

1E2004**1E2004**

B. Tech. I Semester (Back) Examination, Dec. 2018
104 Engineering Chemistry

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What is coke? Explain the manufacturing of coke by Beehive oven method. (8)
- b) What is synthetic petrol? Explain it by Fischer Tropsch process. (8)

OR

2. a) Write short notes on any two-
 - i. Octane number
 - ii. Oil gas
 - iii. Coal gas (2×4=8)
- b) Explain Refining of petroleum crude. (8)

Unit - II

3. a) Explain High and low calorific value of fuel. How will you determine calorific value of gaseous fuel by Junker's calorimeter. (8)
- b) Write short notes on any two
 - i. Flue gas Analysis
 - ii. Ultimate Analysis
 - iii. Proximate Analysis. (2×4=8)

OR

4. a) Describe the Bomb calorimeter for the determination of calorific value of solid fuel and explain corrections also. (8)

- 2
- b) A coal sample found to have following composition.

C = 76%, H = 8.0%, O = 5.2%, N = 3.0%

Ash = Rest. Calculate minimum amount of oxygen and air required (by weight) for complete combustion of 1 Kg of coal. Calculate amount of Air required if 60% excess air is supplied. (8)

Unit - III

5. Write short notes on following.

- i. Neoprene rubber and its vulcanization
- ii. Buna - S
- iii. Buna - N
- iv. Butyl Rubber

(4×4=16)

OR

6. a) Discuss the free radical polymerization mechanism. (8)
- b) Explain the manufacturing properties and uses of fullerenes. (8)

Unit - IV

7. What is portland cement? Describe the manufacturing of cement by Rotary Kiln Technology. (16)

OR

8. Write the short notes on following

- i. Optical fiber grade glass
- ii. Annealing in glass
- iii. Role of gypsum
- iv. Basic constitutions and composition of cement.

(4×4=16)

Unit - V

9. a. What is refractory? Describe properties of refractories. (10)
- b. Explain silica refractory. (6)

OR

10. Explain following-

- i. Classification of lubricant
- ii. Viscosity and its measurement
- iii. Cloud and pour point
- iv. Flash and fire point.

(4×4=16)

1E2207	Roll No. _____	[Total No. of Pages : 2]
	1E2207	
B.Tech. I Semester (Back) Examination, Dec. - 2018 CE-101 Environmental Engineering and Disaster Management		

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 28

Instructions to Candidates:

*Attempt any **five** questions, including **Question No.1**, which is **compulsory**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

1. **Compulsory.** Answers for each sub - question be given in about **25** words.
(8×2=16)
 - a) What do you mean by environmental engineering? (2)
 - b) What are the adverse effects of environmental protection? (2)
 - c) Explain biotic and Abiotic environment. (2)
 - d) Write down the various laws made for protection of environment. (2)
 - e) Describe the different control strategies. (2)
 - f) Describe the ecosystem with its components. (2)
 - g) What are the basic laws of Bio - diversity? (2)
 - h) Describe the population dynamics. (2)
2.
 - a) Explain the methods of Assessment of ground water yield. (8)
 - b) What are the various unit operations and processes in waste water treatment? (8)
3.
 - a) Explain the different ways and means of collection, transportation and treatment of solid waste. (10)
 - b) Describe the term composting, it's methods and advantages. (6)

4. a) Describe the classification of Air pollution based on position of sources. (8)
b) Describe the methods of controlling the automobile pollution. (8)
5. a) What are natural calamities? (8)
b) How do you prevent volcano eruption? (8)
6. a) What are principles of disaster management? (10)
b) What are the examples of man - made disaster? (6)
7. Write short notes on : -
- i) Industrial hazards. (4)
 - ii) Fire hazards. (4)
 - iii) Nuclear accidents. (4)
 - iv) Preventive measures of disaster management. (4)
-

1E2408

Roll No. _____

[Total No. of Pages : **3**]**1E2408**

B.Tech. I - Semester (Main) Examination, Dec. - 2018
ESC
1FY3-08 Basic Electrical Engg.

Time : 2 Hours**Maximum Marks : 80****Instructions to Candidates:**

Attempt all **five** questions from **Part A**, selecting **four** questions from **Part B** and **two** from **Part C**. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

All questions are **compulsory**. (Short answer questions up to **25** words).

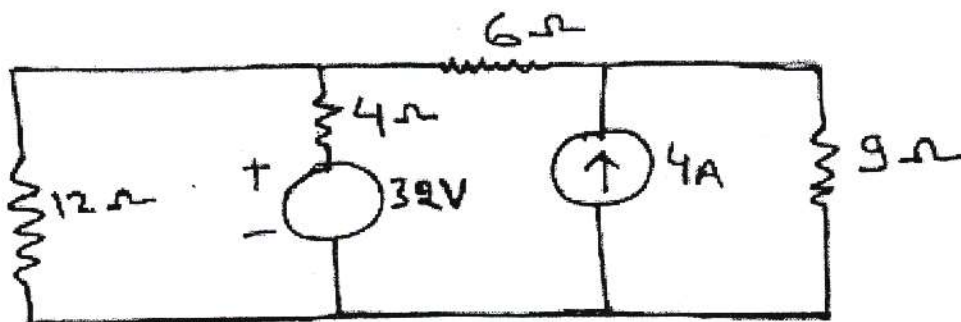
(5×2=10)

1. How do you find Thevenin's resistance?
2. Explain the concept of RMS value.
3. Define Faraday's law of Induction.
4. Explain the term "slip".
5. What do you mean by earthing?

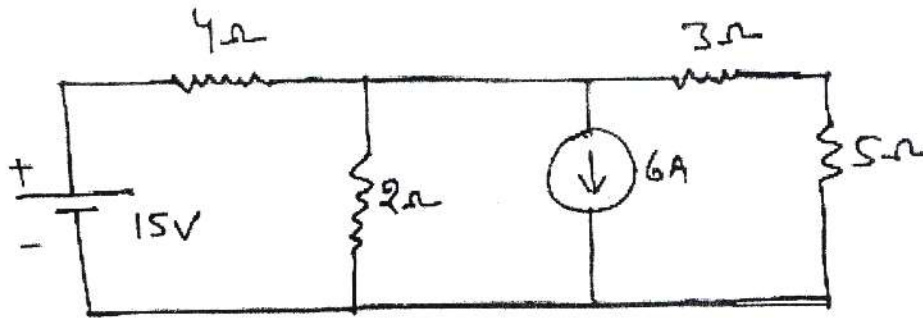
Part - B

Attempt any **four** questions. (Analytical/Problems Solving Questions). (4×10=40)

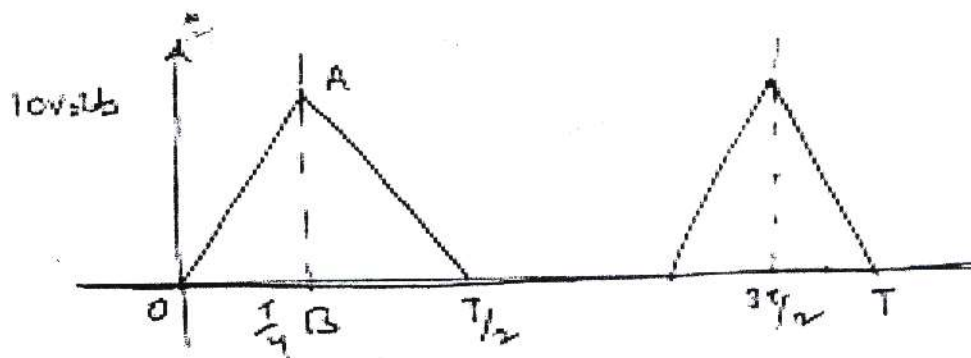
1. Compute the power dissipated in 9Ω resistor by applying superposition theorem.



2. Determine the current in 5Ω resistor using the Thevenin's Theorem.



3. Find the average and RMS values of the given wave shape over one cycle.

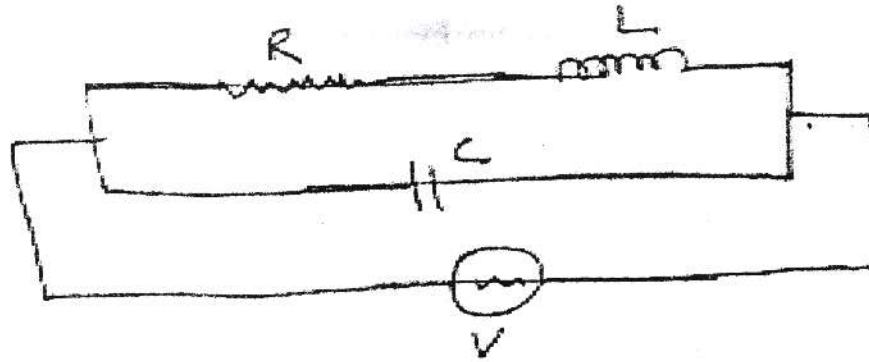


4. Explain in detail the construction, working principle and emf equation of a single phase transformer.
5. Draw and explain "Torque - slip" characteristics of a induction machine with all suitable diagrams and necessary equations.
6. Explain the constructional detail and operating principal of "DC-DC" converter.

Part - C

Attempt any **two** questions. (Descriptive/Analytical/Problem Solving/Design Question). (2×15=30)

1. Draw Frequency response curve of a
 - a) Series R-L-C circuit and discuss the effect of varying frequency over wide range upon the circuit parameters : R , X_L , X_C , X , Z , I and power factor with all necessary graphs. (10)
 - b) Prove that for the given circuit the resonant frequency $f_0 = \frac{1}{2\pi} \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$ (5)



2. a) Explain the construction and working of a single phase induction motor with all necessary diagrams and suitable equations. (8)
- b) Explain the starting and speed control methods of single - phase Induction motor with all necessary diagrams and suitable equation. (7)
3. Write short notes on following :
 - a) IGBT (5)
 - b) Synchronous generator (5)
 - c) Layout of LT switchgear (5)

1E2409	Roll No. _____	[Total No. of Pages : 2]
	1E2409	
	B.Tech. I semester (Main) Examination, Dec. - 2018 ESC 1FY3-09 Basic Civil Engg.	

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Attempt all five questions from Part A, selecting four questions from Part B and two from Part C. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

(Short answer questions up to 25 words). All question are compulsory. (5×2=10)

1. Discuss scope of civil engineering and give any two objects of civil engineering.
2. Write down the formula for tape correction due to - temperature and tape correction for sag.
3. Write down the different units of measurements.
4. Explain in brief the term R.C.C.
5. Define levelling and any one objects of levelling.

Part - B

(Analytical/Problem Solving Questions). Attempt any four question. (4×10=40)

1. Convert the following whole circle Bearing of lines in to quadrantal Bearing system as :
 - i) 35°
 - ii) 115°
 - iii) 210°
 - iv) 315°

2. The following readings were observed with a 4 metre levelling staff and a dumpy level. Calculate the reduced level by Height of Instrument (H.I.) method. Also apply a arithmetical check. The reading given in table as :

STATION	B.S.	I.S	F.S	H.I.	R.L	REMARK
A	3.25				210.00	B.M.
B		3.15				
C		3.25				
D		2.95				
E			2.85			

3. Explain Fundamental principles of surveying upon which the various methods of surveying is based? Explain how will you fix a point C in the field in relation to two points 'A' and 'B' which is already fixed in the field.
4. What are the various safety measures will you take during accidents, in civil construction and in Traffic.
5. Describe impact of Infrastructural development on economy of country and role of civil engineer in society.
6. Explain Hydrological cycle with neat sketch.

Part - C

(Descriptive/Analytical/Problem Solving/Design Question). Attempt any two question. (2×15=30)

1. Explain various components of buildings along with their functions.
2. State Building Bye laws. Explain various types of buildings along with their functions.
3. Describe Reuse and saving of water. Also explain Rain water harvesting with neat sketch.
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1E2407	Roll No. _____	[Total No. of Pages : 3]
	<div style="border: 1px solid black; display: inline-block; padding: 5px 20px; font-weight: bold; font-size: 1.1em;">1E2407</div>	
	B. Tech. I Semester (Main) Examination, Dec. - 2018 ESC 1FY3-07 Basic Mechanical Engineering	

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates :

*Attempt all five questions from **Part A**, selecting four questions from **Part B** and two from **Part C**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Part - A

(All questions compulsory)

Short answer questions (up to 25 words)

(5×2=10)

1. Differentiate between Boyle's law and Charle's law.
2. Describe second law of Thermodynamics.
3. Define the properties of Lubricating oil or Lubricant.
4. Write the comparison between hot working and cold working processes.
5. What do you understand by the following?
 - i) Chamfering ii) Baring

Part - B

(Attempt any four questions)

Analytical / Problem solving questions

(4×10=40)

1. a) A V-belt of 6.4 Cm³ cross-section has a groove angle 30° and the angle of lap of 165°. The frictional co-efficient is 0.1. The weight of the V-belt is 1.4 Kg/ meter run. The maximum safe stress is 3 N/mm². Calculate the power transmitted at the velocity of 20 meter/sec. **(5)**
- b) Explain clearly what is meant by 'entropy' of a gas show on the FS diagram isothermal and adiabatic processes. **(5)**

- 11
2. a) Why is cooling of I.C. engines done? Describe briefly the various cooling methods used in I. C. engines. (5)
 - b) Explain the working of surface condenser. (5)
 3. a) Write short note on Comfort air Conditioning. (5)
 - b) What are the advantages and disadvantages of Chain drive over belt drive? (5)
 4. a) Differentiate between Homogeneous & Heterogeneous systems. (4)
 - b) Differentiate between welding, brazing and soldering processes. (6)
 5. a) What are the advantages of artificial draught system over natural draught system? (5)
 - b) Derive expression of indicated power for a single stage reciprocating air compressor. (5)
 6. a) Explain the various pattern allowances used in foundry. (5)
 - b) Explain the various engineering materials properties. (5)

Part - C

(Attempt any two)

Descriptive / Analytical / Problem solving / Design question

(2×15=30)

1. a) A four cylinder petrol engine of 250mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 0.01052m^3 . The initial pressure and temperature are 1 bar and 47°C . If the maximum pressure is limited to 25 bar, find the following.
 - i. The air standard efficiency of the cycle.
 - ii. The mean effective pressure for the cycle. (10)
- b) The distance between two bearing of a shaft which transmits 200 h. p. at 250 rpm is 250 cm. It is subjected to torsion only. Determine the diameter of the shaft for steady loading if the safe shear stress is 400 Kg/cm^2 . (5)
2. a) Describe the procedure for making green sand mould with the help of a sketch. (7)
- b) A Fluid system under goes a non- flow frictionless process from $V_1 = 0.12\text{m}^3$ to $V_2 = 0.04\text{ m}^3$ in accordance with $V = \frac{4.5}{p} - 2$ where p is in bar and V is in m^3 . During the process, the fluid system rejects 40kJ of heat. Determine change in enthalpy and internal energy. (8)

- 12
3. a) Define steam boiler & write different types of Boiler (5)
- b) 2 kw of power is transmitted by an open belt drive. The linear velocity of belt is 2 m/s. The angle of lap on the smaller pulley is 160° . The coefficient of friction is 0.25. Determine the effect on power transmission in the following cases:
- i. Initial tension in the belt is increased by 8%
 - ii. Initial tension in the belt is decreased by 8%
 - iii. Angle of lap is increased by 8% by the use of an idles pulley, for the same speed and the tension on the tight side.
 - iv. Coefficient of friction is increased by 8% by suitable dressing to the friction surface of the belt. (10)
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1E2005

Roll No. _____

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1E2005

B.Tech. I - Semester (Back) Examination, Dec. - 2018
105 Basic Electrical and Electronics Engg.

Time : 3 Hours

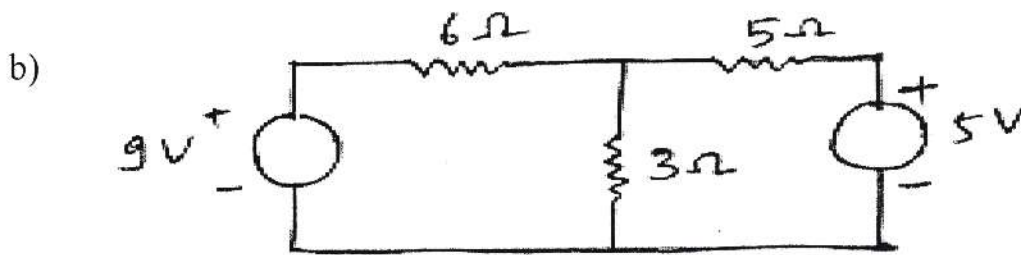
Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

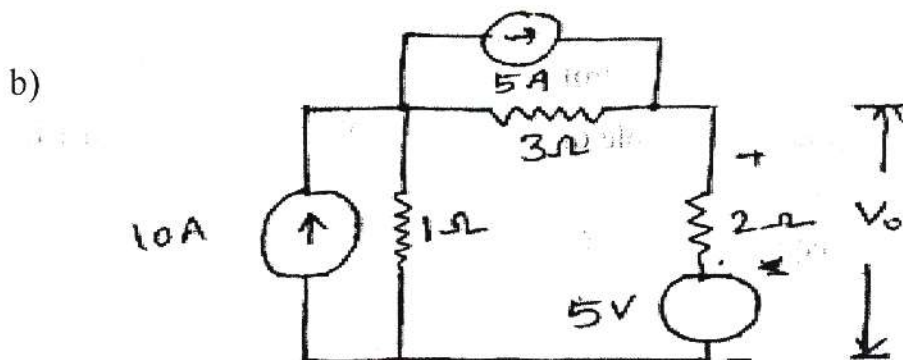
1. a) State and explain superposition theorem with a suitable example. (8)

*Fig. 1*

Using Thevenin's theorem find the value of current in 5Ω resistor in fig.1. (8)

OR

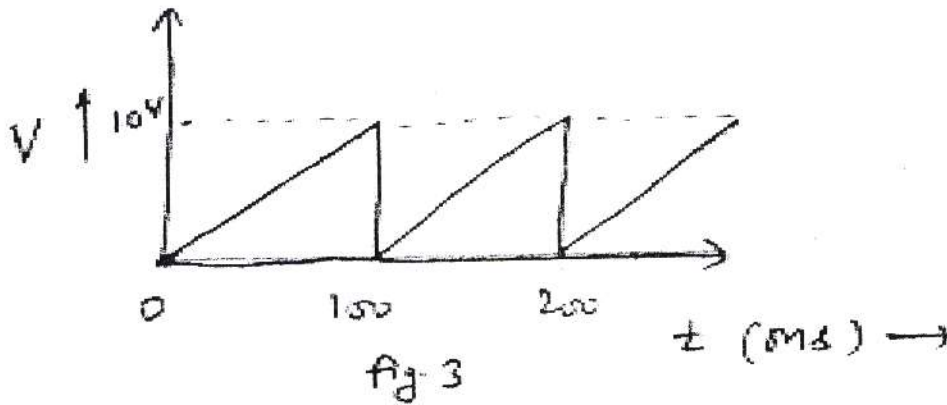
1. a) State and explain Thevenin's theorem with a suitable diagram. (8)

*Fig. 2*

Using Superposition theorem, find the value of the output voltage V_o in the circuit of fig.2. (8)

Unit - II

2. a) A periodic voltage waveform is shown in fig 3.



Determine

- i) frequency of the waveform.
 - ii) wave equation for $0 < t < 100$,
 - iii) r.m.s value
 - iv) Average value and form factor. (8)
- b) Write short note on followings :
- i) form factor
 - ii) peak factor (8)

OR

2. a) Derive an expression for resonant frequency for a series R-L-C circuit. (8)
- b) In a particular R-L series circuit a voltage of 10 V at 50 Hz produces a current of 700 mA while the same voltage at 75 Hz produces 500 mA. What are the values of R and L in that circuit? (8)

Unit - III

3. a) Explain the working principle of a d.c. motor. What is back e.m.f.? Explain the significance of back e.m.f. (8)
- b) Derive torque equation of a D.C. motor. (8)

OR

3. a) Write a short note on the types of D.C. motors. (8)
- b) Derive an expression for the emf of a d.c. generator. (8)

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Unit - IV

4. a) How transistor works as an amplifier? Explain. (8)
- b) Explain common emitter configuration of transistor with input and output characteristics. (8)

OR

4. a) How transistor works as an emitter follower? Explain. (8)
- b) When the emitter current of a transistor is changed by 1mA, its collector current is changed by 0.995 mA. Calculate
- a) its common - base short circuit current gain α .
- b) its common - emitter short circuit current gain β . (8)

Unit - V

5. Write a short note on any **two** of followings :

- i) Amplitude modulation.
- ii) Classification of ICs.
- iii) Load cell

(2×8=16)

OR

5. Write a short note on any **two** of followings :

- i) Frequency modulation.
- ii) Strain gauge.
- iii) Thermocouple

(2×8=16)

1E2406	Roll No. _____	[Total No. of Pages : 2]
<div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px;">1E2406</div>		
B.Tech. I semester (Main) Examination, Dec-2018 ESC 1FY3-06 Programming for Problem Solving		

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates:

*Attempt all **five** questions from **Part A**, **four** questions out of six from **Part B** and **two** out of three from **Part C**. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Part - A

(Short answer questions up to **25** words). All questions are **compulsory**.

(5×2=10)

1. Write the difference between High - Level language and Low - Level language. (2)
2. Write the various elements of C language (C-Tokens). (2)
3. Write the syntax of switch - case statement in C language. (2)
4. Write the difference between assignment operator and equality operator. (2)
5. What is an array. Write the syntax of an array declaration in C language. (2)

Part - B

(Analytical/Problems Solving Questions). Attempt any **four** question. (4×10=40)

1. What do you mean by identifiers? Write the rules for identifier declaration in C.(10)
2. Write a program in C language to determine the youngest of three boys i.e. shyam, ajay and mohan, if their ages are input through the keyboard. (10)
3. Write a program to print the table of any given input number N. (10)
4. Define a pointer. Write a program to swap two integer variables using pointer.(10)

5. Perform the following :-

(5×2=10)

a) $(1101.101)_2 = (?)_{10}$

b) $(743.91)_{10} = (?)_8$

c) $(A1B2.6C)_{16} = (?)_{10}$

d) $(10111010)_2 + (10101)_2 = (?)_2$

e) $(1011011)_2 - (110101)_2 = (?)_2$

6. Write the programmes to print following patterns using loop :

(2×5=10)

a) *

* *

* * *

* * * *

b) 1

0 1

1 0 1

0 1 0 1

Part - C

(Descriptive/Analytical/Problem Solving/Design Question). Attempt any two question.

(2×15=30)

1. Discuss the difference between call by value and call by reference parameter passing technique with suitable examples. (15)
2. Explain the concept of file handling in C Language. Write a program to copy the data from source file to destination file. (15)
3. Discuss the uses of structure and pointer to structure with suitable examples. (15)

1E2206	Roll No. _____	[Total No. of Pages : 2]
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	B.Tech. I Semester (Back) Examination, Dec. - 2018 CS-101 Computer Programming	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 28

Instructions to Candidates:

Attempt any five questions, including Question No.1, which is compulsory. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Compulsory. Answers for each sub - question be given in about 25 words.

(8×2=16)

1. Explain in brief.

- a) Flow chart & pseudo code.
- b) Formatted input and output functions.
- c) Constants in 'C'.
- d) ASCII & EBCDIC code.
- e) Data type conversion.
- f) Keywords in 'C'.
- g) Function call & function definition.
- h) Iteration.

2. a) Explain the block diagram of computer, also explain its different parts. **(8)**

b) Differentiate between :

- i) Low level and high level programming language.
- ii) Primary memory and secondary memory.

(8)

- 19
3. a) Explain the looping statement with types, syntax and examples. (8)
b) Explain the break, goto and continue statement with examples. (8)
 4. a) Explain recursion with an example. (8)
b) Convert the followings :
 - i) $(568)_8 = ()_{10}$
 - ii) $(2AB)_{16} = ()_2$
 - iii) $(11010011)_2 = ()_8$
 - iv) $(269)_{10} = ()_{16}$ (8)
 5. a) Explain the different decision making statements in 'C' with examples. (8)
b) Write a program in 'C' to find the minimum number among three given numbers using nested if - else. (8)
 6. a) Explain the structure of a 'C' program. Write the advantages of modular programming. (8)
b) Explain the different datatypes in 'C' programming language. (8)
 7. a) Explain the function and different techniques of parameter passing. (8)
b) Write a program in 'C' to exchange the values of two variables using a function. (8)



Roll No. _____

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1E2203**1E2203**

B.Tech. I semester (Main/Back) Examination, Dec - 2018
HU-103 Human Values

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 28****Instructions to Candidates:**

Attempt any five questions, including Question No.1, which is compulsory. All questions carry equal marks. (Schematic diagrams, must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

1. Compulsory.**(8×2=16)**

- a) Why there is a need of value education.
- b) Define self exploration.
- c) What is happiness?
- d) What do you mean by 'sukh' and 'Suvidha'?
- e) Define Will power and self discipline.
- f) Explain the feeling of 'care'.
- g) What is 'Justice'?
- h) Define harmony in nature.

2. What do you mean by human values? Explain.

(16)

3. What do you understand by the terms 'saratva', 'swatantrata' and 'swarajaya'? Explain.

(16)

4. What is the difference between prosperity and wealth? What is more acceptable to us and why?

(16)

5. Explain the concept of holistic perception of harmony in existence.

(16)

6. What are the values necessary for human relationship? Explain each briefly. (16)
7. How do the current world scenario lead to contradictions and dilemmas in professional life? Explain. (16)



1E2202	Roll No. _____	[Total No. of Pages : 2]
<div style="border: 1px solid black; display: inline-block; padding: 5px 15px; margin: 0 auto; width: 100px;">1E2202</div> <p style="margin: 10px 0;">B.Tech. II semester (Back) Examination, Dec. - 2018</p> <p style="margin: 0 0 10px 0;">HU-101 Communication Skills</p>		

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt any **five** questions, including **Question No.1**, which is **compulsory**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

1. Compulsory. Answers for each sub - question be given about **25** words.
(8×2=16)

- a) Define the term 'communication'.
- b) What is meant by 'barriers in communication'?
- c) Explain the essentials of qualities of good communication.
- d) Mention few techniques to over come the barriers to communication?
- e) What do you understand by 'Interpersonal communication'?
- f) What does the title of the poem "where the mind is without fear" mean?
- g) What are the formal and informal channels of communication?
- h) Portray the character of the lady in the short story "The Luncheon" in short, in your own words.

2. Change the following sentences into passive voice. **(8×2=16)**

- a) Accidents kill thousands of people every year.
- b) The news casters telecast the news at 8.00pm.
- c) You have not yet informed me.
- d) They held the gathering near the temple.
- e) Please listen to me.
- f) Do not park your vehicle here.

- g) The nurse is giving the medicine to the patient.
- h) The director called for a meeting.
3. Write an application for the post of Assistant Professor, accompanied with a detailed CV, inventing all the relevant details. (16)
4. Write a paragraph on any **one** of the following topics : (16)
- a) Woman empowerment A cause for increasing divorce rate in India.
- b) Hard work embedded with smart work leads to success.
5. Describe the use of irony, and humour in "The Luncheon" by Somerset Maugham. (16)
6. Explain the poem with reference to the context. (16)
- "Remember, no men are strange, no countries foreign Beneath all uniforms, a single body breathes life ours ; the land our brothers walk upon Is earth like this, in which we all shall lie. They, too, aware of sun and air and water, Are fed by peaceful harvests, by war's long winter starv'd".
7. Describe the types of communication along with the techniques to overcome the barriers to communication. (16)

OR

Describe the different channels of communication. Distinguish between formal and informal channels of communication. (16)



Roll No. _____

[Total No. of Pages : 3]

1E2001**1E2001**

B.Tech. I semester (Back) Examination, Dec. - 2018
101 Communication English

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - IAnswer any **four** sections of the following sections :**(4×4=16)****Section - A****I.** Put the suitable form of verbs in the following sentences:**(4)**

1. He _____ (cash) a cheque every month.
2. The play _____ just (begin). You are a little late.
3. Prince _____ (break) his leg in a accident last year.
4. I _____ (remember) this day all my life.

Section - B**II.** Turn the following sentences into passive voice :**(4)**

1. Ram has posted the letter.
2. Most people opposed this.
3. Was he writing the book?
4. They looked after the baby.

Section - C**III.** Put the following into indirect speech:**(4)**

1. He said, "My wife has just been made a judge".

2. "Are you interested in acting"? asked Mary.
3. "Wash it in lukewarm water", the assistant recommended to me.
4. John Keats said, "A thing of beauty is a joy forever".

Section - D

IV. Put the verbs in brackets into the correct tense : (4)

1. If she _____ (need) a book she can borrow mine.
2. If he _____ (know) the whole story he would not have been so angry.
3. If I found her address I _____ (send) her an invitation.
4. If he is late we _____ (have) to go without him.

Section - E

V. Fill in the blanks with suitable modals : (4)

1. Students _____ solve this problem easily. (ability).
2. _____ you lend me your book? (polite request).
3. We _____ must win the match. (strong possibility).
4. _____ you both be happy ! (wish).

Unit - II

1. Write a paragraph of about 200 words in any one of the following topics: (8)

- I. Health is wealth
- II. Digital India
- III. Importance of industrial tour in technical institutes.

OR

Enumerate do's and don'ts of dialogue writing. (4+4=8)

2. Make a precis of the following passage : (8)

Trees give shade for the benefit of others, and while they themselves stand in the sun and endure the scorching heat, they produce the fruit of which others profit. The character of good men is like that of trees. What is the use of this perishable body if no use is made of it for the benefit of mankind? Sandal wood, the more it is rubbed, the more scent does it yield. Sugarcane, the more it is peeled and cut up into pieces, the more juice does it produce. The men who are noble at heart do not lose their qualities even in losing their lives. What matters whether men praise them or not? What difference does it make whether they die at this moment or whether lives are prolonged? Happen what may, those who tread in the right path will not set foot in any other. Life itself is unprofitable to a man who does not live for others. To live for the mere sake of living one's life is to live the life of dog and crows. Those who lay down their lives for the sake of others will assuredly dwell forever in a world of bliss.

26
OR

Write a report on the annual inter college sports meet organised in your college.

(8)

Unit - III

1. Draw a character sketch of lady's character in W.S. Maugham's story "The Luncheon". (8)

OR

How is "The Last Leaf" by O'Henry a story of hope, friendship and sacrifice?

(8)

2. Draw a character sketch of Behrman in O' Henry's story "The Last Leaf". (8)

OR

Write the summary of the story "How Much Land Does a Man Need"?

(8)

Unit - IV

1. Discuss Gandhiji as an internationalist. (8)

OR

'Liberty is not a personal affair only, but a social contract'. Discuss.

(8)

2. Write in detail the defects of our civilization. (8)

OR

Write the summary of the essay 'On the Rule of the Road'.

(8)

Unit - V

1. What message do you get from the poem 'The Unknown Citizen'? (8)

OR

Explain in detail Wotton's poem 'The Character of happy life'.

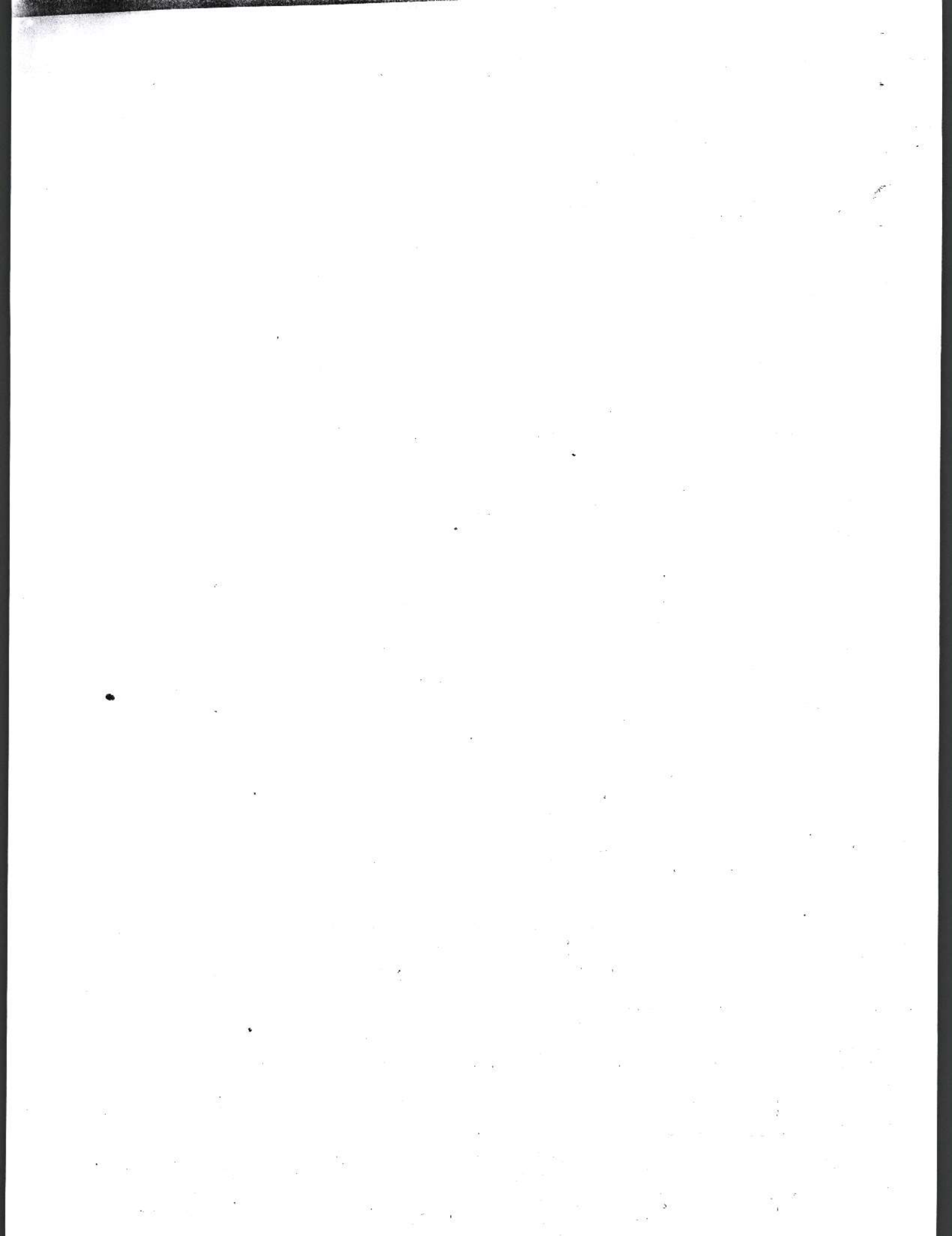
(8)

2. Discuss "If" as an inspirational poem. (8)

OR

Write the summary of the poem 'No Men are Foreign'.

(8)



1E2405	Roll No. _____	[Total No. of Pages : 2]
	1E2405	
	B.Tech. I Semester (Main) Examination, Dec. - 2018 HSMC 1FY1-05 Human Values	

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates :

Attempt All five questions from Part A, selecting four question from Part B and two from Part C. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

(All questions compulsory)

Short answer questions (up to 25 words)

(5×2=10)

1. What are the basic guidelines for value education?
2. What is meant by self exploration?
3. What do you understand by prosperity?
4. What are the three important needs of human beings?
5. What are the four orders in nature?

Part - B

(Attempt any four questions)

Analytical/Problem solving questions

(4×10=40)

1. Explain the process of self-exploration with the help of a diagram.
2. What do you mean by natural acceptance? Illustrate with examples. Is it invariant with time and place?
3. "Physical facilities are necessary and complete for animals, while they are necessary but not complete for humans". Comment on this statement with suitable examples in support of your views.

- 28
4. Distinguish between the needs of the self and the needs of the Body, with examples.
 5. Explain the nine feelings (values) in human relationships.
 6. Indicate a few feasible steps to promote harmony in the society and co-existence with nature.

Part - C

(Attempt any two)

Descriptive/Analytical/Problem solving/Design questions

(2×15=30)

1. Critically examine the prevailing notions of happiness and prosperity and their consequences.
 2. "The problem today is that the desires thoughts and expectations are largely set by pre-conditionings or sensations". Examine this statement critically.
 3. What is ethical human conduct? Explain it in terms of values, policies and character.
-

1E2404	Roll No. _____	Total No. of Pages : 2
	1E2404	
	B.Tech. I - Semester (Main) Examination, Dec. - 2018	
	HSMC	
	1FY2-04 Communication Skills	
	(Common for all Branches)	

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates:

*Attempt all **five** questions from **Part A**, **four** questions out of six questions from **Part B** and **two** questions out of three questions from **Part C**. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Part - A

(Answer should be given up to **25** words only). All questions are **compulsory**.
(5×2=10)

1. Mention two qualities of good communication.
2. What are modal verbs, give examples.
3. Define a Paragraph.
4. How did the woman know the narrator in "Luncheon"?
5. What does the poet, Rabindranath Tagore, mean by "Where knowledge is free"?

Part - B

(Analytical/Problem Solving Questions). Attempt any **four** questions. (4×10=40)

1. Discuss the media and types of communication giving suitable examples.
2. Define Reported Speech. Mention the rules for the conversion of direct speech into indirect speech giving apt examples.
3. Convert the following sentences into passive voice:
 - i. Did she recognize you.
 - ii. Who wrote this book?
 - iii. When will they announce the results?

- iv. Has he made all the necessary arrangements.
 - v. Whom did you invite?
 - vi. Please help me.
 - vii. I didn't see him leaving the office.
 - viii. The teacher always answers the students' queries.
 - ix. The maid vacuums and dusts the house regularly.
 - x. The fire will destroy the entire building.
4. Write a report on any **one** of the following (200 words) :
- Blood donation Camp organized in your college
- or
- Tree plantation drive started by the people of your colony.
5. Explain in detail how greed ruins the life of the main protagonist, Pahom, in Leo Tolstoy's "How Much Land Does A Man Need"?
6. "Beneath all uniforms." What uniforms do you think the poet is speaking about and how does he suggest that all people on earth are the same?

Part - C

(Descriptive/Analytical/Problem Solving/Design Question). Attempt any **two** questions. (2×15=30)

- 1. Describe in detail formal and informal Channels of communication, mentioning methods for improving interpersonal communication.
- 2. Give a detailed summary of the short story "The Night Train at Deoli" by Ruskin Bond.
- 3. Rajasthan Rajya Vidyut Utpadan Nigam Ltd has issued an advertisement No. RVUN/P&A/Rectt./04/2018-19 for the recruitment of junior engineers JE in power companies i.e. RVUN, RVPN, JVVN of Rajasthan. As an eligible candidate, write an application for a job accompanied with detailed CV. invent all relevant details.

1E2003

Roll No. _____

[Total No. of Pages : 3]

1E2003

B. Tech. I Semester (Main/Back) Examination, Dec. - 2018**103 Engineering Physics - I****Common to all Branch****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates :**

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) With the help of a neat diagram show an experimental arrangement to produce Newton's rings by reflected light. Prove that in reflected light the diameter of dark rings is proportional to the square root of the natural numbers. (4+4)
- b) Michelson interferometer experiment is performed with a source of light having two wavelengths 4882 \AA and 4886 \AA . Through what distance does mirror have to be moved between two positions that fringes disappear? (8)

OR

1. a) Write short notes on the following: (4+4)
 - i. Interference filter
 - ii. Anti reflection coating
- b) A convex surface of radius of curvature 1.0 m rests on a concave surface of radius curvature 2.0 m. If this system is used to observe Newton's rings under light of wavelength 600nm, find the difference in the squares of diameters in successive dark and bright rings. (8)

Unit - II

2. a) Explain idea of circularly and elliptically polarized light in terms of electric vector associated with light. Describe Laurent's half shade polarimeter giving its theory, construction and use. (4+4)
- b) What are quarter wave plates? Plane polarized light is incident on a quarter wave plates, discuss under which the plane polarized, circularly polarized light and elliptically polarized light are obtained. (2+6)

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OR

2. a) What is optical activity? Write the laws of optical active solution. (2+2)
- b) Discuss double refraction in calcite crystal. How can a phase retardation plate be obtained from it? (2+2)
- c) The refractive indices of right handed and left handed circularly polarized light of wavelength 7620 \AA for quartz are 1.53914 and 1.53920 respectively. Calculate the rotation of the plane of polarization of light in degrees produced by a plate of 0.5 mm thickness. (8)

Unit - III

3. a) What is plane diffraction grating? Show that the intensity of light diffracted from a plane transmission grating is given by

$$I = I_0 \left(\frac{\sin \alpha}{\alpha} \right)^2 \left(\frac{\sin N \beta}{\beta} \right)^2 \text{ where the symbols have their usual meanings. (2+6)}$$

- b) A source emits 531.62 nm and 531.81 nm light, (4+4)
- i. What minimum number of lines is required for a grating that resolves the two wavelengths in the first order spectrum.
- ii. Determine the slit spacing for a grating 1.32 cm wide that has required minimum number of lines.

OR

3. a) Explain Rayleigh criterion for resolution and apply it to distinguish between resolving power and dispersive power of a grating. (2+2)
- b) Outline the following for a plane transmission grating (2+2+2)
- i. Maximum orders of spectra obtainable.
- ii. Missing orders.
- iii. Overlapping spectra.
- c) The width of the slit is 0.012 mm. Monochromatic light is incident on it. The angular position of first bright line is 5.2° , calculate the wavelength of incident light. (6)

Unit - IV

4. a) Based on the band theory of solids, distinguish between conductors, semiconductors and insulators. (9)

- b) The x-ray analysis of a crystal is made with monochromatic x-ray. Two successive Bragg's reflection are obtained at angles of
- 13.5° and
 - 20.5°.

If the interplanar spacing of crystal is 2.57\AA , calculate the wavelength of x-rays. (7)

OR

4. a) What is Hall effect? Give an elementary theory of Hall effect. Mention some important uses of Hall effect. (2+4+4)
- b) Calculate the fermi energy for sodium. Given atomic weight 23.0 gm / mole and density of sodium 0.971 gm / cm^3 . (Assume one free electron / atom) (6)

Unit - V

5. a) Define inertial frame of reference and derive Lorentz transformation. (2+6)
- b) Calculate the percentage contraction of rod moving with a velocity 0.8 times the velocity of light in a direction at 60° to its own length. (8)

OR

5. a) Write down the postulates of special theory of relativity. Using Lorentz transformations, obtain the law of addition of velocities. (2+6)
- b) Show that the relativistic kinetic energy is given by $(m - m_0)c^2$ and it approaches to non relativistic energy for $v \ll c$. (All symbols have their usual meanings) (8)

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Roll No. _____

[Total No. of Pages : 3]

1E2204**1E2204****B.Tech. II Semester (Back) Examination, Dec. - 2018****Engineering Physics****PY-101****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 28****Instructions to Candidates:**

Attempt any **five** questions, including Question No.1, which is **compulsory**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Only ordinary calculator.

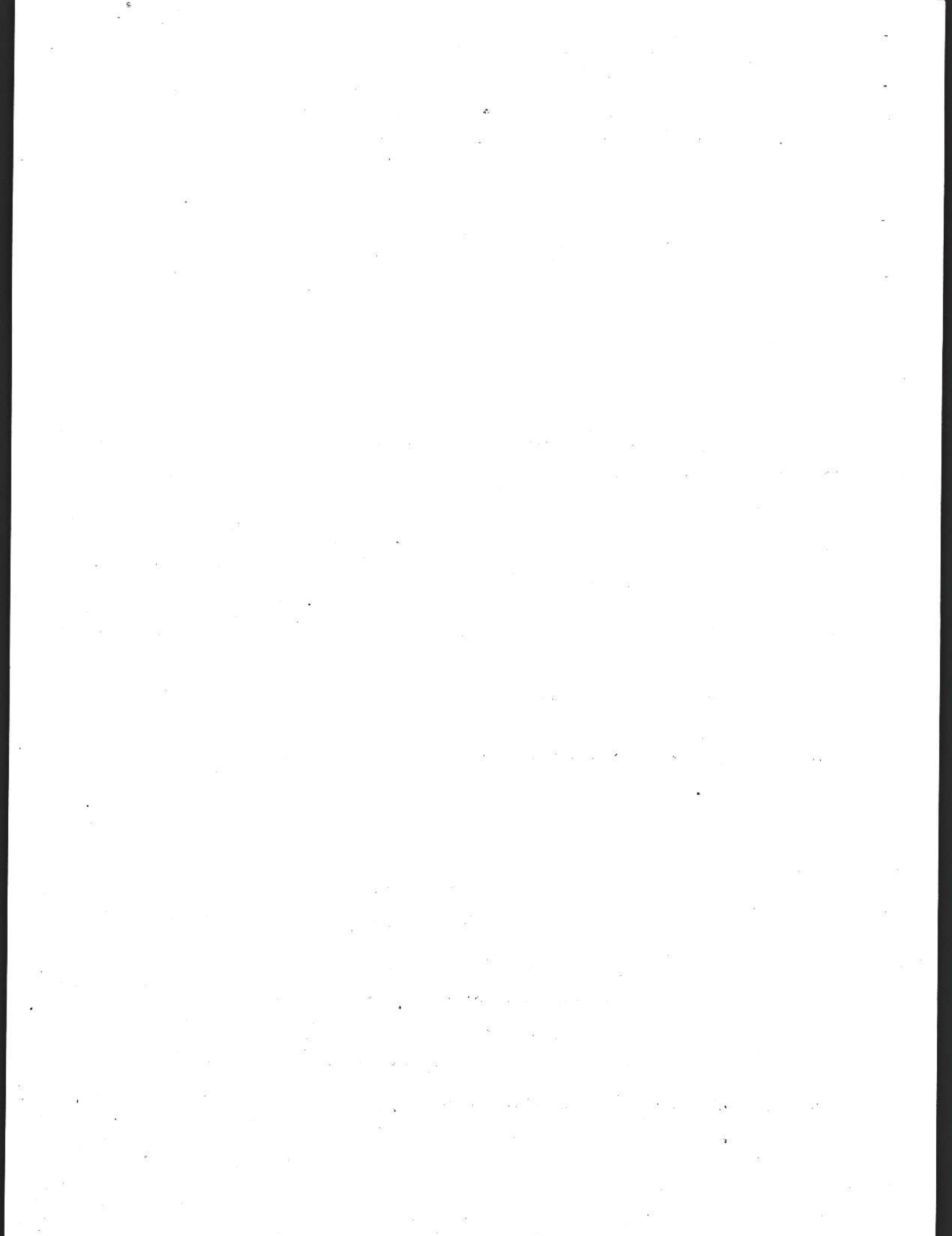
1. Compulsory. Answers for each sub - question be given in about **25** words.

(8×2=16)

- a) Why two coherent sources of light are required for sustained interference of light? (2)
- b) Why anti reflection coating is needed on glass lens? Write formulae for minimum thickness of coating and its refractive index. ($1+\frac{1}{2}+\frac{1}{2}=2$)
- c) What is the reason to draw large number of lines on glass plate to prepare a plane transmission grating. Explain using LPI = 7500. (1+1=2)
- d) On what factors the rate of stimulated emission depend? (2)
- e) Define specific rotation of cane sugar solution. Write the factors on which it
 - i) depends
 - ii) does not depends. ($1+\frac{1}{2}+\frac{1}{2}=2$)
- f) What do you mean by normalized and mutually orthogonal wave functions. (1+1=2)
- g) What are semiconductor lasers? (2)
- h) Explain valence band, conduction band and forbidden energy gap. ($1+\frac{1}{2}+\frac{1}{2}=2$)

- 35
2. a) Draw a schematic diagram of michelson interferometer and explain its working including
- need of compensating plate
 - point at which two coherent sources of light are generated by division of wave amplitude. How shall you use it to measure the wavelength of monochromatic light. Write necessary formula. (2+1+1+4=8)
- b) Prove that for anti reflection coating the refractive index of coating is given by $\mu_f = \sqrt{\mu_g}$, where μ_g is refractive index of glass. Why magnesium fluoride is used for coating on glass. (3+1=4)
- c) Michelson Interferometer experiment is performed with a light source having two wavelengths 5890 \AA and 5896 \AA . Through what distance does the mirror M_1 has to be moved between two positions of maximum distinctness of fringes? (4)
3. a) The intensity of light due to fraunhofer diffraction at a single slit is $I = I_0 \left(\frac{\sin \alpha}{\alpha} \right)^2$, where $\alpha = \frac{\pi}{\lambda} (a \sin \theta)$, a is width of slit. Find the conditions of positions and intensities for
- central maxima
 - principal minima and
 - secondary maxima. Prove that intensities of successive maxima are nearly in the ratio.
- $$1 : \frac{4}{9\pi^2} : \frac{4}{25\pi^2} : \frac{4}{49\pi^2} \dots$$
- (1+1+2+4=8)
- b) What are the uses of Nicol prism and quarter wave plate. How these two are used to distinguish polarisation of light having mixture of UPL, PPPL, PPL, CPL and EPL. ($\frac{1}{2} + \frac{1}{2} + 3 = 4$)
- c) If 20 cm, length of certain solution causes right handed rotation of 42° and 30cm length of another solution causes left handed rotation of 27° . What optical rotation will be produced by 30 cm length of mixture of above solutions in the volume ratio 1:2 (Assume the solutions are not chemically reactive). (4)
4. a) Discuss the theory of Hall effect and derive an expression for Hall coefficient. How Hall coefficient can be determined experimentally. (4+2+2=8)
- b) Derive Bragg's law for X rays diffractions and discuss Bragg's condition for X-ray diffraction. (3+1=4)

- c) Hall coefficient of specimen is $3.70 \times 10^{-4} \text{ m}^3 \text{ C}^{-1}$ and resistivity of specimen is $9.00 \times 10^{-3} \Omega \times \text{m}$. Find the mobility and density of charge carriers. (2+2=4)
5. a) Write time independent schrodinger equation for a particle in a rigid one dimensional box and solve it with proper boundary conditions to obtain eigen function. Draw curves for wave function (ψ) and probability (ψ^2) V/s position of particle (x) in box and mention important points differing with classical consideration for integer $n = 1, 2$ and 3 . (1+5+2=8)
- b) Discuss physical interpretation of wave function and mention its properties in brief. (2+2=4)
- c) Show that the value of energy which a photon must have so that it may transfer half of its energy to an electron at rest in about 256 KeV in compton scattering experiment. (4)
6. a) How optical fiber acts as optical wave guide? Explain. Derive expression for numerical aperture of step index fiber and explain angle of acceptance. (2+5+1=8)
- b) Prove that visibility of interference fringes is measure of coherence. (4)
- c) Sodium light source emits 5890 \AA and 5896 \AA in visible region. Determine its
- Coherence length
 - Coherence time and
 - Q value. (1+1+2=4)
7. a) Explain the construction and working of He - Ne laser. With necessary diagram. Why it is called four level laser system and what is role of He in this laser? (4+2+2=8)
- b) Describe the method of recording of the hologram and reconstruction of image from it with suitable ray diagram. (2+2=4)
- c) Find the ratio of populations of two states in He - Ne laser that produce light of wavelength 6328 \AA at 300K. (4)
-



1E2205	Roll No. _____	[Total No. of Pages : 2]
	1E2205	
	B.Tech. I semester (Back) Examination, Dec. - 2018 CY-101 Engineering Chemistry	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt any **five** questions, including Question No.1, which is **compulsory**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

1. Compulsory. Answers for each sub - question be given in about **25** words.

(8×2=16)

- a) Define carbonates and non - carbonates hardness of water with examples.
 - b) Define octane number and cetane number.
 - c) Define thermoplastic and thermosetting polymers with examples.
 - d) What is pitting - Bedworth rule?
 - e) What is viscosity - Index (V.I.) explain it.
 - f) Explain the classification of refractory with one example of each.
 - g) Define setting and hardening of cement.
 - h) What is meant by calorific value of a fuel.
- 2.**
- a) Give details of scale and sludge formation in boilers and write about the methods used for their prevention.
 - b) A water sample contains the following impurities ; $\text{Ca}^{+2} = 20 \text{ PPM}$, $\text{Mg}^{+2} = 18 \text{ PPM}$, $\text{HCO}_3^- = 183 \text{ PPM}$ and $\text{SO}_4^{2-} = 24 \text{ PPM}$, Calculate the lime and soda needed for softening of this sample of water. **(8+8)**

3. a) Explain proximate analysis of coal? How it is carried out.
b) Calculate the mass of air needed for complete combustion of 5 kg of coal contain :

C = 80%, H = 15%, O = rest. (8+8)

4. Write the short notes on any **three** of the following: (6+5+5)

- a) Difference between thermal and catalytic cracking.
b) Explain break - point chlorination.
c) Explain sterilization of water.
d) Cloud and pour point and its determination.

5. a) Give the preparation, structure and uses of the following. (4+4)

- i) Styrene - buta diene rubber (SBR).
ii) Buna - N

- b) Explain the various method for prevention of corrosion. (8)

6. a) Define lubricant and its functions. Explain thin layer mechanism of lubrication. (10)

- b) Write short notes on any **two** :

- i) Lime - soda glass
ii) Borosilicate glass
iii) Glass wool. (3+3)

7. a) Define cement with its constituents. Explain the manufacturing of cement by R.K. method with involved reactions and neat diagram. (12)

- b) Define refractory and write the characteristics of a good refractory. (4)

1E2402	Roll No. _____	[Total No. of Pages : 3]
	1E2402	
	B.Tech. I semester (Main) Examination, Dec. - 2018	
	BSC 1FY2-02 Engineering Physics	

Time : 3 Hours

Maximum Marks : 160

Instructions to Candidates:

*Attempt all **ten** questions from **Part A**, any **five** questions out of **seven** from **Part B** and any **four** questions out of five from **Part C**. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. Calculator (Non Programmable).

Part - A

(Answer should be given up to 25 words only). All questions are **compulsory**.
(10×3=30)

1. What will happen to Newton ring if a plano convex lens of small radius of curvature is used?
2. State Bragg's law.
3. What is degeneracy of energy level?
4. What is normalized wave function?
5. Define temporal coherence.
6. Define numerical aperture of an optical fiber.
7. What is active medium in Laser?
8. State Hall effect.
9. What is displacement current?
10. What do you understand by poynting vector?

40

Part - B

Attempt any five questions.

(5×10=50)

1. Newton's rings are observed in reflected light of wavelength 5.9×10^{-5} cm. The diameter of 10th dark ring is 0.50 cm. Find the radius of curvature of lens and thickness of the air film at the ring. (5+5)
2. The distance between the first dark and the sixth minima in the diffraction pattern of a single slit is 0.5 mm. The screen is 0.5 m away from the slit. If the wavelength of light is used 5000 \AA , determine the slit width. (10)
3. Find the probability that a particle in a box can be found between 0.45 a and 0.55 a where a is the width of the box and particle is in the first excited state. (10)
4. An electron is trapped in a cubical box of side 1 \AA . Find energy and momentum for the ground state and the first excited state. (Given : Planck's constant $h = 6.62 \times 10^{-34}$ J-S, mass of electron $= 9.1 \times 10^{-31}$ kg). (5+5)
5. A typical optical fibre ($n_1 = 1.50$) with cladding ($n_2 = 1.40$) is used in a water ($n_0 = 1.33$) environment. Determine
 - i) the numerical aperture and
 - ii) the maximum acceptance angle. (5+5)
6. An electric field of 150 V/m is applied to a sample of n - type semiconductor whose Hall coefficient is $1.5 \times 10^{-2} \text{ m}^3 \text{C}^{-1}$. Determine the charge carrier density and current density in the sample assuming electron mobility to be $0.40 \text{ m}^2 \text{V}^{-1} \text{s}^{-1}$. (5+5)
7. For the metallic conductor at $f = 2 \text{ kHz}$, $\sigma = 6 \times 10^7 \text{ mho/m}$, $\epsilon_r = 1$ and conduction current density is $\vec{J} = 10^9 \sin(6283t - 444z) \hat{a}_x \text{ A/m}^2$, find the displacement current density. (Given : $\epsilon_0 = 8.85 \times 10^{-12} \text{ F/m}$). (10)

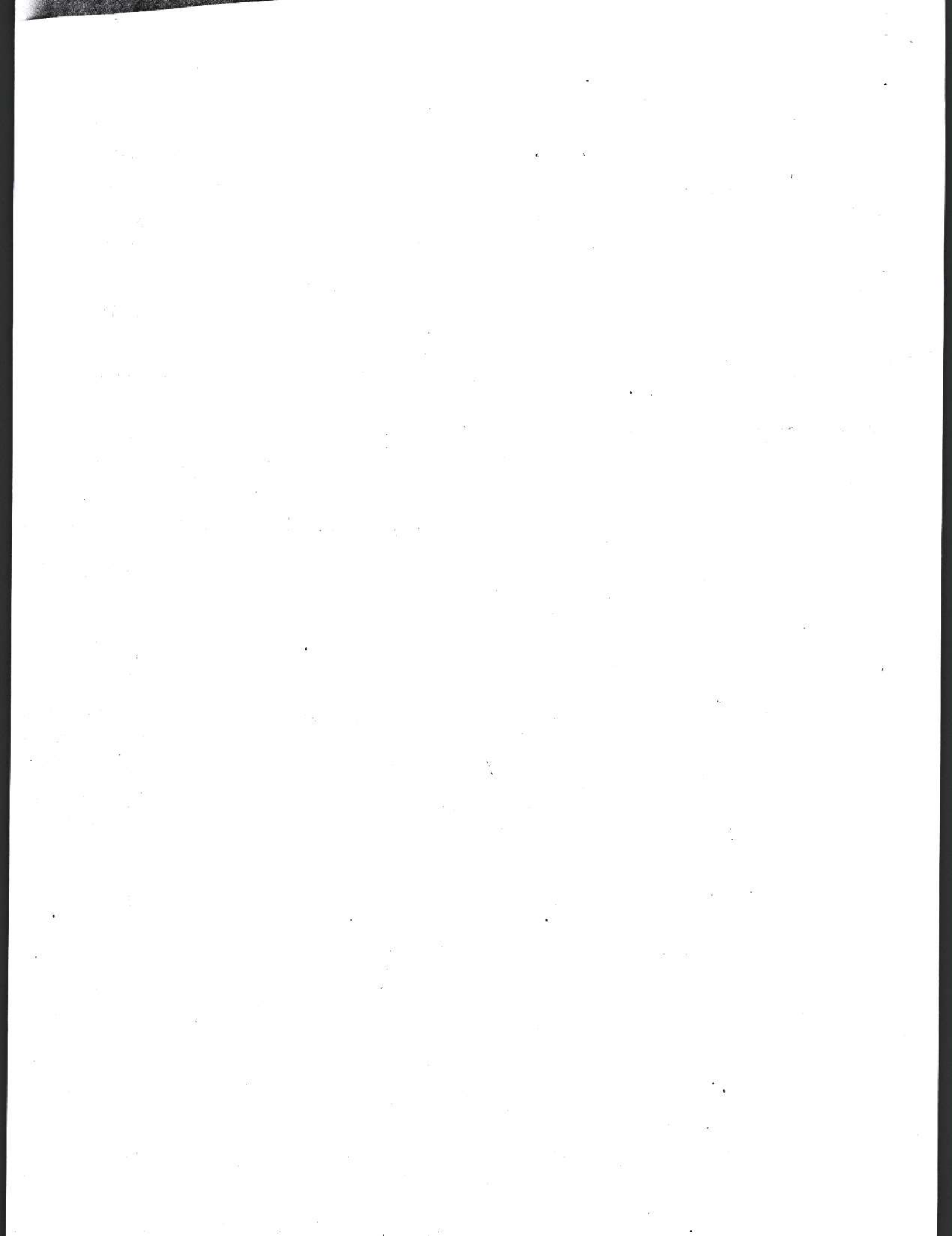
Part - C

Attempt any four questions.

(4×20=80)

1.
 - a) With schematic diagram, explain the construction and working of a Michelson's interferometer. Show with necessary theory how it can be used to measure the difference in the wavelength between D lines of sodium light? (2+4+4+2)
 - b) Explain the Rayleigh criterion of resolution. What do you mean by resolving power of grating? (4+4)
2.
 - a) Write down the Schrodinger's time independent equation for a free particle of mass m trapped in one - dimensional box of side a. Solve it for energy eigenvalues and eigenfunctions. Show your results graphically. (2+4+4+2)

- 4/
- b) Answer the following questions with respect to a particle in a cubical box of side a :-
- i) What is the order of degeneracy for $n_x + n_y + n_z = 4$. (4)
 - ii) What will happen to the degeneracy for $n_x + n_y + n_z = 4$ if the box is not cubical but rectangular parallelepiped with side a , b , and c such that $a = b \neq c$? (4)
3. a) With a suitable diagram explain the construction and working of a semiconductor laser. (2+4+4)
- b) Explain coherence length and coherence time. (2+2)
- c) Show that the numerical aperture of a step index fibre is given by $NA = n_1 \sqrt{2\Delta}$ where the symbols have their usual meanings. (6)
4. a) Explain Hall effect with suitable diagram. Show that the Hall coefficient R_H is given by $R_H = -\frac{1}{ne}$ when n is number of charge carriers per unit volume. (5+7)
- b) Write short notes on intrinsic and extrinsic semiconductors. (4+4)
5. a) Derive the Maxwell's equation in integral and differential form. Discuss their physical significance. (10+4)
- b) State Faraday's law of electromagnetic induction and show that it can be expressed as $\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$. (2+4)
-



1E2403	Roll No. _____	[Total No. of Pages : 2]
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	B.Tech. I - Semester (Main) Examination, Dec. - 2018 BSC 1FY2-03 Engineering Chemistry (Common for all Branches)	

Time : 3 Hours

Maximum Marks : 160

Instructions to Candidates:

*Attempt all **ten** questions from **Part A**, any **five** questions out of seven questions from **Part B** and any **four** questions out of five from **Part C**. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Part - A

(Answer should be given up to **25** words only). All questions are **compulsory**.
(10×3=30)

1. What is Calgon conditioning?
2. What is Octane number?
3. Define corrosion.
4. What is lime saturation factor in cement?
5. Structure and uses of Aspirin.
6. What is annealing of glass?
7. Cloud and pour point.
8. Composition and uses of coal gas.
9. Advantages of gaseous fuels.
10. Hardness of water.

Part - B

(Analytical/Problem solving questions). Attempt any **five** questions. **(5×10=50)**

1. Explain the problems of priming and its preventions in boilers.
2. What is carbonization of coal? Describe Otto - Hoffmann by product oven method of carbonization.

3. What is municipal water? Explain the sterilization process to get drinking grade water.
4. Describe process of dry corrosion and the importance of pilling Bedsworth's rule.
5. Explain composition, preparation, properties and uses of borosilicate glass.
6. Explain electrophilic substitution in benzene
7. What is viscosity of oil? Describe viscosity measurement of oil by Red wood's viscometer number -1.

Part - C

(Descriptive/Analytical/Problem Solving/Design question). Attempt any **four** questions. **(4×20=80)**

1. What is water softening? Describe water softening by De-mineralization process with diagram. **(5+10+5=20)**
 2. What is calorific value? Explain the determination of calorific value of coal, with diagram, by a Bomb - Calorimeter. **(5+10+5=20)**
 3. a) Explain the phenomena of galvanic corrosion by taking suitable example. **(10)**
 b) Describe any two methods of protection from corrosion. **(5+5=10)**
 4. What is cement? Describe cement manufacturing by a rotatory kiln technology with diagram and reactions involved in the process. **(5+5+5+5=20)**
 5. a) Explain thick layer mechanism of lubrication. **(10)**
 b) Describe the synthesis, properties and uses of paracetamol. **(6+2+2=10)**
-

1E2002

Roll No. _____

[Total No. of Pages : 3]

1E2002

B.Tech. I Semester (Mercy Back) Examination, Dec. - 2018
102 Engineering Mathematics - I

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Find the asymptotes of the following curve :

$$x^3 + yx^2 - xy^2 - y^3 - 3x - y - 1 = 0. \quad (8)$$

- b) Show that the radius of curvature at any point P on the parabola $y^2 = 4ax$ is

$$\frac{2(SP)^{3/2}}{\sqrt{a}}, \text{ where S is the focus of the parabola.} \quad (8)$$

OR

1. a) Show that every points where the curve $y = c \sin \frac{x}{a}$ meets the x-axis is a point of inflexion. (8)

- b) Trace the curve $y^2(2a - x) = x^3$. (8)

Unit - II

2. a) If $u = (x^2 + y^2 + z^2)^{-1/2}$ Show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = 0$. (8)

- b) If $u = \tan^{-1} \left(\frac{x^3 + y^3}{x + y} \right)$, then show that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$. (8)

OR

[Contd....

2. a) Find the Maximum and Minimum value of $f(x, y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$. (8)

b) Minimize $f(x) = \frac{1}{2}(x_1^2 + x_2^2 + x_3^2)$

Subject to $g_1(x) = x_1 - x_2 = 0$

$g_2(x) = x_1 + x_2 + x_3 - 1 = 0$

by Lagrange's multiplier method. (8)

Unit - III

3. a) Find the volume of the solid generated by revolution of the curve $(a-x)y^2 = a^2x$ about its asymptote. (8)

b) Evaluate $\int_0^x \int_0^{\sin x} y dx dy$. (8)

OR

3. a) Change the order of integration in $\int_0^1 \int_x^1 \frac{x dx dy}{x^2 + y^2}$ and Hence evaluate it. (8)

b) Prove that $B(m, n) = a^m b^n \int_0^\infty \frac{x^{m-1}}{(ax+b)^{n+m}} dx$. (8)

Unit - IV

4. Solve the following differential equations :

a) $(x+y+1) \frac{dy}{dx} = 1$ (5)

b) $\frac{dy}{dx} = e^{x-y}(e^x - e^y)$. (5)

c) $(xy^3 + y)dx + 2(x^2y^2 + x + y^4)dy = 0$. (6)

OR

4. Solve the following differential equations :

a) $\frac{d^3y}{dx^3} - 9\frac{d^2y}{dx^2} + 26\frac{dy}{dx} - 24y = 0$. (5)

b) $(D^3 - D^2 - 6D)y = 1 + x^2$. (5)

c) $(D^2 - 3D + 2)y = \sin 3x + e^{4x}$ (6)

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Unit - V

5. a) Solve $x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x$. (8)

b) Solve $(2x^2 + 3x) \frac{d^2 y}{dx^2} + (6x + 3) \frac{dy}{dx} + 2y = (x + 1)e^x$ (8)

OR

5. a) Solve $\cos x \frac{d^2 y}{dx^2} + \sin x \frac{dy}{dx} - 2y \cos^3 x = 2 \cos^5 x$ (8)

b) Solve $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} = e^x \sin x$, by the method of variations of parameters. (8)



1E2201

1E2201

B.Tech. I semester (Back) Examination, Dec. - 2018
MA-101 Engineering Mathematics - I

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 28****Instructions to Candidates:**

Attempt any five questions, including Question No.1, which is compulsory. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

1. Compulsory. Answers for each sub - question be given in about **25** words.

(8×2=16)

- a) How many asymptotes are there for the curve $xy(x+y) = a(x^2 - a^2)$.
- b) Find the degree of homogenous function $f(x,y) = \frac{x^2(x^2 - y^2)^{1/3}}{(x^2 + y^2)^{2/3}}$.
- c) In which direction a function $f(x,y)$ increases most rapidly and decreases most rapidly at any point P.
- d) Give an example of a function which is not continuous at origin although its partial derivative exist at origin.
- e) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} (x^2 + y^2) dy dx$.
- f) Give the value of $\Gamma\left(\frac{1}{4}\right)\Gamma\left(\frac{3}{4}\right)$.
- g) Check whether $f(r)\vec{r}$ is irrotational or not?
- h) Give the value of $\text{div}(\text{curl}\vec{F})$ where $\vec{F} = 2xyz\hat{i} + (xyz^2 - \sin yz)\hat{j} + ze^{xy}\hat{k}$.

- 2. a)** Find the equation of the cubic curve whose asymptotes are same as that of the curve $x^3 - 6x^2y + 11xy^2 - 6y^3 + x + y + 1 = 0$ and which touches the axis of y at origin and passes through the point (3,2).

- b) Find the flux of $\vec{F} = yz\hat{i} + x\hat{j} - z^2\hat{k}$ through the parabolic cylinder $y = x^2$, $0 \leq x \leq 1, 0 \leq z \leq 4$ in the outward direction of normal. (16)
3. a) Using Taylor's theorem, find a quadratic approximation to $f(x,y) = \sin x \sin y$ near the origin. How accurate is the approximation if $|x| \leq 0.1$ and $|y| \leq 0.1$.
- b) If $\vec{A} = (x + 2y + az)\hat{i} + (bx - 3y - z)\hat{j} + (4x + cy + 2z)\hat{k}$, find a, b, c so that \vec{A} is irrotational. Find scalar potential of \vec{A} . (16)
4. a) Trace the curve $r = 3 + 2\cos\theta$.
- b) Find the directional derivative of $f(x,y,z) = x^2yz + 4xz^2$, at $P_0 = (1, -2, -1)$ in the direction of $\vec{u} = 3\hat{i} + 6\hat{j} - 2\hat{k}$. (16)
5. a) Find Tangent Plane and Normal Line to the surface $x^2 + y^2 + z - 9 = 0$ at point $P_0 = (1, 2, 4)$.
- b) Evaluate the following integral by change of order of Integration.
- $$\int_0^a \int_{\sqrt{ax}}^a \frac{y^2}{\sqrt{y^4 - y^2x^2}} dy dx. \quad (16)$$
6. a) Find the volume of the wedgelike solid that lies beneath the surface $z = 16 - x^2 - y^2$ and above the region R bounded by the curve $y = 2\sqrt{x}$ and the line $y = 4x - 2$ and the x -axis.
- b) The plane $x + y + z = 1$ cuts the cylinder $x^2 + y^2 = 1$ in an ellipse. Find the points on the ellipse that lie closest to and farthest from the origin. (16)
7. a) Evaluate $\int_0^a x^2(a^2 - x^2)^{3/2} dx$.
- b) Use Stoke's theorem, evaluate $\int_C \vec{F} \cdot d\vec{r}$ if $\vec{F} = xz\hat{i} + xy\hat{j} + 3xz\hat{k}$ and C is the boundary of the portion of the plane $2x + y + z = 2$ in the first octant, traversed counterclockwise as viewed from above. (16)

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	<p>B.Tech. I Semester (Main) Examination, Dec. - 2018</p> <p>BSC</p> <p>1FY2-01 Engineering Mathematics - I</p>	

Time : 3 Hours

Maximum Marks : 160

Instructions to Candidates:

Attempt all ten questions from Part A, any five questions out of seven from Part B and any four questions out of five from Part C. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Part - A

(Answer should be given up to 25 words only). All questions are compulsory.

(10×3=30)

1. What is the value of $\Gamma\left(-\frac{1}{2}\right)$.
2. Find the value of $\int_0^{\pi/2} \sin^6 \theta \cos^7 \theta d\theta$.
3. Find whether series $\sum \frac{n}{n+10}$ is convergent or not?
4. Give an example of two divergent series whose sum is convergent.
5. Find sum of Fourier series of $f(x)$ at $x = 2$ where $f(x) = \begin{cases} 0, 0 \leq x < 1 \\ 1, 1 \leq x < 2 \end{cases}$.
6. State Parseval's Theorem.
7. Give an example of two variable function whose both partial derivatives exist but limit does not exist at origin.

8. Find the directions in which $f(x, y) = \frac{x^2}{2} + \frac{y^2}{2}$ increases most rapidly at the point (1,1).
9. Suppose the force field $F = \nabla f$ is the gradient of the function $f(x, y, z) = -\frac{1}{(x^2 + y^2 + z^2)}$. Find the work done by F in moving an object along a smooth curve C joining (1,0,0) to (0,0,2) that does not pass through origin.
10. Find $\iint_S \vec{r} \cdot \hat{n} dS$ where S is a closed surface enclosing volume V and $\vec{r} = xi + yj + zk$.

Part - B

(Analytical/Problem solving questions). **Attempt any five questions.**

(5×10=50)

1. Find volume of the solid generated by the revolution of the curve $x = a \cos^3 \theta, y = a \sin^3 \theta$ about the x-axis.
2. Find Taylor series expansion of $f(x) = \cos 5x^2$ about the point $x = \pi$.
3. Obtain half range sine series for $f(x) = e^x$, in $0 < x < 1$.
4. If resistors of R_1, R_2 and R_3 ohms are connected in parallel to make an R-ohm resistor, find the value of $\partial R / \partial R_2$ when $R_1 = 30, R_2 = 45$ and $R_3 = 90$ ohms.
5. The derivative of $f(x, y)$ at $P_0(1, 2)$ in the direction of $i + j$ is $2\sqrt{2}$ and in the direction of $-2j$ is -3 . What is the derivative of f in the direction of $-i - 2j$?
6. Find the area of the region R in the xy-plane enclosed by the circle $x^2 + y^2 = 4$ above the line $y = 1$ and below the line $y = \sqrt{3}x$.
7. Find the centroid of the region in the first quadrant that is bounded above by the line $y = x$ and below by the parabola $y = x^2$.

Part - C

(Descriptive/Analytical/Problem Solving/Design question). **Attempt any four questions.**

(4×20=80)

1. Find the value of $\int_0^\infty \cos x^2 dx$.

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2. Discuss the convergence of the series $\sum \frac{\sqrt{n}}{\sqrt{n^2+1}} x^n$.

3. Find Fourier series representation of $f(x) = \begin{cases} 0, & -\pi \leq x \leq 0 \\ \sin x, & 0 < x < \pi \end{cases}$ and prove that

$$\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots = \frac{1}{2}$$

4. The plane $x + y + z = 1$ cuts the cylinder $x^2 + y^2 = 1$ in an ellipse. Find the points on the ellipse that lie closest to and farthest from origin.

5. Verify Stoke's theorem for the hemisphere $S: x^2 + y^2 + z^2 = 9, z \geq 0$, its bounding circle $C: x^2 + y^2 = 9, z = 0$, and the field $\vec{F} = y\vec{i} - x\vec{j}$.



