School of Aeronautics (Neemrana)

I-04, RIICO Industrial Area, Neemrana, Dist. Alwar, Rajasthan

Approved by Director General of Civil Aviation, Govt. of India, All India Council for Technical Education
Ministry of HRD, Govt of India & Affiliated to Rajasthan Technical University, Kota & BTU, Bikaner Rajasthan

Question Paper For Internal Assessment Examination (Theory) - Credit 2 / 16

Instructions For Students / FacultyMid Term I (Total 40 Marks, 1.5 HRS. Syllabus From Beginning Of Session)
• Part A: Total number of questions to be given are four, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For Both Question & Answer)**, no objective type or fill in the blanks. Total 8 marks.
• Part B: Total number of questions to be given are five, out of which student has to answer any three. They are long answer type **(Not More Than 50 Words For Question Only)**, each carrying 6 marks. Total 18 marks.
• Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type* **(Not More Than 70 Words For Question Only)**, each carrying 7 marks. Total 14 marks.
Mid Term II & III (Total 60 Marks, 2 HRS. Syllabus From Beginning Of Session)
• Part A: Total number of questions to be given are ten, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words For Both Question & Answer)**, no objective type or fill in the blanks. Total 20 marks.
• Part B: Total number of questions to be given are six, out of which student has to answer any four. They are long answer type **(Not More Than 50 Words For Question Only)**, each carrying 5 marks. Total 20 marks.
• Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type **(Not More Than 70 Words For Question Only)***, each carrying 10 marks. Total 20 marks.
* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS**: 1 FY1 - 04 Communication Skills (Cr 2), 1 FY1 - 05 Human Values (Cr 2), 2 FY1 - 04 Communication Skills (Cr 2), 2 FY1 - 05 Human Values (Cr 2), 3 AN1 - 02 Technical Communication (Cr 2), 4 MH1 - 02 Technical Communications (Cr 2), 4 MH1 - 03 Economics and Financial Accounting (Cr 2), 5 AN5 - 12 Aircraft Maintenance Practices (Cr 2), 6 AN3 - 01 Mechanics of Composite Materials (Cr 2), 6 AN5 - 12 Aircraft Rules and Regulation (Cr 2), 6 MH3 - 01 Automobile Engineering (Cr 2).
FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER.

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.

Question Paper & Student Details

Mid Term	Mid Term 2	**Date of Submission**	20/08/2020
Name of Faculty	Mr. Yatan	**Date of Examination**	24/08/2020
Course	B.Tech (Aeronautical Engineering)	**Semester**	SEMESTER : 5
Batch	Combined Batches 15, 16, 17, SF 1	**Subject**	5 AN3 - 01 Vibration Engineering (Cr 2)

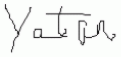
COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER
(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Outcome	COURSE OUTCOME Upon completion of the course, Students will be able to CO1: Solve problems in free, free damped and forced vibration characteristics of single degree of freedom systems. CO2: Analyse the vibration characteristic of multi degree of freedom systems including orthogonality conditions. CO3: Apply the vibration characteristics of continuous system such as strings, bar, shafts and beams in real time applications. CO4: Calculate the fundamental frequency of multi degree of freedom systems using approximate methods. CO5: Investigate the aero elastic effects of 2D wing.

Email I'd	yatannagpal@soaneemrana.org	**Phone No.**	798-226-2196
Student Name		**Student Reg No.**	

Part A			
Question : 1	What do you understand by coordinate coupling?		
Lesson Plan No. - 9	Topic - Coordinate coupling	Source - V.P. Singh	CO No. - 2
Question : 2	What do you understand by orthogonality principle and principle coordinates?		
Lesson Plan No. - 11	Topic - Orthogonality	Source - V.P. Singh	CO No. - 2
Question : 3	Define vibration of the continuous system and also define boundary conditions in continuous media or system.		
Lesson Plan No. - 14	Topic - Continuous system	Source - V.P. Singh	CO No. - 3
Question : 4	What is D		

Lesson Plan No. - 3	Topic - D\	Source - V.P. Singh	CO No. - 1
Question : 5	What is meant by vibration isolation?		
Lesson Plan No. - 6	Topic - Support excitation	Source - V.P. Singh	CO No. - 1
Question : 6	Define lateral vibrations, transverse vibrations in strings along with torsional vibration in shaft.		
Lesson Plan No. - 15,16	Topic - Vibration in elastic bodies	Source - V.P. Singh	CO No. - 3
Question : 7	Define Lagrange's equations and write the expression of Lagrange's equations.		
Lesson Plan No. - 13	Topic - Lagrange's equation	Source - V.P. Singh	CO No. - 2
Question : 8	Write the equation of motion of undamped vibration of two degree of freedom system along with damped free vibration.		
Lesson Plan No. - 8	Topic - Multi degree of freedom	Source - V.P. Singh	CO No. - 2
Question : 9	What is the principle of vibration absorber? What is the difference between vibration isolation and vibration absorber?		
Lesson Plan No. - 9	Topic - Vibration absorber	Source - V.P. Singh	CO No. - 2
Question : 10	What is meant by transmissibility and name some instruments used for the measurement of vibrations.		
Lesson Plan No. - 7	Topic - Vibration measuring instruments	Source - V.P. Singh	CO No. - 1
Part B			
Question : 1	Derive the expression for torsional vibration of a uniform shaft.		
Lesson Plan No. - 16	Topic - Torsional vibration:continuous system	Source - V.P. Singh	CO No. - 3
Question : 2	Derive the equation of coordinate coupling with the help of a diagram.		
Lesson Plan No. - 9	Topic - Coordinate coupling	Source - V.P. Singh	CO No. - 2
Question : 3	Explain briefly the concept of forced harmonic vibration of two degree of freedom system.		
Lesson Plan No. - 8	Topic - Two degree of freedom system	Source - V.P. Singh	CO No. - 2
Question : 4	Derive the expression for 1-D wave equation for transverse vibrations of string and lateral vibration of string and also determine their solution of wave equation.		
Lesson Plan No. - 15	Topic - Continuous system:elastic bodies vibration	Source - V.P. Singh	CO No. - 3
Question : 5	Derive the equation of motion of multi degree of freedom system using Newton		
Lesson Plan No. - 10	Topic - Multi degree of freedom system	Source - V.P. Singh	CO No. - 2
Question : 6	How the principal modes and mode shapes can be determined in case of multi degree of freedom systems? Explain with the help of an example.		
Lesson Plan No. - 11	Topic - Mode shape	Source - V.P. Singh	CO No. - 2
Part C			
Question : 1	Find the natural frequencies and mode shapes of the system shown in Fig (a) for k1=k2=k3=k and m1=m2=m3=m using Eigen values and Eigen vector method.		
Lesson Plan No. - 12	Topic - Eigen value	Source - V.P. Singh	CO No. - 2
Question : 2	Use Lagrange's equation to find equation of motion of a system shown in figure (b).Given: m1 = 10 kg, m2 = 15 kg, k = 320 N/m. Use Lagrange's equation to find equation of motion of a system shown in figure (c).		
Lesson Plan No. - 13	Topic - Lagrange\	Source - V.P. Singh	CO No. - 2
Question : 3	A machine having a mass of 100 kg and supported on springs of total stiffness 7.84 x 105 N/m has an unbalanced rotating element which result in disturbing force of 392 N at a speed of 3000 r.p.m. Assuming a damped factor of ε=0.20, determine (a) the amplitude of motion due to unbalance (b) transmissibility (c) transmitted force.		
Lesson Plan No. - 6	Topic - Transmissibility	Source - V.P. Singh	CO No. - 1

Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. *(Mention question number with relevant fig / numerical / equations. Max 150 KB)*	
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.	

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