



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
END SEMESTER EXAMINATION, December 2024

Program: B. Tech. (CE & DD)

Course Code: PH13101

Full Marks: 60

Semester: 1

Department: Physics

Course Name: Engineering Physics

Duration of Examination: 3 hours

Answer all questions. Assume missing data suitably, if any.

- Q1. What do you understand by interference? Explain types of interference. Derive an expression for the intensity distribution due to single-slit diffraction and discuss the conditions for maxima and minima. [15]
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- Q2. (a) State Maxwell's equations. Show that **E** and **B** fields are orthogonal to each other. Estimate the velocity of the em wave in free space. [15]
(b) Define group velocity (V_g) and phase velocity (V_p). Establish the relationship between V_g and V_p .
(c) Calculate the ratio of de Broglie waves associated with a proton and an electron each having the kinetic energy of 20 MeV; Given $m_p = 1.67 \times 10^{-27}$ kg and $m_e = 9.1 \times 10^{-31}$ kg.
- Q3. (a) What are the Einstein's coefficients in LASER? Show that at thermal equilibrium the ratio of spontaneous to stimulated emissions is given by $e^{h\nu/(k_B T)} - 1$. [15]
(b) Explain the construction and working principle of Ruby laser. Draw a schematic energy level diagram and explain it.
(c) Two parallel plates of capacitor having equal and opposite charges are separated by **6.0 mm** thick dielectric material of dielectric constant **2.8**. If the electric field strength inside be 10^5 V/m, determine polarization vector, displacement vector and energy density in the dielectric.
- Q4. (a) Explain wave-particle duality in nature. [15]
(b) Derive the energy and wavefunction for a particle trapped in a box of width **L** and infinite wall.
(c) Explain Heisenberg uncertainty principle. Show that electron cannot reside inside the nucleus.



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
MID SEMESTER EXAMINATION, JULY-DEC 2024

Program: B.Tech CE & DD /M&T/M&C
Course Code: Communicative English
Branch: B.Tech CE & DD/ M&T/M&C
Full Marks: 45

Semester: 1st
Course Name: HS13101/
HS17101/HS18101
Duration of Examination: 3 Hours

Instructions: Answer all the questions in your own words.

Faculty-Dr. Zeeshan Ali

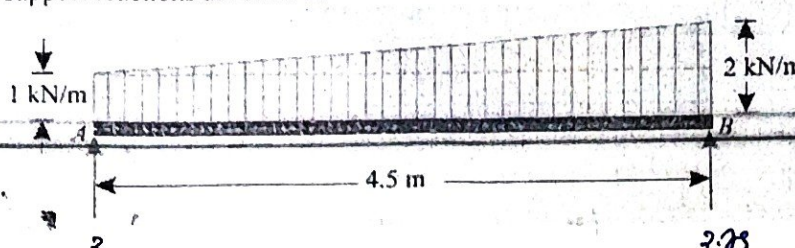
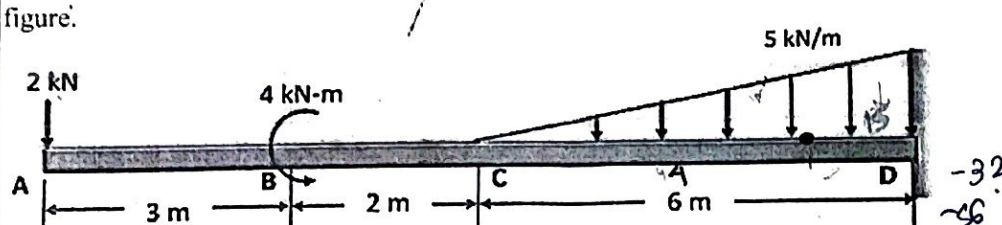
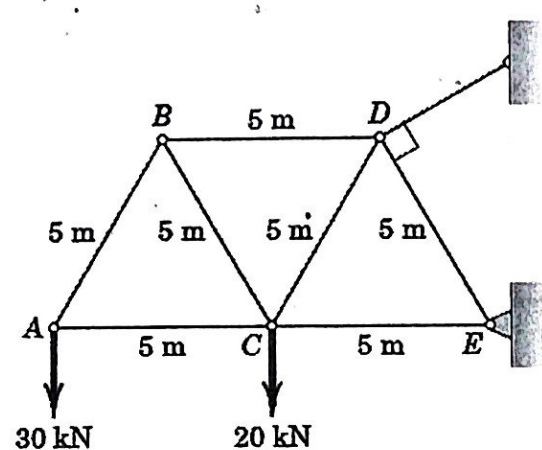
1. "Mastering the art of speaking fluently, effectively, and with the right intonation requires dedication and continuous practice." Design a practical action plan incorporating strategies for improving speaking skills and provide examples to demonstrate its implementation. (11 marks) CO5
2. "Speed reading can transform how we process information in a world driven by knowledge." Evaluate the importance of speed reading in professional and academic contexts, and critically analyse how the outlined methods improve comprehension and efficiency (11marks) CO6
3. "Interviews require effective use of both verbal and non-verbal communication to leave a positive and lasting impression." Assess the impact of these communication forms on interview success, and evaluate strategies to improve them with practical examples. (11.5 marks) CO8
4. "Delivering an impactful presentation requires a balance of well-structured content, engaging delivery, and meaningful audience interaction." Combine key presentation skills, storytelling techniques, and audience engagement strategies to propose an innovative approach for impactful presentations, supported by relevant examples. (11.5 marks) CO8

NATIONAL INSTITUTE OF TECHNOLOGY PATNA
Department of Civil Engineering
End-Semester Examination, Dec-2024

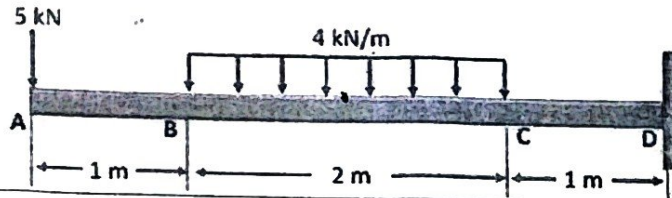
Course Name: Engineering Mechanics
Course Code: CE13103
Exam Durations: 3 hours

B.Tech: 1st Semester (Gr-B)
DOE: 04/12/2024
Full Marks: 60

Note: Answer any one among question 3 and 6, other questions are compulsory. Mark for each question is provided on the right-side margin.

S.N.	Questions	Marks	CO	BL
1	<p>(a) Explain three types of loading with a neat sketch.</p> <p>(a) A simply supported beam AB of span 4.5 m is loaded as shown in Fig. Find the support reactions at A and B.</p> 	6+4=10	1	II, III
2	<p>(a). Derive the relation between load, shear force and bending moment with neat sketches.</p> <p>(b). Determine the shear force and bending moment distributions produced in the cantilever beam shown below. Details of acting load and dimension are given in the figure.</p> 	5+10=15	2	II, III, IV
3	<p>(a). What do you mean by perfect truss?</p> <p>(b). From the loaded cantilever truss (shown below) compute the force in each member by the method of joints.</p> 	3+7=10	2	II, III
4	(a). Explain in details types of frictions with their features.	5+10= 15	3	II

	(b). Explain four situations for angle of frictions for different motion conditions with neat sketches.			
5	Define linear impulse. A flywheel wheel is making 180 rpm at $t=0$ and after 20 sec it is running at 120 rpm. How many revolutions will it make and at what time will it elapse before it stops, if the retardation is uniform? 60, 30, 0.914	1+9=10	4	I, III
6	(a). Explain point of contraflexure with neat sketches. (b). Determine the shear force and bending moment diagram of the cantilever beam shown below.	3+7=10	2	II, III

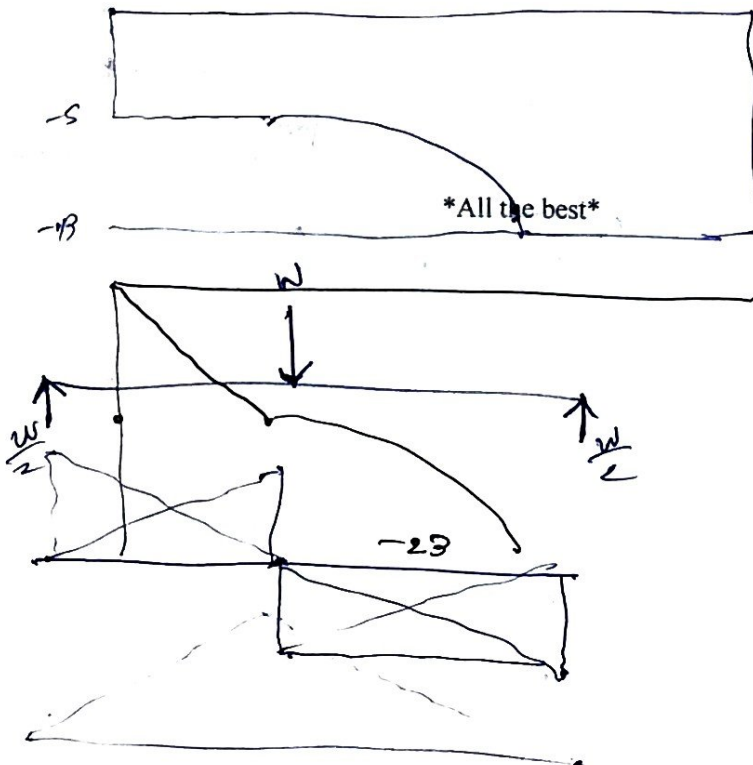


20 + 16

29.5

465-2

(1, 5)
(2, 10)
(3, 23)



20 d

16

$F \propto dF = w dx$
 $f = dF/w dx$
 $F = \int dF = w dx$



NATIONAL INSTITUTE OF TECHNOLOGY PATNA
Department of Computer Science and Engineering
END SEMESTER EXAMINATION, Jul-Dec 2024

B.Tech: CE

Course Name: Information Technology Fundamentals

DOE: 10/12/2024

Course Code: CS13101

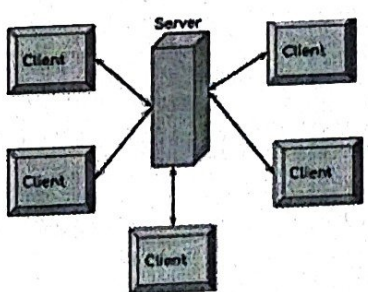
Max. Marks: 60

Maximum Time: 3 hours

Instruction:

1. Attempt all questions.
2. Assume any suitable data, if necessary.
3. The Marks, CO (Course Outcome), and BL (Bloom's Level) related to questions are mentioned on the right-hand side margin.

S.N.	Questions	Marks	CO	BL
1.	Draw the computer system interaction diagram and give a brief introduction of its components.	[2+3=5]	CO2	Understand
2.	a) Which is better to use for data transmission—analogue signal or digital signal? Why? b) What do you mean by broadband technology? c) What is the purpose of an assembler?	[3+2+1=6]	CO3	Apply
3.	Give differences between the following: a) Guided media and Unguided media b) STP and UTP c) Bandwidth and Throughput d) Modulation and Demodulation e) Bus, Ring and Star LAN topologies	[5]	CO1	Understand
4.	What do you mean by the term network? Describe the following network types briefly. (a) LAN (b) MAN (c) WAN	[1+6=7]	CO2	Remember
5.	"OS supervises and manages the hardware of the computer". Explain.	[5]	CO5	Evaluate
6.	How does the OSI seven-layer protocol work?	[7]	CO2	Remember
7.	Briefly discuss the followings: (a) Difference between data, information and Knowledge with an example. (b) Data processing and steps involved in processing (c) What is the need of the IP address? (d) What is the purpose of sequencing information in a packet sent by TCP over the Internet?	[3+3+2+2=10]	CO1, CO3, CO4	Remember, Apply, Analyze

8.	<p>What will be the output of the following codes:</p> <p>a)</p> <pre>#include<stdio.h> int main() { float a=3.15529; printf("%2.1f\n", a); return 0; }</pre> <p>b)</p> <pre>#include <stdio.h> void main() { int i; printf("The first 10 natural numbers are:\n"); for (i=1; i<=10; i++) { printf("%d ", i); } printf("\n"); }</pre> <p><i>Handwritten note:</i> 2.1) 3.15529 / 2.1 = 1.5529</p>	[2+3=5]	CO3, CO5	Apply, Evaluate
9.	<p>Write a latex code to create a sample document as it is given below (in other words when code is compiled similar document will be generated). Consider the image used in the document below named as "network.jpg".</p> <div data-bbox="188 1115 1024 1724" data-label="Diagram"> <p style="text-align: center;">Sample Latex Document 05/12/2024</p>  <p style="text-align: center;">Figure 1: Computer network architecture</p> <p>The computer network architecture shown in Figure 1 has the following components:</p> <ul style="list-style-type: none"> • Server • Client </div>	[5]	CO3	apply
10.	<p>Solve the following and do the conversion in required number system.</p> <p>i. $FAFC_{16} = \underline{175374}_8$</p> <p>ii. $70275_8 = \underline{708D}_{16}$</p> <p>iii. $111101010101000101010_2 = \underline{17525052}_8$</p> <p>iv. $888_{10} = \underline{110111000}_2$</p> <p>v. $5026_{10} = \underline{100111000000}_8$</p> <p><i>Handwritten note:</i> 11700</p>	[1*5=5]	CO3	apply

Roll No

National Institute of Technology Patna

End Semester Examinations, Dec-2024

Course Name: Workshop Practice
Course Code: ME13102

Full Marks – 60
Total Time: 3.00 Hours

Instructions: (i) Answer any Four
(ii) All questions carry equal marks

- ✓1. Describe in detail about *Electric Arc Welding* Process supported by a neat sketch. Also provide description about any three *Welding Joints* aptly supported by sketches.
- ✓2. Provide a detailed description about *Oxyfuel Gas Welding*. Also highlight in brief about *Brazing and Soldering*.
3. Provide a detailed classification about the *Files* used in Bench work or Fitting process with appropriate sketches of the same.
- ✓4. Write short notes on any two *Seasoning processes of Wood*. Also provide a brief write-up about any two types *Saws* used in Wood Work.
- ✓5. Provide a classification along with a detailed description about the various types of *Engineering Materials*.

