FACULTY OF SCIENCE

B.Sc. V-Semester (CBCS) Examination, June / July 2019

Subject : Mathematics

Paper – VI (B) : Integral Calculus   (DSE E– 2)

Time : 3 Hours   Max. Marks: 60

PART – A (5 x 3 = 15 Marks)
(Short Answer Type)
Note : Answer any FIVE of the following questions.
Each question carries 3 marks.

1 Compute $\displaystyle\int_{-1}^{5}\int_{1}^{2}(5-|y|)\,dx\,dy$.

2 Integrate the function f(x, y) = 1 – xy over the triangular region with vertices (0, 0), (2, 0), (0, 2).

3 Compute the triple integral $\displaystyle\iiint_{(1,e)\times(1,e)\times(1,e)}\frac{1}{xyz}\,dyv$.

4 Evaluate $\displaystyle\iiint_{W}(1-z^{2})\,dv$, where W is the tetrahedron with vertices

   (0, 0, 0), (1, 0, 0), (0, 2, 0) and (0, 0, 3).

5 Find the volume of a ball of radius a using spherical coordinates.

6 Evaluate $\displaystyle\iiint_{B}f(x,y,z)\,dv$, where B = [-2, 3] x [0, 1] x [0, 5] and $f(x,y,z)=x^{2}e^{y}+xyz$.

7 Evaluate $\displaystyle\int_{0}^{1}\int_{0}^{1-y}(1-x-y)\,dx\,dy$.

8 Compute $\displaystyle\int_{0}^{4}\int_{0}^{2\sqrt{y}}x\sin(y^{2})\,dx\,dy$.

PART – B (3 x 15 = 45 Marks)
(Essay Answer Type)
Note: Answer ALL the questions. Each question carries 15 marks.

9 (a) Define the double integral of f(x, y) over a region R. Let D be the region bounded by the line x = y and the parabola x = y² - 2. Calculate $\displaystyle\iint_{D}y\,dA$.

OR

   (b) Evaluate $\displaystyle\iint_{D}3y\,dA$ where D is the region bounded by

   xy² = 1, y = x, x= 0 and y = 3.

10 (a) Compute $\iint_W x \, dW$ where W is the region in the first octant bounded by

$z = x^2 + y^2$, $x=0$, $y = 0$ and $z = 4$.

OR

(b) Evaluate $\iiint_W xyz \, dv$ where W is the region bounded by the paraboloid

$y = x^2$, the plane $y + z = 9$ and the xy plane.

11 (a) Evaluate $\iiint_W (x^2 + y^2 + 2z^2) \, dv$, where W is the solid cylinder defined by the

inequalities $x^2 + y^2 \leq 4$, $-1 \leq z \leq 2$.

OR

(b) Evaluate $\int_{-1}^{1} \int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} \int_{0}^{4-x^2-y^2} e^{x^2 + y^2 + z^2} \, dz \, dy \, dx$, using cylindrical

coordinates.

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FACULTY OF SCIENCE

B.Sc. V – Semester (CBCS) (Backlog) Examination, June/July 2019

Subject: Mathematics
(F: Mathematical Modeling)
(SEC – 3) Paper – V

Time: 1½ Hour

Max.Marks: 40

Note: Answer all questions and carries equal marks.

PART – A (2x5 = 10 Marks)
[Short Answer Type]

1 a) Explain Newton's law of cooling.

OR

b) Write logistic equation and find its solution.

2 a) Solve the IVP $\dfrac{d^2x}{dt^2} + 9x = 2 \sin 4t$ given that $x(0) = 0$, $x'(0) = 0$.

OR

b) Find the steady state solution $q_p(t)$ and the steady state current in the LRC circuit when the voltage is $E(t) = E_o \sin wt$.

PART – B (2x15 = 30 Marks)
[Essay Answer Type]

3 a) When a cake is removed from an oven its temperature is measured at 300°F. Three minutes later its temperature is 200°F. How long will it take for the cake to cool off to a room temperature at 70°F?

OR

b) A 12 volt battery is connected to series circuit in which the inductance is $\dfrac{1}{2}$ henry and the resistance is 10 Ohms. Determine the current i if the initial current is zero.

4 a) Solve the boundary value problem $y'' + \lambda y = 0$, $y(0) = 0$, $y(L) = 0$ where λ is constant and L is the length of string.

OR

b) A mass weighing 2 pounds stretches a spring 6 inches. At t=0 the mass is released from a point 8 inches below the equilibrium position with an upward velocity of $\dfrac{4}{3}$ ft/s. Determine the equation of motion.

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FACULTY OF SCIENCE

B.Sc. V-Semester (CBCS) Examination, June/July 2019

Subject : Statistics (Statistical Quality Control and Reliability)

Paper – VI (A) (DSE E – I)

Time : 3 Hours   Max. Marks: 60

PART – A (5 x 3 = 15 Marks)
(Short Answer Type)
Note : Answer any FIVE of the following questions.

1   Define 'Shewart control chart'.
2   What is np-chart with fixed sample size?
3   How do you construct modified control charts?
4   What are natural tolerance limits and specification limits?
5   Define (a) AQL & (b) LTPD
6   What is single sampling plan?
7   What is a reliability function?
8   Define Parallel structure. Also derive its system reliability.

PART – B (3 x 15 = 45 Marks)
(Essay Answer Type)
Note: Attempt ALL the questions.

9   (a) What are the various control charts for variables? Explain mean, range and standard derivation charts.

OR

(b) What are control charts for attributes? Explain np-chart when sample size is varying interpret the same.

10 (a) Explain(i) the control charts for number of defects per unit and (ii) control charts for number of defects for variable sample size.

OR

(b) Explain the concept of modified control charts.

11 (a) What is double sampling plan for attributes? Also describe the designing of a double sampling plan using Poisson distribution.

OR

(b) Explain K out of N structure of a system with examples. Derive the reliability of a K out of N system.

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FACULTY OF SCIENCE

B.Sc. V-Semester (CBCS) Examination, November / December 2018

Subject : Statistics

Paper – V (DSC) : Sampling Theory, Time Series, Index Numbers and Demand Analysis

Time : 3 Hours

Max. Marks: 60

PART – A (3 x 5 = 15 Marks)
(Short Answer Type)
Note : Answer any FIVE of the following questions.

1. Define Sampling unit and sampling frame.
2. Explain probability sampling.
3. Explain about proportional allocation.
4. Explain about Random fluctuations in Time Series data.
5. Distinguish between Complementary and competitive commodities.
6. What is Giffen's paradox?
7. Explain chain base Index Numbers.
8. Explain the multiplicative and mixed model of a Time series data.

PART – B (3 x 15 = 45 Marks)
(Essay Answer Type)
Note: Answer ALL questions.

9. (a) Distinguish between sampling and non sampling errors. Give the sources of Non sampling errors.

OR

   (b) Define SRSWOR and SRSWR. Show that in SRSWOR the probability of selecting a specified unit of the population at any given draw is equal to the probability of selecting it at the first draw.

10. (a) What are the seasonal variations? Explain Ratio to Trend method of calculating seasonal variations. Also give its merits and demerits.

OR

   (b) Define Cost function. With a cost function $C = a + \Sigma_h c_h n_h$ prove that the variance of the estimated mean $\bar{y}_{st}$ is minimum when n_h is proportional to $N_h S_h / \sqrt{C_h}$.

11. (a) Describe Leontief's method of estimating price elasticity of demand for time series data and its limitations.

OR

   (b) What is meant by (i) Base shifting (ii) Deflating (iii) Splicing of Index Numbers? Explain and illustrate.

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FACULTY OF SCIENCE
B.Sc. V-Semester (CBCS) Examination, June / July 2019

Subject : Statistics (Big data Analysis)

Paper – V (SEC – 3)

Time : 1½ Hours

Max. Marks: 40

Note: Answer all questions from Part – A and Part-B.
Each question carries 5 marks in Part – A and 15 marks in Part – B.

PART – A (2 x 5 = 10 Marks)
(Short Answer Type)

1   (a) State the risks involved in Big data.

OR

(b) What structure does the Big data have?

2   (a) Explain Traditional Analytic Architecture.

OR

(b) Explain Hybrid Sand Box.

PART – B (2 x 15 = 30 Marks)
(Essay Answer Type)

3   (a) Discuss the value of Telematics data with suitable examples.

OR

(b) Discuss the value of Social Network data in Telecommunications and other industries.

4   (a) What is cloud computing and state its essential characteristics and explain public and private clouds?

OR

(b) Explain Enterprise Analytic Data set process in detail.

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