable title to the passage.
- (vi) What was the result of the experiment ?
- (vii) Which of the following is closest in meaning to the word 'Deterioration' ?
 - (a) Depression

- (b) Deduction
- (c) Decline
- (d) Disconnection

Unit—V

5. (A) Do as directed (any fifteen) : 15
- (i) Add question tags :
 - (a) Let us take a walk in the open.
 - (b) He hates her like poison.
 - (ii) Rewrite as complex sentences with a subordinating conjunctions :
 - (a) All ants are social insects.
Some kinds of ants have very small colonies.
 - (b) In July the weather is warm and humid.
Ants leave on a wedding flight at this time.
 - (iii) Combine the following pairs of sentences with appropriate coordinating conjunctions :
Some slave ants work for their masters.
Some others do nothing for their keep.
 - (iv) How selfish I have been.
(Rewrite as assertive sentence).
 - (v) We believe that children are benevolent.
(Change into Simple Sentence)
 - (vi) If we do not check him, he may become a dictator. (Change into a Compound sentence)
 - (vii) Change the Narration (Introducing verb as Past)
 - (a) Shut the door after you.
 - (b) Are you enjoying yourself.

- (viii) The man you want has just left.
(Add a contact clause)
- (ix) Change the voice.
 - (a) Our action was justified by the facts.
(Change into Active form)
 - (b) You must iron the dress tonight.
(Change into Passive voice)
- (x) Fill up with preposition :
 - (a) He is kept police custody.
 - (b) We must wait the bus stop.
- (B) Do as directed (any five) : 5
- Give collective noun for :
 - (xi) We sat down in the shade of a
for trees.
 - (xii) He bought a large of bananas.
- Give antonyms of :
 - (xiii) timid, conceal.
- Give synonyms of
 - (xiv) discourse, repellent
- Give one word for :
 - (xv) A written account of one's own
life.....
 - (xvi) The habit of talking about oneself

- (xvii) A person who uses him/her power arbitrarily.
- (xviii) A skilled manual worker or craftsman.
- (xix) Give the sound of animals :
horse, cat
- (xx) Make sentence :
The sky is the limit
- (xxi) Make sentence :
to some extent
- (xxii) Make nouns of :
strong, true