

DESIGN AND FABRICATION OF FUNCTIONING THE GO - KART

A PROJECT REPORT

Submitted by

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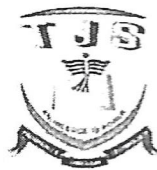
in partial fulfillment for the award of the degree

of

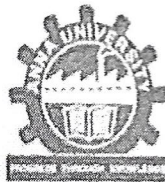
BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING



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JUNE 2022



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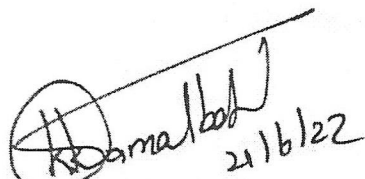
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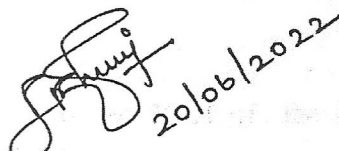
BONAFIDE CERTIFICATE

Certified that this project report "DESIGN AND FABRICATION OF FUNCTIONING THE GO - KART" is the bonafide work of "M.DINESH KUMAR (112819114005), S.HARISH (112819114008), S.MURUGAN (112819114014), M.VISHAL (112819114025)", who carried out the project work under my supervision.


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SIGNATURE

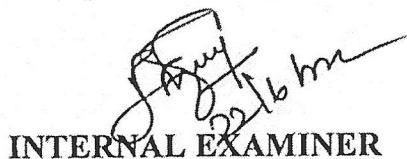
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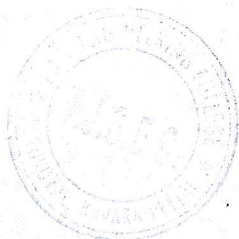
Submitted for project viva - voce examination held on 22/06/22

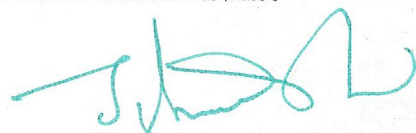

22/6/22

INTERNAL EXAMINER


22/6/2022

EXTERNAL EXAMINER





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ABSTRACT

A go kart is a small four wheeled vehicle basically used of traditional kart racing and amusement purpose. We designed and fabricated a go kart for participation at the national go kart championship. The design includes applications of extensive engineering analysis, teamwork, project management, and development of conceptual ideas. These ideas have been then converted into viable concepts ready for fabrication. The main objective of the design is to make a car that is durable as well as reliable and will last through the endurance using parts that are cost effective and easily available in India. The kart has been designed using sound design principles. The principle of triangulation has been extensively used to make sure that the chassis is extremely rigid and provides a safe cocoon for the driver in case of an accident. The vehicle has been designed in such a way that the reliability is not compromised in the pursuit of speed. The wheel and suspension geometry have been designed taking into account the track layout and prevailing conditions.

Keywords: Analysis, Teamwork, Durable, Reliable, Sound design principles, Triangulation



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OBJECTIVES

- To familiarize the various steps involved in the Design Process
- To understand the principles involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.
- To learn to use standard practices and standard data
- To learn to use catalogues and standard machine components
- (Use of P S G Design Data Book is permitted)

UNIT I STEADY STRESSES AND VARIABLE STRESSES IN MACHINE MEMBERS 9

Introduction to the design process - factors influencing machine design, selection of materials based on mechanical properties - Preferred numbers, fits and tolerances - Direct, Bending and torsional stress equations - Impact and shock loading - calculation of principle stresses for various load combinations, eccentric loading - curved beams - crane hook and 'C' frame- Factor of safety - theories of failure - Design based on strength and stiffness - stress concentration - Design for variable loading.

UNIT II SHAFTS AND COUPLINGS 9

Design of solid and hollow shafts based on strength, rigidity and critical speed - Keys, keyways and splines - Rigid and flexible couplings.

UNIT III TEMPORARY AND PERMANENT JOINTS 9

Threaded fasteners - Bolted joints including eccentric loading, Knuckle joints, Cotter joints - Welded joints, riveted joints for structures - theory of bonded joints.

UNIT IV ENERGY STORING ELEMENTS AND ENGINE COMPONENTS 9

Various types of springs, optimization of helical springs - rubber springs - Flywheels considering stresses in rims and arms for engines and punching machines- Connecting Rods and crank shafts.

UNIT V BEARINGS 9

Sliding contact and rolling contact bearings - Hydrodynamic journal bearings, Sommerfeld Number, Raimondi and Boyd graphs, -- Selection of Rolling Contact bearings.

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of this course the students will be able to

- CO1 Explain the influence of steady and variable stresses in machine component design.
- CO2 Apply the concepts of design to shafts, keys and couplings.
- CO3 Apply the concepts of design to temporary and permanent joints.
- CO4 Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
- CO5 Apply the concepts of design to bearings.

TEXT BOOKS:

1. Bhandari V, "Design of Machine Elements", 4th Edition, Tata McGraw-Hill Book Co, 2016.
2. Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett "Mechanical Engineering Design", 9th Edition, Tata McGraw-Hill, 2011.



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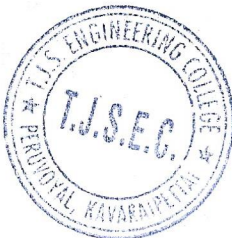
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1. Alfred Hall, Halowenko, A and Laughlin, H., "Machine Design", Tata McGraw-Hill BookCo.(Schaum's Outline), 2010
2. Ansel Ugural, "Mechanical Design – An Integral Approach", 1st Edition, Tata McGraw-Hill Book Co, 2003.
3. P.C. Gope, "Machine Design – Fundamental and Application", PHI learning private ltd, New Delhi, 2012.
4. R.B. Patel, "Design of Machine Elements", MacMillan Publishers India P Ltd., Tech-Max Educational resources, 2011.
5. Robert C. Juvinall and Kurt M. Marshek, "Fundamentals of Machine Design", 4th Edition, Wiley, 2005
6. Sundararajamoorthy T. V. Shanmugam .N, "Machine Design", Anuradha Publications, Chennai, 2015.



A handwritten signature in blue ink, appearing to be "S. Shanmugam".

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