FACULTY OF SCIENCE

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

Subject : Computer Science

Paper – V: Programming in Java (DSC)

Max. Marks: 60

Time : 3 Hours

PART – A (5 x 3 = 15 Marks)

(Short Answer Type)

Note : Answer any FIVE of the following questions.

- 1. Write about inner classes.
- 2 Write a note on type conversion in java.
- 3 Define thread. List the methods in Thread class.
- 4 What are wrapper classes?
- 5 Why layouts are needed?
- 6 What is the purpose of AWT? List the controls supported by AWT.
- 7 How java supports multiple inheritance?
- 8 Write about thread synchronization.

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

9 (a) Explain about branching mechanisms in java by giving an example.

OR

- (b) Compare and contrast method overloading and method overriding in java by giving an example for each.
- 10 (a) What is an exception? Define an exception called "No Match Exception" that is thrown when a string is not equal to "India". Write a program that uses this exception.

OR

- (b) Define thread. Explain the different ways we can create thread by giving an example for each.
- 11 (a) Explain the sequence of applet's life cycle methods in which they are called with an example program.

OR

(b) What is layout manager? Explain types of layout managers with an example.

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

Subject : Computer Science

Paper – IV (B) : Software Engineering (DSE E - 2)

Max. Marks: 60

Time : 3 Hours

PART – A (5 x 3 = 15 Marks)

(Short Answer Type)

Note : Answer any FIVE of the following questions.

- 1 Define Software and Software Engineering.
- 2 Discuss how the specifications are validated and traced.
- 3 Explain architectural design principles.
- 4 Describe state machine diagram with an example.
- 5 Mention good coding practices.
- 6 Write about debugging.
- 7 Explain decision tree with an example.
- 8 Write about test case and its parameters.

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

OR

9 (a) Explain software development life cycle model with a neat diagram.

(b) Describe SRS structure in detail according to IEEE standards.

10 (a) Explain object oriented design model.

OR

(b) What is a sequence diagram? Explain sequence diagram for banking system.

11 (a) Explain black box testing.

OR

(b) Describe defect density testing metrics.

Code No. 5727/E

1050-17-468-061

FACULTY OF SOCIAL SCIENCES B.A. / B.Sc. / B.Com./ B.S.W./ BBA II-Semester Examination, May / June 2018

Subject : Gender Sensitisation

AECC : Paper - II

Max. Marks: 40

Time : 11/2 Hours

Note: Answer all questions from Part – A and Part – B.

PART – A (2 x 5 = 10 Marks) (Short Answer Type) Note : Answer the following questions.

1 Gender and its historicity.

2 Women Discrimination at work place.

PART - B (2 x 15 = 30 Marks)

(Essay Answer Type)

3 (a) What is gender spectrum? Explain the different perspectives of gender spectrum.

OR

(b) Elaborate the gender based division of labour with suitable examples.

4 (a) Discuss the constitutional and legal safeguards provided to women in India.

OR

(b) "Indian women are standing behind in terms of individual and social empowerment" - Comment.

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6	Code No. 7006 / E / BL
0	FACULITIOF SCHENCE
0	B.Sc. I-Semester (CBCS) Examination, May / June 2018
0	Subject: Mathematics
6	Paper – I Differential Calculus Max.Marks: 80
C	Time: 3 Hours PART – A (5x4 = 20 Marks) [Short Answer Type]
6)	Note: Answer any FIVE of the following questions.
() ()	1 Find the n th derivative of $f(x) = \sin^3 x$.
G	2 Find the coefficient of x^3 in the Maclawin's expansion of $f(x) = e^x \sec x$.
G Ø	3 Evaluate $\lim_{x \to 0} \frac{x - \tan x}{x^3}$.
\odot	4 Find the radius of curvature of the curve $x = a \cos t$, $y = b \sin t at t = \frac{a}{4}$.
6	5 If $u = sin\left(\frac{x}{y}\right)$, $x = e^{t}$, $y = t^{2}$ then evaluate $\left(\frac{du}{dt}\right)$.
0	6 If $u = \tan^{-1}\left(\frac{y}{x}\right)$ then evaluate $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}$.
е 6	7 Find the envelope of the family of straight lines $\frac{x}{a} + \frac{y}{b} = 1$ where $a+b = c$, c is a constant.
•	8 Find the asymptotes of the curve $y^2(x^2-a^2) = x$ which are parallel to the coordinate axes.
6 0	PART – B (4x15 = 60 Marks) [Essay Answer Type]
\bigcirc	Note: Answer <u>ALL</u> the questions.
k.	9 a) If $y = (sin^{-1} x)^2$ then show that $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - n^2y_n = 0$.
٢	OR
(\bar{b})	b) i) State Lagrange mean value theorem and give its geometrical interpretation.
63	ii) Find the interval in which $f(x) = \log (2+x) - \frac{2x}{2+x}$ is increasing or decreasing.
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OR

10 a) Find the circle of curvature of the curve $ay^2 = x^3$ at p (a,a).

b) i) Evaluate $\lim_{X \to \infty} \left(\frac{\pi}{2} - \tan^{-1}x \right)^{\frac{1}{X}}$. ii) Evaluate $\lim_{X \to 0} (\operatorname{cosecx})^{\frac{1}{\log X}}$.

11 a) If
$$u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$$
 then find the value of $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$.

b) Expand $f(x,y) = e^x \cos y$ in powers of 'x' and 'y' using Taylor's theorem.

12 a) Find the maxima and minima of f(x, y, z) = xy (6 - x - y). OR b) Find the asymptotes of the curve $x^3 - 2x^2y + xy^2 + x^2 - xy + 2 = 0$.

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	Code No. 3070/E
®	FACULTY OF SCIENCE
8	B.Sc. III-Semester (CBCS) Examination, November / December 2016
0	Subject : Mathematics
(B	Paper - III: Logic and Sets (SEC - I)
ing)	Time : 11/2 Hours
o o	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)
C	1 (a) If p, q, and r are primitive statements then construct the truth table for the
(f)	compound statement $(p \rightarrow q) \rightarrow 1$.
Ch.	(b) Prove that for every integer n, $4x + 7$ is odd.
é.	 2 (a) If A = {1, 2, 3, 4, 5, 6, 7} then determine the number of (i) subsets of A and (ii) subsets of A containing 3 elements OR
0	(b) Let A, B are two mutually exclusive events of a random experiment. If P(AUB)=0.95 and P(Ā)=0.6 then find P(B).
•	PART - B (2 x 15 = 30 Marks)
G	(Essay Answer 1990) (a) (i) Show that the compound statement A : $(p \rightarrow q) \land (p \rightarrow r)$ is logically
69	equivalent to B : $p \rightarrow (q \land r)$.
Ð	(ii) Show that the compound stationary $(p \rightarrow q) \rightarrow (\neg q \rightarrow \neg p)$ is a tautology
Q	(b) (i) Negate and then simplify the statement
(3)	$p \rightarrow (\neg q \land p)$ (ii) If p, q, r and s are primitive statements, then write the dual of the compound
65	statement
e la companya de la compa	$(p \lor \neg q) \land (\neg 1 \lor s)$
(C)	4 (a) (i) Using the laws of set theory, simplify $(A \cap B) \cup (A \cap B \cap \overline{C} \cap D) \cup (\overline{A} \cup B)$
63	(ii) Show that $\overline{A \Delta B} = \overline{A} \Delta B$
C	OR (i) Let X be a random variable whose probability distribution is as follows:
\odot	
0	$\begin{array}{c cccc} X & 1 & 3 & 4 & 0 \\ \hline P(X=x) & \frac{1}{5} & \frac{2}{5} & \frac{1}{5} & \frac{1}{5} \\ \hline \end{array}$
8 6	Then evaluate (i) E(X) (ii) Variance of X (ii) If A, B are events in a sample space S with P(A) = 0.6, P(B) = 0.4 and $P(A \cup B)=0.7$ then evaluate $P(\overline{BT} \text{ and } P(A \mid \overline{B}))$
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0			Code No. 3010
6			FACULTYOF SCIENCE
æ		1	B.Sc. I – Semester (CBCS) Examination, November / December 2018
•		2	Subject : ELECTRONICS (Circuit Analysis)
8			Paper I
۲		Time	: 3 hours Max. Marks : 80
Ø			Part - A (5 X 4 = 20 Marks)
G			(Short Answer Type)
0			Note : Answer any Five of the following questions.
¢		1 De	efine a phasor and explain the phasor representation of sinusoidal voltage.
	•	2 DI 3 St	ate Milliman's theorem.
0)	4 Fi	nd the load resistance and current for maximum power transfer from a source 100 yolts dc having internal resistance of 50Ω .
6	9	5 D	erive the expression for decay current in LR circuit and hence define time
C)	сс 6 М	ention the main characteristics of series resonance circuit at resonance.
C	6	7 D ar	raw the circuit diagram of a low pass RC filter and draw its frequency response
6	9	8 E:	xplain the measurement of the phase angle using a CRO.
¢ Ø	3		Part – B (4 X 15 = 60 Marks)
6	9		(Essay Anower Type) Note : Answer all from the following questions.
U)	2	0 0	Define and derive the everencian for the everence and DMC value of a
6	9	9 a)	sinusoidal AC waveform.
æ	9	b)	OR Explain the terms Node and Mesh Explain mesh current and node voltage
C)	- /	analysis to solve a two loop network with a single source in one branch.
6	D	10 a)	State and prove Thevenin's theorem.
¢	9	b)	OR State and prove reciprocity theorem
(1	Ð	, 11 a)	Discuss the transient reasonable of DO elevit with fi
Q		ii aj	expression for the time constant.
6		b)	OR Explain the working of differentiator and integrator circuit with PC
(1)	b		combination.
E	Ð	12 a)	Draw the block diagram of a CRT and briefly explain its parts.
6	Ð	b)	What is resonance? Derive the expression for resonance frequency and
G	B		quality factor of parallel resonant RLC circuit.
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FACULTY OF SCIENCE B.Sc. II-Semester (CBCS) Examination, May / June 2019

Subject : Electronics

Paper - II : Electronic Devices

Max. Marks: 80

Time : 3 Hours

PART - A (5 x 4 = 20 Marks) (Short Answer Type)

Note : Answer any FIVE of the following questions.

- 1 Explain tunneling phenomenon.
- 2 Explain the junction capacitance.
- 3 Define and P of a transistor and derive the relation between them.
- 4 The collector current of a transistor is 5mA. If β =140, I_B=35 $\mu A,$ then calculate leakage current Ico.
- 5 Explain briefly UJT as relaxation oscillation.
- 6 An N-channel JFET has a pinch-off voltage of -4.5v and I_{DSS} = 9mA. At what value of V_{GS} in the pinch off rgion will I_D equal to 3mA.
- 7 Draw the diagram of LED and mention its applications.
- 8 Mention Application of SCR.

$PART - B (4 \times 15 = 60 Marks)$

(Essay Answer Type) Note: Answer ALL the questions.

9 (a) How is P-N junction diode formed? Explain its characteristic curves and types of breakdowns.

OR

- (b) Describe the construction and working of a varactor diode. Draw and explain its characteristics.
- 10 (a) Explain the two methods of transistor biasing.

OR

- (b) Define h-parameters for a low frequency CE transistor. Give an equivalent hparameter model for a BJT under CE configuration.
- 11 (a) Explain the construction and working of a JFET. Explain its characteristics.

OR

- (b) Explain the construction and working of UJT. Explain its characteristics.
- 12 (a) Draw a half-wave SCR circuit and explain its operation. Indicate the current and voltage waveform of the SCR.

OR

(b) Explain the construction and operation of a photovoltaic cell. Mention its applications.

-	6	Code No. 3080
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		FACUL STOF SCIENCE
		Campeter (CBCS) Examination, November / December 2018
	6	B.Sc. III - Semester (ODDD)
	0	Paper – III (DSC)
	69	Max. Marks : 81
	0	Time : 3 hours
	6)	$Part - A (5 \times 4 = 20 \text{ Marks})$
		(Short Answer Type)
	()	Note : Answer any Five of the following questions.
	8	
	G	1 Explain choke input litter. 2 What is Regulation? Define Ripple factor.
	0	3 Draw and explain the block diagram of regulated power supply.
	Ø	4 Explain briefly about the classification of amplifiers.
	æ	 6 Explain positive and negative feedback in amplitiers. 6 Explain positive and negative feedback in amplitiers.
		7 Obtain expression for Barkhausen entenen and a stable multivibrator.
	69	$Bart = B (4 \times 15 = 60 \text{ Marks})$
	0	(Essay Answer Type)
	0	the following questions.
		Note : Answer an from the remember of the actuation for its rinnle
	-	9 a) Draw the circuit diagram of an L-section filter and derive equation for its hpple
	6	factor. OR
	6	b) Draw the circuit diagram of bridge rectifier and explain its circuit action and
	C	derive an expression for efficiency and hpple rectant
	ø	10 a) Explain Series and Shunt transistor regulated power supplies.
		b) Explain principle and working of Switch Mode Power Supply (SMPS).
	0	2) - appendix is the second single stage RC coupled amplifier and explain its
	\bigcirc	11 a) Draw the circuit diagram of single stage inco coupled ampliner and expression frequency response curve.
	6	OR OR
		b) Explain the working of an Emiller follower and mendor no deco.
	() ()	12 a) Describe the working of Hartley Oscillator and obtain an expression for the
		frequency of oscillations. OR
		b) Explain Monostable multivibrator and draw the circuit diagram and relevant
	۲	waveforms.

FACULTY OF SCIENCE

B.Sc. V – Semester (CBCS) Examination, November / December 2018 Subject : ELECTRONICS (Digital Electronics)

Paper - V (DSC)

1059-16-474-088 Max. Marks : 60

11

11

12

Time : 3 hours

Part – A (5 X 3 = 15 Marks) (Short Answer Type)

Note : Answer any Five of the following questions

- 1/ Convert decimal number 72905 to hexadecimal number.
- Draw a circuit diagram of XOR gate and explain its working with truth table.
- 3 Show that $(A + B) (\overline{A} + \overline{B}) = A\overline{B} + \overline{A}B$ using Boolean Algebra.
- 4 Explain sum of products (SOP).
- 5 Explain working of JK flip flop.
- 6 Explain Johnson Counter.
- 7 Explain 4-bit Asynchronous counter.
- 8 Distinguish between PROM and EPROM.

Part – B (45 Marks)

(Essay Answer Type)

Note : Answer all from the following questions.

9 a) Explain 1's compliment and 2's compliment method for subtraction.

OR

- b) Draw the circuit diagram of parallel binary adder consisting of full adders and explain its operation.
- 10 a) State and explain the basic laws in Boolean algebra.

OR

- b) Draw the circuit diagram of multiplexer and explain its operation.
- Describe the working of Master Slave JK flip flop with neat circuit diagram. 11 11-21
 - b) Discuss the various shift registers.
- 12 a) Describe the organization working of ROM.

OR

OR

(b) Explain working of decade counter with truth table and timing diagrams.

	V-CEM	
	TINE Code No. 3206	
.0	FACULTY OF SCIENCE	
G	B Sc. V - Semester (CBCS) Examination, November / December 2018	
0	Subject : ELECTRONICS (8085 Microprocessor and Applications)	
0	Paper – VI-A (DSE E-1)	
8	Time : 3 hours Max. Mar	ks
Ô	Part – A (5 X 3 = 15 Marks)	
0	(Short Answer Type)	
03	1 Define instruction cycle, machine cycle.	
Ø	2 How many machine cycles does 8085 have, mention them.	
0	3 Explain the IN and OUT instructions of 8085.	
	4 Explain how stack is implemented in 6005. 5 Event the output at PORT '0' as the following instructions are executed	
0	MVI A. 93H	
6	MVI B, B7H	
0		
6	HLT (7550 flag effect execution	
w and the second	6 Specify the register A & B contents and flag status of ZERO flag after execution	
0	MVI A, A9H	
9	MVI B, 57H	
ø	ADD B ORA A	
G	7 Give the circuit diagram of 4 bit R-2R ladder network.	
(a)	8 What are the advantages of closed loop method of control process?	
	Part – B (45 Marks)	
Ø	(Essay Answer Type)	
City	Note : Answer an morn the following questions.	8
٢	9 a) Explain the architecture of Intel 8085 microprocessor with functional bloc diagram	k
0	OR	d
@	 b) What is address space portioning? Explain and compare memory mappe I/O and I/O mapped I/O methods. 	a
	10 a) List the addressing modes employed in Intel 8085 instructions set and explai	n
	them with suitable examples.	
	What are the addressing modes used in the following instructions	
©	I) CMA II) MOV B,C III) STA 8050	
	b) Explain the significance of AC flag and its use in DAA instruction wit	h
C	example. Give one example each to one byte, two byte and three byte instruction.	
۲		

N-SEW No. 3206 1) - 2 -0 11 a) Write an assembly language program to multiply two given Hex numbers. 11 1 Explain the logic. OR b) Write an assembly language program to find the largest number among the 0 11 given 10 numbers. 0 12 a) Give the block diagram of 8255 PPI and explain the modes operation of this . 12 IC. 3 OR b) Explain the functioning of Stepper motor. Draw the necessary circuit diagram. 12 0 9 . 0 -9 0 0 8 . 0 3 0 0)

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	8		Code No. 3076
	43		FACULTY OF SCIENCE
	0		B.Sc. III-Semester (CBCS) Examination, November / December 2018
	6		Subject : Computer Science
	0		Paper –III (SEC- I) : (B: Boolean Algebra)
	0	Tir	ne : 1½ Hours Max. Marks: 40
	6		Note: Answer all questions from Part – A and Part-B.
	0		Each question carries 5 marks in Part – A and 15 marks in Part – B.
	e		
	13		(Short Answer Type)
	¢		
	Ċ	1	(a) Write the binary codes and octal codes for decimal digits 0 to 9. OR
	0		(b) State and prove the Demorgan's Laws using truth tables.
	6	2	(a) Explain the Exclusive – OR and Equivalence operations.
	0		(b) Explain the conversion of English sentences to Boolean equations with
	9		examples.
	69		$PART = B(2 \times 15 = 30 \text{ Marks})$
	0		(Essay Answer Type)
		3	(a) (i) Explain the addition of 2's complement binary numbers with example.
	()		(ii) Write the gray codes and Excess - 3 codes for decimal digits 0 to 9.
	A		OR
	U		(b) (i) Describe about the AND, OR and complement operations with examples.
	۲		(ii) Simplify the following expressions using basic Boolean identities. (a) $C + \overline{RC}$ (b) $\overline{AR}(\overline{A} + R)(\overline{R} + R)$
	Ø		(a) $C + DC = (D) AD (A + D) (D + D)$
	6	4	 (a) (i) Describe the multiplying out and factoring Expressions. (ii) Explain the consensus Theorem.
	Ð		OR
			(b) Explain the design and implementation of full adder.

	69		

Extra



FACULTY OF SCIENCE

1059-16-1774-122

B.Sc. IV-Semester (CBCS) Examination, May / June 2018

Subject: Computer Science

Paper – IV (SEC – 2) D: Digital Logic

Time: 11/2 Hours

Max.Marks: 40

Answer all the following questions.

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

1 -a) Draw the karnaugh map for three-variable function with minterms.

OR

b) Explain the procedure for designing minimum two-level circuits using NAND

gates.

2/a) What is a hazard? Explain different types of hazards.

OR

b) Explain the three-state buffer with truth table.

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

3 a) Explain the terms sum-of-products and product-of-sums. Find the minimum sumof-products for the function $f(a, b, c, d) = \sum m(1, 3, 4, 11) + \sum d(2, 7, 8, 12, 14, 15)$.

OR

- /b) Find a circuit of AND and OR gates to realize $f(a, b, c, d) = \sum m(2, 5, 6, 7, 8, 10, 10)$ 12, 13, 14, 15).
- 4 a) Realize f(a, b, c, d) = ∑ m(0, 3, 4, 5, 8, 9, 10, 14, 15) using 3-input NOR gate.

OR

/b) What is a decoder? Draw the logic diagram for 3-to-8 line decoder with truth table.

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

(F: Computer Organization) Subject : Computer Science

Paper - V (SEC - 3)

1059-16-474-038 Max. Marks: 40

Time : 11/2 Hours

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) Explain the working of SR Flip Flop with circuit diagram

OR

(b) Discuss 4-bit Register with circuit diagram.

2 (a) Explain Comparator design using an iterative circuit.

(b) Draw and explain Binary Adder.

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

OR

(a) Explain Half Adder and Full Adder with circuit diagram and truth table. 3

OR

(b) Describe 4-bit Binary Counter with timing diagram, circuit diagram and truth table.

4 (a) Explain the designing of sequential circuit using ROM ad PLA with circuit diagram and truth table?

OR

(b) Describe the Design and Working of Binary multiplier.

Extra Papers.



FACULTY OF SCIENCE B.Sc. II-Semester (CBCS) Examination, May / June 2018

Subject : Statistics

Paper – II : Probability Distributions

Time : 3 Hours

Max. Marks: 80

PART – A (5 x 4 = 20 Marks) (Short Answer Type) Note : Answer any FIVE of the following questions.

- 1 Define uniform distribution. Obtain its mean.
- 2 Define Poisson distribution. State its reproductive property.
- 3 From a consignment, 15 record players are selected at random, one by one, and examined. Those examined are not put back. What is the probability that 9th record examined is the third and the last defective.
- A State the memory less property of geometric distribution.
 - 5 The mean of a normal distribution is 60 and 6% of the values are greater than 70. Find the standard deviation. P[0 < z < 1.56] = 0.44
- 6 Obtain the mean and variance of exponential distribution.
- 7 Define Beta distribution of first kind and find its mean.
- 8 Define Cauchy distribution. Give its applications.

PART – B (4 x 15 = 60 Marks) (Essay Answer Type) Note: Answer all the questions.

9 (a) Define Binomial distribution. Derive its mean and mode.

OR

- (b) Obtain $\beta_1 \& \beta_2$ for a Poisson distribution. Also comment on its skewness and kurtosis.
- 10 (a) Define hypergeometric distribution. Derive its mean and variance.

OR

- (b) Derive Poisson distribution as a limiting case of negative Binomial distribution.
- 11 (a) Derive standard deviation, mean deviation about mean and quartile deviation for normal distribution.

OR

- (b) Show that normal distribution is a limiting case of Binomial distribution.
- 12 (a) Define Gamma distribution. Obtain its moment generating function and hence find its mean and variance.

OR

(b) Derive moment generating function of Exponential distribution. Show that the sum of exponential random variables is a gamma random variable.

Code No. 7031/E

FACULTY OF SCIENCE B.Sc. II-Semester (CBCS) Examination, May / June 2018

1059-17-468-061

Subject : Physics

Paper – II : Waves and Oscillation

Max. Marks: 80

Time : 3 Hours

PART – A (5 x 4 = 20 Marks) (Short Answer Type) Note : Answer any FIVE of the following questions.

- 2 A simple harmonic wave is represented by $y = 5 \sin 2\pi [(t/0.05) 0.05x]$ cm. Find its
- 1 What are Lissajous figures? Mention their applications.
- wavelength, amplitude and frequency.
- 8 Define Q-factor. Explain sharpness of resonance. 4 The amplitude of an oscillator of frequency 200 per second falls to 1/10 of its initial
- value after 2000 cycle. Calculate its relaxation time.
- 5 Write the laws of transverse vibrations of the strings.
- 6 A steel wire 50cm long has mass of 5 gm it is stretched with a tension of 400N. Find the frequency of the wire in fundamental mode of vibration. Obtain an expression for the frequency of a vibrating bar clamped at both ends.
- 8 A rod of material with density 8gm/cm³ and youngs modules 7.2x10¹¹ dynes cm⁻² produces longitudinal waves of frequency 300 Hz. Find the wave length of the waves produced.

PART - B (4 x 15 = 60 Marks) (Essay Answer Type) Note: Answer all the questions.

(a) Define simple harmonic motion. Obtain an expression for rigidity modulus of the 9 material of a given wire using torsional pendulum.

OR

- (b) Discuss the effect of combining two mutually perpendicular simple harmonic vibrations of same frequency.
- 10 (a) Define damped harmonic oscillator and derive the differential equation of damped harmonic oscillator and obtain its solution under over damped condition.

OR

- (b) What are forced vibrations? Obtains an expression for the amplitude resonance and velocity resonance of a forced oscillator.
- 11 (a) Discuss the modes of vibration of a stretched string clamped at both the ends.

OR

- (b) Derive the equation for the velocity of transverse wave along a stretched string.
- 12 (a) Derive the transverse wave equation in a bar and discuss its solution.

Code No. 7031/E/R

FACULTY OF SCIENCE B.Sc. II-Semester (CBCS) Examination, June 2018

Subject : Physics

Paper – II : Waves and Oscillation

Time : 3 Hours

Max. Marks: 80

PART – A (5 x 4 = 20 Marks) (Short Answer Type)

Note : Answer any FIVE of the following questions.

- 1 Write the physical characteristics of simple harmonic motion.
- 2 A particle moving in simple harmonic motion has speeds 4 cm/s and 3 cm/s at distances 9cm and 16cm respectively from mean position. Find the amplitude of oscillation.
- 3 What is logarithmic decrement? Obtain an expression for it.
- 4 The amplitude of seconds pendulum falls to half its initial value in 150 sec. Calculate the Q-factor.
- 5 Write a note on harmonics in a vibrating string.
- 6 A flexible string of length 1m and mass 1gm is stretched to a tension T. The string is found to vibrate in three segments at a frequency of 612 Hz. Calculate the tension in the string.
- 7 Distinguish between clamped free bar and free-free bar.
- 8 A copper rod of length 1m is clamped at one end. Calculate the frequency of longitudinal vibration of the first three harmonics. Young modulus of copper is 12 x 10¹⁰ Nm⁻² and density is 9800 kg m⁻³.

PART – B (4 x 15 = 60 Marks) (Essay Answer Type) Note: Answer all the questions.

9 (a) Explain compound pendulum and hence derive an equation for the equivalent length of simple pendulum.

OR

- (b) Establish the equation of motion of a simple harmonic oscillator and solve it. Hence derive expression for its velocity, period and frequency.
- 10 (a) What are forced oscillations? Derive the equation of motion for a forced oscillator and obtain the solution.

OR

- (b) What are damped oscillations? Solve the differential equation of a damped harmonic oscillator and discuss the case when it is under damped motion.
- 11 (a) Formulate the differential equation for a transverse wave motion on a stretched string and write its general solution.

OR

- (b) Define transverse wave, state the laws of transverse vibrations of strings. Obtain an expression for the frequency of vibration in a stretched string.
- 12 (a) Give the solution of the differential wave equation when longitudinal vibrations are produced in a rod. Hence discuss the nature of the harmonics produced in a rod clamped at both ends.

OR

(b) Derive transverse wave equation in a bar and discuss its solution.

Code No. 3064/E

FACULTY OF SCIENCE

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

Subject : Physics

Paper – III: Thermodynamics (DSC)

Max. Marks: 80

Time : 3 Hours

PART – A (5 x 4 = 20 Marks)

(Short Answer Type)

Note : Answer any FIVE of the following questions.

Derive the expression for viscosity of gases. -1

- 2 Give the relationship between entropy and enthalpy.
- 3 Deduce the Clausius Clayperon's equation of thermodynamics
- 4 What is the principle of refrigeration?
- 5 Derive the Stefan's law from Planck's law.
- 6 How do you calculate the effective temperature of sun?
- 7 Write about phase space.
- 8 Apply Bose-Einstein distribution to photons and derive Planck's radiation formula.

PART – B (4 x 15 = 60 Marks) (Essay Answer Type)

Note: Answer ALL questions.

- 9 (a) Explain the Maxwell's distribution law of velocities and derive the equation for velocity of molecules. ^ -
 - (b) Calculate the r.m.s. velocity of H₂ at 27°C. Given $k = 1.38 \times 10^{-23}$ J/deg and mass of hydrogen molecule $m = 3.34 \times 10^{-27} kg$.

OR

- (c) Describe the theory of Kelvin's thermodynamic scale of temperature.
- (d) Draw and explain the T S diagram.

10 (a) Deduce the expressions for Maxwell's thermodynamics relations.

(b) Using Maxwell's thermodynamics relations, show that

(ac.,)	_	$\partial^2 S$		$\partial^2 P$
av	= T	avar	= 1	$\overline{\alpha r^2}$
(0,)		01.01		(01.)

OR

- (c) Describe the method of liquefication of gases in Joule Thomson expansion.
- (d) Distinguish between adiabatic and Joule Thompson expansion.

11 (a) How is the energy spectrum distributed for a block body?

(b) Derive the Wein's displacement law.

OR

- (c) How is a disappearing filament optical pyrometer constructed? Explain its working method.
 - (d) The order of magnitude of the energy received from sum at earth's surface is 10⁻¹J cm⁻² sec⁻¹. Calculate the order of magnitude of the total force due to solar radiation on the earth. [Earth's diameter = 12×10^6 m].

12 (a) What are the fundamental postulates of statistical mechanics.

(b) Give a description of statistical ensembles.

OR

(State, explain and derive the Maxwell-Boltzman energy distribution law.

FACULTY OF SCIENCE

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

Subject : Statistics (Statistical Quality Control and Reliability)

Paper – VI (A) (DSE E-I)

Time: 3 Hours

$PART - A (5 \times 3 = 15 Marks)$

Max. Marks: 60

(Short Answer Type) Note : Answer any FIVE of the following questions.

- 1 What is the importance of SQC in industry?
- 2 Give the statistical basis of control charts.
- 3 What is c-chart and how do you interpret it?
- 4 What is the process capability index?
- 5 Derive the reliability function in terms of hazard rate.
- 6 Explain the concept of memory less property.
- 7. What are Rectifying Inspection plans?
- 8 Describe a single sampling plan. Give its ASN and ATI.

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

- 9 (a) What are control charts? How do you construct mean and range charts? OR
 - (b) How do you construct control chart for number of defectives in cases of (i) fixed sample size and (ii) variable sample size.
- 10 (a) Construct c-chart for variable sample size to the following data and state whether the process is under statistical quality control.

1	2	3	4	5	6	7	8	9	10
110	125	115	115	125	145	140	120	155	145
15	14	13	17	14	3	14	11	15	12
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(b) Define (i) Natural tolerance limits ; (ii) specification limits and (iii) Modified control charts.

11 (a) What is double sampling plan? Explain its OC curve.

OR

(b) Explain parallel and series configuration of a system. Also derive their system reliability.

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e	CODE No. 10320/BL
0	Win of Arts Commerce, Science, Management & Social Science
0	B.A, B.Com, B.B.A, B.Sc & B.S.W B.A, B.Com, B.B.A, B.Sc & B.S.W
0	I Year I Semester (CBCS) Examination Sub: Sanskrit (Second Language)
\$	Paper-I Max. Marks : 80
() ()	Time: 3 Hours. 'अ' विभाग: PART 'A' (5x4=20)
0	पञ्च प्रश्नाः समाधेयाः
0	र प्रतोकं भाषान्तरीकरुत ।
•	प्रियवादी च भूतानां सत्यवादी च राघवः ।
0	बहुश्रुतानां वृद्धानां ब्राह्मणानामुपासिता ।।
0	्र जयन्दर्भं व्याख्यात – 'आत्मानमपरिचाययन्तोपि प्रवेष्टव्याः '
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	3. महाकविविजयसारथिमुद्दिश्य लघुनिबन्ध लिखत ।
	4 अधोलिखितपदानां लिङगविभक्तिवचनानि प्रत्यभिजानीत ।
0	
	(1) कविभिः (2) गाः (3) रमायाम् (4) वाराणाम्
6	म् स्र विघटयत – (1) नपतिर्जयति (2) दिङ्नागः
6)	3) तवेव (4) कपीशः
69	
	 वाक्यमिद ससन्दर्भ व्याख्यात – 'वृष्टिमन्त महामध नदन्तामव बाहण.
0	 ददाति प्रतिगृहणाति गुह्यमाख्याति पृच्छति ।
6	भुङ्क्ते भोजयते चैव षड्विधं प्रीतिलक्षणम् ।।
	श्लोकममु भाषान्तरीकुरुत ।
	8. उद्यमेन
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CODE No. 10320/BL

(5x12=60)

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'आ' विभाग: PART 'B' सर्वे प्रश्नाः समाधेयाः । सर्वे समानाङ्काः ।

9.

द्वयोः श्लोकयोः प्रतिपदार्थं भावं च लिखत ।

यं सर्वशैलाः परिकल्प्य वत्सं मेरौ स्थिते दोग्धरि दोहदक्षे । भारवन्ति रत्नानि महौषधीश्च पृथूपदिष्टां दुदुहुर्धरित्रीम् ।। (अ)

-2-

यज्ञाङगयोनित्वमवेक्य यस्य सारं धरित्रीधरणक्षमं च ।

- प्रजापतिः कल्पितयज्ञभागं शैलाधिपत्यं स्वयमन्वतिष्ठत् ।। (आ) कपोलकण्डूः करिभिर्विनेतुं विघटि्टतानां सरलद्रुमाणाम् ।
- यत्र सुतक्षीरतया प्रसूतः सानूनि गन्धः सुरभीकरोति ।। (로) अनन्तरत्नप्रभवस्य यस्य हिमं न सौभाग्यविलोपि जातम् ।
- एको हि दोषो गुणसन्निपाते निमज्जतीन्दोः किरणेष्विवाङ्कः ।। (ई)

'कृतघ्ने नास्ति निष्कृतिः' इति पाठ्यांशस्य सारं विवृणुत । 10. अथवा

'धर्मबद्धो दौवारिक:' इति पाठ्यांशे गौरसिंहस्य पात्रं विवृणुत । 'अवन्तु भारतप्रजाः स्वतन्त्रभारतप्रभाम्' इति पाठ्यांशस्य सारांशं लिखत । 11.

अथवा नीतिश्लोकानाम् अध्ययनेन किं प्रयोजनं विवृणुत ।

द्वौ शब्दौ सर्वासु विभवितषु लिखत । 12. 1. देव 2. मति 3. वारि 4. पितृ

> नामनिर्देशपूर्वकं त्रिषु सन्धिं विघटयत । अ)

- 4. अजन्तः 13. 1. गुरूपदेशः 2. नवोदयः 3. षण्मुखः
 - नामनिर्देशपूर्वकं त्रीणि सन्धत्त ।
 - 1. गुरो: + आज्ञा 2. सुप् + अन्त: 3. महा + ईश: 4. एक + एक: आ)

CODE No. 16702

Faculties of Arts, Commerce, Science, Management & Social Science B.A, B.Com, B.B.A, B.Sc & B.S.W II Year III-Semester (CBCS)Examination November/December,2018

Sub: Sanskrit (Second Language)

Paper- III

Time : 3 Hours.

Max. Marks : 80

<u>'अ' विभागः - PART – 'A'</u> पञ्चप्रश्नाः समाधेयाः

(5x4=20)

ससन्दर्भ व्याख्यात – 'उपरागान्ते शशिनः समुपगता रोहिणी योगम्' ।

1. अन्वादं कुरुत ।

तत्रैव समीपे अगस्त्याश्रमस्य अगाधम् अप्रतिमम् अपां निधानं पम्पाभिधानं पद्मसरः आसीत् । तस्य पद्मसरसः पश्चिमे तीरे महान् जीर्णः शाल्मलीवृक्षः आसीत् ।

- ससन्दर्भ व्याख्यात 'सर्वं दहेयं यदिदं पृथिव्यामिति'।
- 4. अनन्वयालङ्कारस्य लक्ष्यलक्षणसमन्वयं कुरुत ।
- <u><u></u>ष्ठ. लिङ्गविभक्तिवचनानि प्रत्यभिजानीत</u>

(1) मनसि (2) विद्वान् (3) नाम्ने (4) भगवद्भिः

- . ससन्दर्भ व्याख्यात स्रजमपि शिरस्यन्धः क्षिप्तां धुनोत्यहिशङ्कया ।
- 🗸 कालिदासमहाकवे: परिचयं लिखत ।
- दीपकालङ्कारेस्य लक्ष्यलक्षणसमन्वयं लिखत ।

'आ' विभाग: - PART - 'B' (5x12=60)

- द्वयोः श्लोकयोः प्रतिपदार्थं भावं च लिखत ।
 - (1) एवमाश्रमविरुद्धवृत्तिना संयमः किमिति जन्मतस्त्वया । सत्वसंश्रय सुखोपि दूष्यते कृष्णसर्पशिशेनेव चन्दनः ।।
 - (2) अर्धपीतपयो मातुरामर्दक्लिष्टकेसरम् । प्रक्रीडितुं सिंहशिशुं बलात्कारेण कर्षति ।।

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CODE No. 16702



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- 10 C	\backslash	Code No. 3006/E
	FACULTX-OF-SCIENCE B.Sc. I-Semester (CBCS) Examination November	/ December 2018
84	Subject : Mathematics	
	Paper – I: Differential Calculus	
	Time : 3 Hours	Max. Marks: 80
	PART – A (5 x 4 = 20 Marks) (Short Answer Type) Note : Answer any FIVE of the following o	questions.
	1 Expand y = log (sec x + tan x) is a Maclaurin series.	
	2 Verify Rolle's mean value theorem for the function	
	$f(x) = e^{x} (\sin x - \cos x) \ln \left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$	
	3 Evaluate $\lim_{x \to 0} (\cos x)^{\cot^2 x}$.	
	 4 Find the radius of curvature of the curve x = a (θ - sinθ), y = a(1 - cos θ) at any point θ. 	
	5 If $u = \sin(xy^2)$, $x = \log t$, $y = e^t$ then find $\frac{du}{dt}$.	
	6 If $z = f(x - ay) + g(x + ay)$ then show that $\frac{\partial^2 z}{\partial y^2} = a^2 \frac{\partial^2 z}{\partial x^2}$.	
	7 Find the envelope of the curve $x \cos^3 \theta + y \sin^3 \theta = C$, where C is any constant.	
	8 Find the asymptotes of the curve $r \theta = a$.	
	PART – B (4 x 15 = 60 Marks) (Essay Answer Type) Note: Answer ALL the question	ıs.
	9 (a) If $y = (x^2 - 1)^n$ then show that $(x^2 - 1)y_{n+2} \div 2x y_{n+1} - n$ OR	$(n+1)y_n = 0.$
	(b) (i) State and prove Cauchy's mean value theorem.	
	(ii) If $f(x) = \sqrt{x}$, $g(x) = \frac{1}{\sqrt{x}}$ then find 'C' value of C	Cauchy's mean value
	theorem on [a, b].	
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10 (a) Show that the evolute of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is $(ax)^{\frac{2}{3}} - (by)^{\frac{2}{3}} = (a^2 + b^2)^{\frac{2}{3}}$.

OR

(b) Find the circle of curvature at the point $P(t^2, 2t)$ of the curve $y^2 = 4x$.

11 (a) (i) Expand $f(x, y) = x^2 - y^2 - 2x 4y + 1$ as a Taylor series around P(1, 2).

- (ii) If $x + y^2 \sin xy = 1$ then evaluate $\frac{dy}{dx}$ at P(0, 1). OR $\left(x^4 + x^4\right) \qquad \qquad \partial u \qquad \partial u$
- (b) (i) If $u = \log\left(\frac{x^4 + y^4}{x + y}\right)$ then evaluate $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$.

(ii) If $f(x, y) = \begin{cases} \frac{x^2 y(x - y)}{x^2 + y^2}, & (x, y) \neq (0, 0) \\ 0, & (x, y) = (0, 0) \end{cases}$ show that $f_{xy} \neq f_{yx}$ at O(0, 0)

12 (a) Find the minimum value $x^2 + y^2 + z^2$ when $xyz = a^3$.

OR

(b) Find the asymptotes of the curve $y(x^2 - y^2) - 6y^2 + 5x - 7 = 0$

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0	Code No. 3072/E
0	B.Sc. III-Semester (CBCS) Examination, November / December 2018
®.	Subject : Mathematics
C	Paper – III : Real Analysis (DSC)
(t)	Time : 3 Hours Max. Marks: 80
6.4	$DADT = A (5 \times A = 20 Marks)$
. Ca	(Short Answer Type) Note : Answer any FIVE of the following questions.
\mathfrak{O}	
60	1 Determine the limit of the sequence $\{s_n\}$, where $s_n = \sqrt{n^2 + 1} - n$.
0	2 Let $t_1=1$ and $t_{n+1} = \frac{t_n + 2}{2t_n}$ for $n \ge 1$. Find the lim t_n .
G	3 If $a_n = \sin\left(\frac{n\pi}{3}\right)$ then find lim sup a_n and lim inf a_n .
œ	4 Show that $\sum_{n=1}^{\infty} \frac{1}{2}$ converges if and only if p > 1.
\odot	$n=2 n (\log n)^p$
٢	5 For n = 0, 1, 2, 3,, let $a_n = \left(\frac{4+2(-1)^n}{5}\right)$. Find lim sup $(a_n)^{\frac{1}{n}}$ lim inf $(a_n)^{\frac{1}{n}}$.
	6 Let $f_n(x) = \frac{1+2\cos^2 nx}{\pi}$. Prove that { f_n } converges uniformly to 0 on R.
	7 Prove that every continuous function f on [a, b] is integrable.
(J)	
(F)	8 Show that $\left \int_{0}^{2\pi} x^2 \sin^8(e^x) dx \right \le \frac{16\pi^3}{3}$.
¢)	$1 - 2\pi$
	PART – B (4 x 15 = 60 Marks) (Essay Answer Type)
\bigcirc	Note: Answer ALL the questions.
<u>_</u>	9 (a) (i) If (s _n) converges to s, (t _n) converges to t, then prove that (s _n t _n) converges
\bigcirc	(ii) If (s _n) converges to s and s _n \neq 0 for all n, and if s \neq 0, then show that
٢	$\left(\frac{1}{s}\right)$ converges to $\frac{1}{s}$.
(B)	(S _n) . OR
0	(b) (i) Prove that $\lim_{n \to \infty} a_n = 0$ if $ a < 1$.
٢	(ii) Prove that $\lim_{n \to \infty} n^n = 1$.
pt.co	

- 10 (a) (i) If the sequence (s_n) converges, then prove that every subsequence converges
 - to the same limit. (ii) State and prove Bolzano-Weierstrass theorem.

OR

- (b) If (s_n) converges to a positive real number s and (t_n) is any sequence then prove that $\lim \sup s_n t_n = s \lim \sup t_n$.
- 11 (a) Let (f_n) be a sequence of functions defined and uniformly Cauchy on a set S \subseteq **R**. Then prove that there exists a function f on S such that $f_n \rightarrow f$ uniformly on S. OR

(b) Derive an explicit formula for $\sum_{n=1}^{\infty} n^2 x^n$ for |x| < | and hence evaluate n = 1

$$\sum_{n=1}^{\infty} \frac{n^2}{3^n}$$

12 (a) Let f be a bounded function on [a, b]. If P and Q are partitions of [a, b] and

 $P \subseteq R$, then prove that

 $L(f, P) \leq L (f, Q) \leq U(f, Q) \leq U(f, P).$ OR

(b) Prove that a bounded function f on [a, b] in Riemann integrable on [a, b] ⇔ it is Darboux integrable, in which case the values of the integrals agree.

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Code No: 7114/E/R

FACULTY OF SCIENCE B.Sc. IV – Semester (CBSC) Examination, June 2018 Subject: Mathematics Paper: IV Algebra

Time: 3 Hours

Max. Marks: 80

SECTION $- A (5 \times 4 = 20 \text{ Marks})$ (Short Answer Type)

Note: Answer any Five of the following questions

1. Write all subgroups of the group Z₃₀ and indicate their orders.

- 2. For n>1, show that the alternating group A_n has order $\frac{n!}{2}$
- 3. If G is a group and H is a sub group of index 2 in G. then show that H is a normal subgroup of G.
- 4. If G is an abelian group and H is a normal subgroup of G then show that $\frac{G}{u}$ is also an

abelian group.

ate.

- 5. Define idempotent element in a ring R. Find all idempotent elements in the ring $(Z_{10}, +_{10}, X_{10})$
- 6. If I_1 and I_2 are any two ideals in a ring R, then show that $I_1 \cap I_2$ is always an ideal of R.
- 7. If $f(x) = 1+2x+3x^2$, $g(x) = 2+3x+4x^2+x^3$ then evaluate f(x)+g(x), f(x).g(x) in the ring $Z_5[x].$
- 8. Let R be a commutative ring of characteristic 2 then show that the mapping $\phi : R \to R$ Defined by $\phi(a) = a^2 \forall a \in \mathbb{R}$ is a homomorphism.

SECTION-B (4x15=60 Marks) (Essay Answer Type)

- 9. (a) (i) Let G be a group and H, K be two subgroups of G. Then show that $HK = \{hk|h \in H, K \in K\}$ is a subgroup of G.
 - (ii) Let G be a group and a \in G is such that o(a) = n then show that $o(a^k) = \frac{n}{\gcd(n,k)}$

(where k is a positive integer)

OR

- (b) (i) If $\alpha = (a_1, a_2, a_3, \dots, a_m)$ and $\beta = (b_1, b_2, b_3, \dots, b_n)$ are any two disjoint permutations then show that $\alpha\beta = \beta\alpha$
- (ii) Let $\alpha, \beta \in S_6$ and $\alpha = (124536), \beta = (143256)$ then evaluate $\alpha.\beta, \alpha\beta^{-1}, \alpha^2$
- 10. (a) Let G be a group and a,b \in G and H is a subgroup of G then show that
 - (i) $aH = bH \Leftrightarrow a \in bH$
 - (ii) ah is a sub group of $G \Leftrightarrow a \in H$.

OR

- (b) Let G be a finite abelian group and P be a prime that divides the order of G then show that G has an element of order P.
- 11.(a) (i) Show that every finite integral domain is a field.
 - (ii) Define characteristics of a ring R with unity. Show that the characteristics of an integral domain is either zero or a prime.

OR

Code No: 7114/E/R

(b) (i) Let R be a commutative ring with unity and A be an ideal of R then show that the

-2-

quotient ring $\frac{R}{A}$ is an integral domain if and only if A is a Prime ideal.

- (ii) Let I be an ideal of a ring R, $1 \in I$ then show that I = R.
- 12. (a) (i) Define kernel of a ring homomorphism.
 - (ii) Let R be a ring and A is an ideal of R. Then show that the mapping $\phi: R \to \frac{R}{A}$ defined $\phi(x) = x+A \forall x \in R$ is an onto homomorphism.

OR

(b) Let F be a field and f(x), $g(x) \in F[x]$ with $g(x) \neq 0$ then show that there exists unique

polynomials q(x) and r(x) such that f(x) = q(x) + r(x) with either r(x)= 0 or deg $r(x) < \deg g(x)$

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1. N	G	Code No. 31	36/
	0	B.Sc. V-Semester (CBCS) Examination, November / December 2018	
	0	Subject : Mathematics	
	-	Paper – VI-A : Solid Geometry (DSE E– I)	
	C	Time : 3 Hours Max. Marks	;: 6
	6	PART – A (5 x 3 = 15 Marks)	
	C	(Short Answer Type)	
	Ğ	1 Find the centre and radius of the sphere	
	Ł	$2x^{2} + 2y^{2} + 2z^{2} - 2x + 4y + 2z + 3 = 0$	
	6	2 Find the limiting points of the co-axial system define by the sphere	
	0	$x^{2} + y^{2} + z^{2} + 3x - 3y + 6 = 0$ and $x^{2} + y^{2} + z^{2} - 6y - 6z + 6 = 0$.	
	0	3 Find the equation of the cone whose vertex is the point (1, 1, 0) and whose guidir	١g
	6	curve is $y = 0, x^2 + z^2 = 4.$	
	0	4. Observe that the general equation to a cone which passes through the three coordin	hat
	6	A Show that the general equation to a cone which passes introdyn the three booten axes is fvz + azx + hxv = 0 where f. q. h are parameters.	
	•		
	0	5 Find the points of intersection of the line $\frac{x+3}{-3} = \frac{y-4}{1} = \frac{z-11}{7}$ with the conicoid	
	S.	$12x^2 - 17y^2 + 7z^2 = 7.$	
	©	6 Find the enveloping cylinder of the conicoid $ax^2 + by^2 + cz^2 = 1$ with its generation	on
	\odot	parallel to the line $\frac{x}{\ell} = \frac{y}{m} = \frac{z}{n}$.	
	\bigcirc	7 Find the equation of the sphere through the circle	
	<u>C</u>	$x^{2} + y^{2} + z^{2} = 9$, 2x + 3y + 4z = 5 then point (1, 2, 3).	
	. 6	8 Find the enveloping cone of the sphere $x^2 + y^2 + z^2 - 2x + 4z - 1 = 0$ with its verte	Х
	6	at(1, 1, 1)	
	ϵ	(Essay Answer Type)	
	Ċ	Note: Answer ALL the questions. 9 (a) Show that the two circles	
	\odot	$2(x^2 + y^2 + z^2) + 8x - 13y + 17z - 17 = 0 = 2x + y - 3z + 1$ and $x^2 + y^2 + z^2 + 3x - 4y + 3z = 0 = x - y + 2z - 4$	
	$\tilde{\mathbb{Q}}$	lie on some sphere and find its equation.	
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(b) Two spheres of radii r₁ and r₂ cut orthogonally. Prove that the radius of the common circle is

$$\frac{r_1 r_2}{\sqrt{r_1^2 + r_2^2}}$$

- 10 (a) Find the equations to the lines in which the plane 2x + y z = 0 cuts the cone $4x^2 y^2 + 3z^2 = 0$
 - OR
 - (b) Find the equation of the right circular cone with its vertex at the origin, axis along z-axis and semi vertical angle α.
- 11 (a) Find the equations to the two planes which contain the line given by 7x + 10y 30 = 0, 5y 3z = 0 and touch the ellipsoid $7x^2 + 5y^2 + 3z^2 = 60$.

OR

(b) Find the locus of points from which three mutually perpendicular tangent lines can be drawn to the conicoid $ax^2 + by^2 + cz^2 = 1$.

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53	0		Code No.	, 3187/E
	0		B.Sc. V-Semester (CBCS) Examination, November / December 2018	ĺ
	6		Subject : Mathematics	
	0		Paper – VI-B : Integral Calculus (DSE E - 2)	
	G	T	ime : 3 Hours Max. Ma	ırks: 60
	0		$PART - A (5 \times 3 = 15 Marks)$	
	0		(Short Answer Type)	
	C		Note : Anower any rive of the following questions.	
	6	1	Compute $\int_{-\infty}^{\infty} \int_{-\infty}^{3} (4 - x^2) dx dy$	
	6	2	0 -2 Integrate the function f(x, y) = 3xy over the region bounded by y = 32x ³ and	
	0		$y = \sqrt{x}$.	
	C	3	Compute $\int \int \int z dV$, where W = [-1, 2] x [2, 5] x [-3, 3].	
	0		W	
	6	4	Evaluate $\iiint_{w} 8 xyz dV$, where W is the region bounded by the y = x ² , y +z = 9	and
	0		the xy plane.	
	C	5	Fvaluate $\int \int (x^2 e^y + xyz) dz dy dy$	
	6	U	-2 0 0	
	Ô	6	For the volume of a ball of radius a using spherical coordinates.	
	ف		$1 - 4 - x^2$	
	Gite	7	Evaluate $\int_{0}^{1} \int_{3x^2} x^2 y dy dx$.	
	() ()		x/	
	(B)	8	Evaluate $\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} (x^2 + y^2) dy dx$.	
	6)		$\frac{0}{\frac{x^2}{4}}$	
	(4)		PART – B (3 x 15 = 45 Marks) (Essay Answer Type)	
	<u> </u>	0	Note: Answer ALL the questions.	
	e	9	(a) Find the area of the region, using double integrals, bounded by $y = 2 - x^2$ and $x - y = 0$, $2x + y = 0$.	
	e.		OR	
			(b) Compute $\int_{0}^{1} \int_{y^2}^{y} \cos(x^2) dx dy$, by changing the order of integration.	
				2

(...

10 (a) Evaluate $\iiint f(x, y, z) dV$ where B is the tetrahedron with vertices (0, 0, 0), (1, 0, 0), (0, 1,0) and (0, 0, 1), and f(x, y, z) = 1+ xy.

- (b) Compute $\iiint y \, dV$ where W is the region bounded by the prove x + y + z = 2 and the cylinder $x^2 + y^2 = 1$ and y = 0.
- 11 (a) Evaluate $\int_{3}^{3} \frac{\sqrt{9-x^2}}{\sqrt{9-x^2}} \frac{3}{\sqrt{x^2+y^2}} \frac{e^z}{\sqrt{x^2+y^2}} dz dy dx$, by using cylinder coordinates.

OR (b) Find the volume of a cone of radius a and height h using spherical coordinates.



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

- 9 (a) (i) Prove that a set {v₁, v₂...,v_p} of two or more vectors with v₁ ≠ ō, is linearly dependent if and only if some V_j (with j > 1) is a linear combination of the preceding vectors v₁, v₂...,v_{j-1}.
 - (ii) Show that the set S={(1, 0, 0, -1) (0, 1, 0, -1) (0, 0, 1, -1) and (0, 0, 0, 1)} in \mathbb{R}^4 is linearly independent.

OR

- (b) (i) State and prove the spanning set theorem.
 - (ii) If a vector space V has a basis of n vectors then prove that every basis of V must consist of exactly n vectors.

$$\begin{bmatrix} 4 & -1 & 6 \\ 2 & 1 & 6 \\ 2 & -1 & 8 \end{bmatrix}$$

10 (a) (i) Find the eigen values and eigen vectors a $A = \begin{bmatrix} 2 & 1 & 6 \end{bmatrix}$

(ii) Prove that the eigen values of a triangular matrix and its diagonal elements.

OR

- (b) Define the term
 - (i) Rank of matrix (ii) Eigen values and Eigen vectors of matrix
 - (ii) Find the characteristic equation if



11 (a) Diagonalize the matrix, if possible

$$A = \begin{bmatrix} 1 & 3 & 3 \\ -3 & -5 & -3 \\ 3 & 3 & 1 \end{bmatrix}$$

OR

(b) (i) Show that the set $\{u_1, u_2, u_3\}$ is an orthogonal set, where

$$u_1 = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, \quad u_2 = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix} \text{ and } u_3 = \begin{bmatrix} -\frac{1}{2} \\ 2 \\ \frac{7}{2} \end{bmatrix}$$

 (ii) If S={u₁, u₂...,u_p} is an orthogonal set of non-zero vectors is Rⁿ, then prove that S is linearly independent.

1059-16-474-088 .

Max.Marks: 80

FACULTY OF SCIENCE

B.Sc. IV-Semester (CBCS) Examination, May / June 2018

Subject: Electronics

Paper - IV

Linear Integrated Circuits and Basics of Communication

Time: 3 Hours

PART – A (5x4 = 20 Marks) [Short Answer Type]

Note: Answer any five of the following questions.

- 1 Define CMRR and Slew rate of an Op-amp.
- 2 An inverting amplifier has $R_1 = 10k\Omega$ and $R_f = 125K\Omega$ calculate the output voltage, for an

input voltage 4 V

- 3 Discuss generation of triangular wave using OP-AMP and explain.
- 4 Explain mono stable multi vibrator using IC555.
- 5 Define modulation index in AM: Explain types of modulation.
- 6 Mention advantages of FM over AM.
- 7 Write a short note on Side Bands and Band width of AM.
- Calculate the modulation index of an FM Wave Which has carrier swing of 160KHZ and has been modulated by a signal of 10KHZ.

PART – B (4x15 = 60 Marks) [Essay Answer Type] Note: Answer all questions from the following.

9 a) Draw the block diagram of Op-Amp and explain in detail. Describe the parameters of op-amp.

OR

OR

- b) Draw the circuit diagram of op-Amp in non inverting mode and derive the equation for its voltage gain.
- 10 a) Explain the working of Wein Bridge oscillator using op-amp with neat circuit diagram, and obtain its frequency of oscillations.
 - b) Draw the Block diagram of IC 555 Timer and describe its working.

11(a) What is amplitude modulation? Show that an AM wave contains a carrier and two side bands for every modulating frequency?

OR

- b) Explain the salient features of amplitude modulation with the help of appropriate wave forms. Give the theory and working of diode detector to detect the AM signals.
- 12, a) Give the analysis of frequency modulation. Describe the working of FM Discriminator with circuit diagram

OR

b) Draw the block diagram of FM radio receiver. Explain the significance of each block.

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Code No. 7112 / E

FACULTY OF SCIENCE

B.Sc. IV-Semester (CBCS) Examination, May / June 2018 Subject: Mathematics (SEC-2) Paper – IV Transportation and Game Theory

Time: 11/2 Hour

Max.Marks: 40

Note: Answer all questions. Each question carries equal marks.

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

1 a) Explain Russell's approximation method.

OR

- b) Write the mathematical model for the assignment problem.
- 2 a) Define:
 - i) Two-person zero-sum game
 - ii) Saddle point
 - OR
 - b) Explain the minimax criterion in game theory.

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

3 a) Consider the transportation problem having the following parameter table.

	Ales.	ing.	Ľ	est	tina	tion		
	A Con		1	2	3	4	5	Supply
	1	1	2	4	6	5	7	4
	Sourco	2	7	6	3	Μ	4	6
	Source	3	8	7	5	2	5	6
	3	4	0	0	0	0	0	4
	Demand	ł	4	4	2	5	5	

Obtain an Initial BF solution by

i) North-West corner rule

ii) Vogel's Approximation method.

OR

b) Consider the assignment problem having the following cost table.

		Task			
		1	2	3	4
	Α	8	6	5	7
Assignee	В	6	5	3	4
Assignee	С	7	8	4	4
	D	6	7	5	6

- i) Draw the network representation of this A.P.
- ii) Formulate this problem as a T.P. by constructing the appropriate parameter table.

iii) Display this formulation on an excel spreadsheet.

iv) Use the Excel Solver to obtain an optimal solution.

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4 a) Find the saddle point for the game having the following payoff table.

		P	ayer 2		
	Strategy	1	2	3	
Distant 1	1	3	-3	-2	
Player 1	2	-4	-2	-1	
	3	1	(-1)	2	

Use the minimax criterion to find the best strategy for each player. Does this game have a saddle point? Is it a stable game?

OR

b) For each of the following payoff table, determine the optimal strategy for each player by successively eliminating dominated strategies.

Player 2

Player 1

Strategy 1 2 3 2 -3 1 1 1 1 2 2 0 -2 3 1

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19	A	B.A./B.Com/B.Sc. and B.S.W I-Year Homber 2018	
		Subject: General English	
	62	Paper-I Max Mark	ks: 8
	0	Iviax. mart	
	0	Time: 3 Hours PART – A (5X4=20 Marks)	
1 -	0	Note: Answer any Five of the following in about 100 words	
	0	the answer as directed	
	6	a) Radha was sitting in a park. (Identify and underline the collective noun).	
	69	b) Aof flowers. (Fill in the blank with a conective hour).	
2	())	c) Philosophy. (Identify and underline the root in the given word).	
	0	d) Pronounciation. (Correct the spelling)	
		2 Answer as directed.	
	•	a) One shouldn't betrayCounty. (Fin in the blank that appropriate	
	0	pronoun).	
	a a	c) Our team won the bockey champion. (Add appropriate suffix to the underlined	
	0	word)	
	0	a) Function. (Add an appropriate prefix to form the antonym of the given word).	
		3 Answer as directed.	
	٢	a) Whomyou meet this afternoon? (Fill in the blank with the correct	
	9	auxiliary verb).	
	(a)	b) That bookmy all time favorite.(Fill in the blank with the correct	
	6	auxiliary verb).	
		c) Shein the middle of her speech. (Choose between 'paws' and pause') The stopethe window pape. (Choose between 'brake':	
		break' and use the words in appropriate form).	
		d) They went away in the midst of	
	۲	correct suffix to 'celebrate).	
		4 Answer as directed.	
	æ	a) Give the past and past participle forms of the verb 'know'.	
		b) How have you been? (Fill in the blank with the correct form of 'do')	

- c) Many do a mistake out of carelessness. (Correct the underlined collocation).
- d) Necessity is the mother of _____. (Fill in the blank with the correct form of 'invent').

5 Answer as directed.

- a) cut (Write the phonetic transcription of the given word).
- b) cool (Write the phonetic transcription of the given word).
- c) Ultimate (Write the phonemic symbol of the underlined diphthong).
- d) reason (Transcribe the sound of 's' in the given word using IPA symbols).
- 6 Expand the following topic sentence into a paragraph.

Pen is mightier than sword.

- 7 Arrange the following sentences in a logical sequence.
 - a) Practicing requires self discipline, hardwork, and commitment.
 - b) Merit-holders in board examinations achieve such marks by studying and revising every day.
 - c) If you learn from your mistakes you will steadily improve.
 - d) 'Practice makes perfect' is applicable to the world of academics as well as the other fields.
 - e) Be it a musician, sportsman or an artist, all excel only through regular practice.
- 8 Complete the following conversation.

A: Hi! I am Radha, I am looking out for someone from my commerce class to borrow the English text.

A: Sorry, but I was wondering if you could let me take it for this class.

B:-----

A: Thank you very much, I shall give it back right after the class.

PART - B (5X12 = 60 Marks) Note: Answer all the questions in about 300 words

9 a) Bring out the differences between the characters of Charlie and Dorothy.

OR

- b) What is the significance of the title 'The Curb in the Sky'?
- 10 a) According to Inge, what makes some people happy and why?

OR

b) What lesson can you learn from the story of the ambassador and his servant in Inge's essay? Contd....3..

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6	11 a) What picture of life does Longfellow present and why?
Ø	b) Is 'Psalm of Life' by Longfellow pessimistic or optimistic? State your reasons.
0	12 a) Justify the title of the play <i>The Dear Departed</i> .
Ø	b) Why does Amelia keep reprimanding her daughter Victoria in the play
8	The Dear Departed?
e	13 a) What is Chindu Bhagavatam and who popularized it? OR
6	b) What is self-confidence and what are its advantages?
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Code No: 7114/E/R FACULTY OF SCHENCE B.Sc. IV - Semester (CBSC) Examination, June 2018 Subject: Mathematics Paper: IV Algebra Time: 3 Hours Max. Marks: 80 SECTION – A (5 x 4 = 20 Marks) (Short Answer Type) Note: Answer any Five of the following questions 1. Write all subgroups of the group Z_{30} and indicate their orders. 2. For n>1, show that the alternating group A_n has order $\frac{m}{2}$ 3. If G is a group and H is a sub group of index 2 in G. then show that H is a normal subgroup of G. 4. If G is an abelian group and H is a normal subgroup of G then show that $\frac{G}{w}$ is also an abelian group. 5. Define idempotent element in a ring R. Find all idempotent elements in the ring $(Z_{10}, +_{10}, X_{10})$ 6. If I_1 and I_2 are any two ideals in a ring R, then show that $I_1 \cap I_2$ is always an ideal of R. 7. If $f(x) = 1+2x+3x^2$, $g(x) = 2+3x+4x^2+x^3$ then evaluate f(x)+g(x), f(x).g(x) in the ring $Z_5[x].$ 8. Let R be a commutative ring of characteristic 2 then show that the mapping $\phi: R \rightarrow R$ Defined by $\phi(a) = a^2 \forall a \in \mathbb{R}$ is a homomorphism. SECTION B (4x15=60 Marks) (Essay Answer Type) 9. (a) (i) Let G be a group and H, K be two subgroups of G. Then show that HK= {hk|h $\in H, K \in K$ } is a subgroup of G. (ii) Let G be a group and a \in G is such that o(a) = n then show that $o(a^k) = \frac{n}{\gcd(n,k)}$ (where k is a positive integer) OR (b) (i) If $a_1 = (a_1, a_2, a_3, \dots, a_m)$ and $\beta = (b_1, b_2, b_3, \dots, b_n)$ are any two disjoint permutations then show that $\alpha\beta = \beta\alpha$ (ii) Let $\alpha, \beta \in S_6$ and $\alpha = (124536), \beta = (143256)$ then evaluate $\alpha, \beta, \alpha\beta^{-1}, \alpha^2$ 10. (a) Let G be a group and a,b ∈ G and H is a subgroup of G then show that (i) $aH = bH \Leftrightarrow a \in bH$ (ii) ah is a sub group of $G \Leftrightarrow a \in H$. OR (b) Let G be a finite abelian group and P be a prime that divides the order of G then show that G has an element of order P. 11.(a) (i) Show that every finite integral domain is a field. (ii) Define characteristics of a ring R with unity. Show that the characteristics of an Integral domain is either zero or a prime. OR

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6	Code No. 7010
6	FACULTY OF SCIENCE B.Sc. I-Semester (CBCS) Examination, December 2017
6	Subject : Electronics
0	Paper – I : Circuits Analysis Max. Marks: 80
6	$PART - A (5 \times 4 = 20 Marks)$
0	(Short Answer Type) Note : Answer any FIVE of the following questions.
C	Derive the expression for RMS value of AC current.
0	2 What is complex impedance?
C	4 State Norton's theorem.
6	5 Explain different types of filters. 8 Explain the working of RC integrating circuit with neat diagrams.
6.	7 Explain the phenomenon of resonance.
	B Explain in action of nucleocon concerns and a second sec
(P)	(Essay Answer Type)
	Note: Attempt ALL the questions.
	(a) State and prove Kirchoff's current law. For the following circuit. Find the current flowing through the voltage source.
()	700 K.m. 1
6)	300V - SISKA S.
e	
8	K K K
Q	OR
0	(b) What do you mean by node voltage method of analysis? Explain. Find the voltage V _{ab} between points 'a' and 'b' in the following circuit of the method of node-
\bigcirc	voltage analysis.
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10 (a) State and prove Thevenin's theorem.

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OR
 (b) State and prove maximum power transfer theorem. Find the value of R_L for maximum power in the following circuit.



OR

- (b) What is a high pass filter? Derive an expression for the cutoff frequency of high pass RC circuit with necessary figures.
- 12 (a) Derive an expression for resonance frequency and quality factor of a series LCR circuit.

OR

(b) Draw the diagram of CRT and briefly explain function of each part.

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6	FACULTY OF SCIENCE
Â	B.Sc. III-Semester (CBCS) Examination, November / December 2018
6	Subject : Mathematics
6	Paper – III : Real Analysis (DSC)
G.	Time : 3 Hours Max. Marks: 80
0	$PAPT = A (5 \times 4 = 20 \text{ Marks})$
e	(Short Answer Type)
62	Note : Answer any FIVE of the following questions.
63	1 Determine the limit of the sequence $\{s_n\}$, where $s_n = \sqrt{n^2 + 1} - n$.
69	2 Let t ₁ =1 and t _{n1} = $\frac{t_n^2 + 2}{t_n}$ for n ≥ 1. Find the lim t _n .
0	$2t_n$
0	3 If $a_n = \sin\left(\frac{n\pi}{3}\right)$ then find lim sup a_n and lim inf a_n .
0	4 Show that $\sum_{n=1}^{\infty} \frac{1}{n}$ converges if and only if $p > 1$.
•	$n=2 n(\log n)^p$
۲	5 For n = 0, 1, 2, 3,, let $a_n = \left(\frac{4+2(-1)^n}{5}\right)^n$. Find lim sup $(a_n)^{\frac{1}{n}}$ lim inf $(a_n)^{\frac{1}{n}}$.
	6 Let $f_n(x) = \frac{1 + 2\cos^2 nx}{\sqrt{n}}$. Prove that {f _n } converges uniformly to 0 on R .
(II)	7 Prove that every continuous function f on [a, b] is integrable.
	27
()	8 Show that $\left \int_{2\pi} x^2 \sin^3(e^x) dx \right \leq \frac{16\pi}{3}$.
()	
Ø	PART – B (4 x 15 = 60 Marks) (Essay Answer Type)
	Note: Answer ALL the questions.
()	9 (a) (i) If (s_n) converges to s, (t_n) converges to t, then prove that (s_n, t_n) converges
0	(ii) If (s _n) converges to s and s _n \neq 0 for all n, and if s \neq 0, then show that
()	$\left(\frac{1}{s}\right)$ converges to $\frac{1}{s}$.
6	(s _n) or
	(b) (i) Prove that $\lim_{n \to \infty} a_n = 0$ if $ a < 1$.
	(ii) Prove that $\lim n^n = 1$.
Ain	$n \rightarrow \infty$

- 10 (a) (i) If the sequence (s_n) converges, then prove that every subsequence converges to the same limit.
 - (ii) State and prove Bolzano-Weierstrass theorem.

OR

- (b) If (s_n) converges to a positive real number s and (t_n) is any sequence then prove that lim sup $s_n t_n = s \lim sup t_n$.
- 11 (a) Let (f_n) be a sequence of functions defined and uniformly Cauchy on a set $S \subseteq \mathbf{R}$. Then prove that there exists a function f on S such that $f_n \rightarrow f$ uniformly on S.

OR

(b) Derive an explicit formula for $\sum_{n=1}^{\infty} n^2 x^n$ for |x| < | and hence evaluate

 $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$

12 (a) Let f be a bounded function on [a, b]. If P and Q are partitions of [a, b] and $P \subset R$, then prove that

$$L(f, P) \le L(f, Q) \le U(f, Q) \le U(f, P).$$

(b) Prove that a bounded function f on [a, b] in Riemann integrable on [a, b] ⇔ it is Darboux integrable, in which case the values of the integrals agree.