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Total No. of Pages.: 02

### 21N506/

B.Tech. II Sem (New Scheme) Main Exam Acad Session 2022-23

#### All Branch

(2FY2-06) - Introduction to Built Environment

Time: 3 Hours

Maximum Marks: 70 Min. Passing Marks:

### Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 10 \* 2 marks = 20 marks. All 10 questions are compulsory.

Part – B: Analytical/Problem Solving questions 5 \* 4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

Part – C: Descriptive/Analytical/Problem Solving/ Design questions 3 \* 10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

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

12	2
PART-A (ATTEMPT ALL)	
Q.1. Define built environment.	[2]
Q.2. What are the soil types and their responses under load?	[2]
Q.3, What do you mean by earthquake resistant design?	[2]
Q.4. List the factors affecting the built environment.	[2]
Q.5. What do you mean by rani-water harvesting?	[2]
Q.6. What do you understand by hydrological cycle?	[2]
Q.7 What are field-water storage structures?	[2]
Q.8. What do you mean by a deep foundation?	[2]
Q.9. What do you mean by building bye-laws?	[2]
Q.10. Mention any two ways steel is used in conventional constructer.	[2]

P.T.O.

## PART-B

Q.1,	Explain various types of transportation system	ms.	[4]
Q.2.	Describe lighting aspects of building.		[4]
Q.3,	Explain the modern world approach towards	ds built environment in context of securities	
	emergencies.		[4]
Q.4.	Discuss the elements of built environment.		[4]
Q.5	Discuss thermal comfort and insulation, and	climate responsive design.	[4]
Q.6.	Explain environmental acts and regulations.		[4]
Q.7.	Describe various road traffic signs.		[4]
	PAR	et-C	
Q.1.	Explain the smart concept in context of cites,	environment, water, metering a	ınd retail.
			[10]
Q.2.	Describe the five engineering divisions and their responsibility in built environment.		
•			[10]
Q.3.	Discuss various aspects of building planning.	Also discuss the need of standa	ard codes.
	•		[10]
Q.4.	What do you understand by building ergonor	nics? Describe acoustic and the	rmal aspects
•	aspects of a building.		[10]
Q.5,/	Write short notes on any four:		[10]
	a. Additive construction using concrete		
	b. Traffic calming		
	c. Reuse and saving of water	https://www.btubika	ner.com
	d. Chemical cycles	Whatsapp @ 93009	30012
	e. · Water quality standards	Send your old paper &	_
	f. Masonry construction	अपने पुराने पेपर्स भेजे और 10 रुपये प Paytm or Google Pay से	

Z-350

21N502 /

Roll No. \_\_\_\_

Total No. of Pages.: 03

### 21N502/

B.Tech. II Sem (New Scheme) Main Exam Acad Session 2022-23

All Branch

(2FY1-02) - Engineering Physics

Time: 3 Hours

Maximum Marks: 70 Min. Passing Marks:

### Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 10 \* 2 marks = 20 marks. All 10 questions are compulsory.

Part – B: Analytical/Problem Solving questions 5 \* 4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

Part – C: Descriptive/Analytical/Problem Solving/ Design questions 3 \* 10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

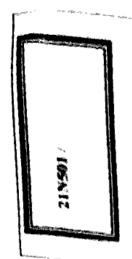
Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

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

	2		
	PART-A	1	
	of dark Newton rings. [2]	0.1	
	the formula for the intensity of secondary maxima.	Q.1. Write the ratio of the diameter of dark Newton rings.	
	[2]	Q.2.	
	ula for energy density. [2]	0.3	
	(2)		
	(4)		
	function.		
	[2]	_	
P.T.O.	ffect?	_	
	the formula for the intensity of secondary maxima.  [2]  ula for energy density.  [2]  tical fibre.  [2]  mula for shift in wavelength.  [2]  [2]  [2]  [2]	Q.2. ~ Q.3. Q.4 <sub>y</sub> Q.5, Q.6. Q.7. Q.8.	

- Explain the physical interpretation of curl. [2] Q.9. Q.10. - Explain the displacement current. [2] PART-B In Newton's ring experiment the diameter of nth and (n+1)th rings are 4.2 mm and 7.0 mm. Q.Ł If the radius of curvature of lens is 2m, then find the wavelength used. [4] Light of wavelength 6000 A<sup>0</sup> is incident normally on a slit of width 24 x 10<sup>-5</sup>cm. Determine Q.2, the angular position of second minimum. [4] Calculate the refractive indices of the core and cladding materials of a fiber from the data. Q.3. NA = 0.22 and  $\Delta$  = 0.012. [4] Q.4. Write a short note on semiconductor laser. [4] An electron is confined to a box of length 10-9m. Calculate the minimum uncertainty in its Q.5. velocity. Q.6. The hall coefficient of certain silicon specimens found to be -7.5 x 10<sup>-5</sup>m<sup>3</sup>/C at a certain temperature. If the conductivity is found to be 200  $\Omega^{-1}$  m<sup>-1</sup>. Calculate the density of charge carriers. https://www.btubikaner.com [4] Find  $\nabla .V$  for the following vector fields: Q.7. [4] a.  $V = (y^2 + z^2)(x + y)\hat{x} + (z^2 + x^2)(y + z)\hat{y} + (x^2 + y^2)(z + x)\hat{z}$ b.  $V = f_1(y_1z)\hat{x} + f_2(x_1z)\hat{y} + f_3(x_1y)\hat{z}$ PART- C
  - Q.1. Describe the construction and working of Michelson Interferometer. Drive the expression for determine the wavelength difference of two components of a line by Michelson Interferometer.
  - Q.2. Explain the term absorption, spontaneous emission and stimulated emission and derive a relation between Einstein's coefficients.

Q.3.	Write down schrodinger's equation for a particle confined in a 1-D box. Obtain the		
	wave function for a particle confined in this box.	[10]	
Q.4.	4. Describe the formation of energy band in solids and hence how it helps to classify the materi		
4	into conductors and insulators.	[10]	
Q.5.	5. Deduce the Maxwell's equations for free space and prove that electromagnetic waves are		
	transverse.	[10]	
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Roll No.

21N501/

Total No. of Pages.: 03

B. Tech. H Sem (New Scheme) Main Exam. Acad Session 2022-23

All Branch

(2FY 1-01) - Engineering Mathematics II

Time: 3 Hours

Maximum Marks: 70 Min. Passing Marks:

# Instructions to Candidates:

Part - A: Short answer questions (up to 25 words) 10 \* 2 marks = 20 marks. All 10 questions are compulsory.

Part - B: Analytical/Problem Solving questions 5 \* 4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

Part - C: Descriptive/Analytical/Problem Solving/ Design questions 3 \* 10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

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

1		
	PART-A	
91.	Evaluate $\left(\frac{-9}{2}\right)$ .	[2]
0.2/	Evaluate $\int_0^1 \int_0^{1-x} xy dx dy$ Evaluate $\int_0^2 (4-x^2)^{\frac{3}{2}} dx$	[2]
98.	Evaluate $\int_{0}^{2} (4-x^{2})^{\frac{3}{2}} dx$ .	[2]
9,4.	Evaluate $\frac{d}{dt}(\vec{r} \times \frac{d\vec{r}}{dt})$	[2]
Q.5.	Find the directional derivative of	[2]
/	$\theta(x,y,z) = (x^2 - 2y^2 + 4z \text{ at (1, 1,-1) in the direction of the vector } 2i + j - k.$	

P.T.O.

State Stoke's theorem. [2] Define right circular cylinder. [2] Find the radius of the circle [2]  $x^{2} + y^{2} + z^{2} - 2y - 4z = 11, x + 2y + 2z = 15.$ Q.9. Find the eigen values of the matrix. [2]  $A = \begin{pmatrix} 5 & 4 \\ 1 & 2 \end{pmatrix}$ Are the following vectors linearly independent Q.10. [2]  $x_1 = (1, 3, 4, 2), x_2 = (1, 2, 3, 4), x_3 = (2, 3, 4, 9)$ PART-B Q.1 Evaluate by changing the order of integration. [4]  $\int_0^\infty \int_x^\infty \frac{e^{-y}}{v} dx dy.$ [4] Q.2. Show that  $\int_0^2 x (8-x^3)^{1/3} dx = \frac{16\pi}{9\sqrt{3}}$ Q.3. if r = xi + yj + zk and r = |r| then find  $\nabla^2 r''$ Q.4. Use Green's theorem to evaluate the line integral  $\int_{0}^{\infty} [(xy + y^2)dx + x^2dy]$ [4] Where C is the boundary of the closed region bounded by y = x and  $y = x^2$  [4] Q.5. Find the equation of the sphere having the circle [4]  $x^{2} + y^{2} + z^{2} = 9, x - 2y + 2z = 5 \text{ as a great circle.}$ Determine the rank of matrix [4]  $\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & 2 & 2 \end{bmatrix}$ Q.7. Investigate for consistency of the following equations and if possible, Find the solutions: [4]

4x-2y+6z=8; x+y-3z=-1; 15x-3y+9z=21

## PART-C

- Find the volume and surface area of the solid formed by revolution of the cardioid Q.1. [10]  $r = a (1 + \cos \theta)$  about the initial time.
  - [10]

Use Stoke's theorem to evaluate Q.2.

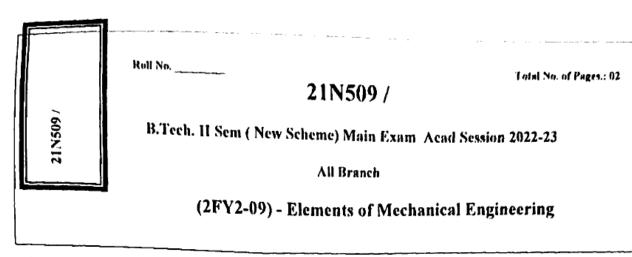
$$\int_{c} [(x+2y)dx + (x-z)dy + (y-z)dz]$$

Where c is the boundary of the triangle with vertices (2, 0, 0), (0, 3, 0) and (0, 0, 6)oriented in the anti-clockwise direction.

- [10] Q.3 Find the equation of the sphere which passes through the circle  $x^2 + y^2 = 4$ , z = 0 and is cut by the plane x + 2y + 2z = 0 in a circle of radius 3.
- [10] Q.4. Find the eigen values and eigen vectors of the matrix  $A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & -6 \\ 2 & -2 & 3 \end{bmatrix}$
- Q.5. Find the values of the constants a, b, c so that the directional derivative of  $\phi = axy^2 + byz + cz^2x^2$  at P (1, 2, -1) has maximum magnitude 64 in the direction parallel to z-axis.

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Time: 3 Hours

Maximum Marks: 70 Min. Passing Marks:

## Instructions to Candidates:

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

1	2
	PART-A
94.	Differentiate between point function and path function.
22.	Enlist the similarities between heat and work.
Q.3.	Define compression Ratio.
Q.4.	Draw P-V and T-S diagram for Carnot Cycle.
Q.5.	Draw a block diagram for the Brayton cycle and mention the function of each element.
Q.6.	Write industrial applications of the Rolling process.
Q.7.	How many atoms and molecules are there in 1 gram of Hydrogen.
0.8.	Classification of IC engines.
09	Why is idler gear used in gear trains?

P.T.O.

Q.10. Determine torque transmitted on the pinion shaft if torque transmitted on the gear shaft is 20Nm. Consider Gear ratio = 4.

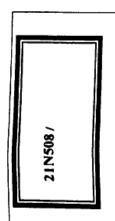
#### PART-B

- Q.1 A certain amount of an ideal gas initially at a pressure  $P_1$  and temperature  $T_1$ . First, it undergoes a constant pressure process 1-2 such that  $T_2=3T_1/4$ . Then, it undergoes a constant volume process 2-3 such that  $T_3=T_1/2$ . The ratio of the final volume to the initial volume of the ideal gas is.
- Q2. Difference between Reversible and Irreversible processes.
- Q.3. Write a short note on Brayton Cycle.
- Q.4. What is the difference between Otto, Diesel, and Dual cycle?
- Q.S. Write a short note on the Classification of Materials.
- Q.6. Classification of Gear Drives.
- Q7. Write the difference between welding, brazing, and soldering.

#### PART- C

- Write Kelvin-Plank and Clausius statements of the second law of thermodynamics with schematic diagrams. https://www.btubikaner.com
  - b) A cyclic heat engine operates between a source temperature of 1073 K and a sink temperature of 303 K. What is the least rate of heat rejection per kW net output of the engine?
  - Q.2. Draw P-V and T-S Diagram for Diesel cycle and derive expression of the efficiency of Diesel cycle.
  - Q.3. Write short notes on different types of Extrusion with a schematic diagram for each.
  - QA. Prove that the ratio of belt tension is given by the T1/T2 =  $e^{\mu\theta}$
  - Q.5. Draw P-V and T-S diagrams for the Ranking cycle and derive the expression of the efficiency of the Ranking cycle.

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Roll No.

## 21N508/

Total No. of Pages.: 02

B.Tech. II Sem (New Scheme) Main Exam Acad Session 2022-23

### All Branch

(2FY2-08) - Computer Fundmentals & Programming

Time: 3 Hours

Maximum Marks: 70 Min. Passing Marks:

## **Instructions to Candidates:**

Part – A: Short answer questions (up to 25 words) 10 \* 2 marks = 20 marks. All 10 questions are compulsory.

Part – B: Analytical/Problem Solving questions 5 \* 4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

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

1N	IA	2 NA	
	PART-A		
∕Q.1.	What are the low-level languages?	[2]	
Q.2.	What do you mean by a base or radix of a number system?	[2]	
Q.3.	What do you mean by nested for loop in C?	[2]	
.∕Q.4.	Differentiate between Relational and logical operators.	[2]	
Q.5.	How does function definition differs from function declaration?	[2]	
Q.6.	Give different ways of initialization of arrays in C language.	[2]	
► Q.7.	Justify the statement-"Name of array can be used as a pointer".	[2]	
Q.8.	How do you access the members of a structure?	[2]	
<b>Q</b> .9.	Differentiate between static and dynamic memory allocation?	[2]	
Q.10.	Describe the function fclose() and fopen ().	[2]	
7		P.T.O.	

**Z-352** 

### PART-B

	I AN -	
√ Q.1	Convert the following numbers:	[4]
	(a) $(6498)_{10} = (?)_2 = (?)_{16}$	
	(b) $(4BD5)_{16} = (?)_2 = (?)_{10}$	
∕Q.2.	Write a program in C to generate fibonacci series.	[4]
Q.3.	List and explain with syntax the most common in build string handling f	function used in C.
		[4]
Q.4.	What do you mean by function prototyping? Write down the advantages	of function
	prototyping in C.	[4]
Q.5.	What are the storage classes? Give the classification of various storage	classes
	used in C.	[4]
Q.6.	Write a program to swap two numbers using call by reference method a	nd display the
	numbers before, during and after the function calling.	[4]
Q.7.	What are the different modes in which a file can be opened in C? Explain	in with suitable
	example.	[4]
	PART- C	_
Q.1.	How many types of storage are normally there in the storage unit of a co	omputer system?
	Give examples of each type and justify the need for each storage unit.	[10]
Q.2.	Differentiate between structure and union. When is union preferred over	structure? Define
	a structure distance having two data members: cm and mm in integer. The	ne program enters
	three variables and find which distance is the largest among them.	[10]
∕ Q.3.	What is an array? Give two classification of arrays. Write a program to f	and greatest number
	in an array.	[10]
Q.4.	List and explain various types of loops available in C with their syntax a	nd suitable examples.
	Write a program to find the table of a number using loop.	[10]
Q.5.	What is a string? How to declare and initialize a string? Write a program	to copy one string to
	another string without using the standard library function strcpy ().	[10]

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Z-352