

SUBJECT CODE NO:- P-17
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(MECH) Examination May/June 2017
I.C. Engines
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Solve any three questions from each section.
 - ii) Support your answer with figure wherever possible.
 - iii) Figures to the right indicate full marks
 - iv) Assume suitable data if necessary

Section A

- | | | |
|-----|---|----|
| Q.1 | (a) Explain with neat diagram working of 4- stroke diesel engine | 07 |
| | (b) Explain with P-V and T.S. diagram Atkinson Cycle. Obtain equation for thermal efficiency of the same. | 07 |
| Q.2 | (a) Write short note on 'heat loss factor'. | 07 |
| | (b) Explain with neat diagram simple carburetor | 06 |
| Q.3 | (a) Discuss the important qualities of S.I. Engine fuel. | 07 |
| | (b) Write short note on fuel additives | 06 |
| Q.4 | (a) Explain the stages of combustion in S.I. Engines | 07 |
| | (b) Explain the effect of various engine variables on S.I. Engine knock | 06 |
| Q.5 | (a) State different Combustion chambers used in S.I. Engine. Explain any one with neat diagram. | 07 |
| | (b) Differentiate between 2 stroke engine and 4- stroke engine | 06 |

Section B

- | | | |
|------|---|----|
| Q.6 | (a) Explain stages of combustion in C.I. Engine | 07 |
| | (b) Explain the phenomenon of knock in CI engine | 07 |
| Q.7 | (a) Explain any one indirect Injection combustion chamber used in CI Engine | 07 |
| | (b) Discuss 'Cetane Rating' of fuel | 06 |
| Q.8 | (a) Explain Willian's line method to measure friction power | 06 |
| | (b) A four-stroke, four cylinder gasoline engine has a bore of 60mm and stroke of 100mm. On test it develops a torque of 66.5 N.m, when running at 3200 rpm. If the clearance volume in each cylinder is 60cc, the relative efficiency with respect to brake thermal efficiency is 0.5 and the calorific value of fuel is 42 MJ/Kg, determine the fuel consumption in kg/hr and bmep. | 07 |
| Q.9 | Write short notes on | 13 |
| | a) MPFI Engine | |
| | b) CRDI Engine | |
| Q.10 | (a) Discuss on I.C. Engine emission and their effects on human health. | 07 |
| | (b) Explain three-way catalytic convertor to control emission | 06 |

SUBJECT CODE NO:- P-50
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(MECH] Examination May/June 2017
Automatic Control System
(Revised)

[Time: Three Hours]

[Max.Marks:80]

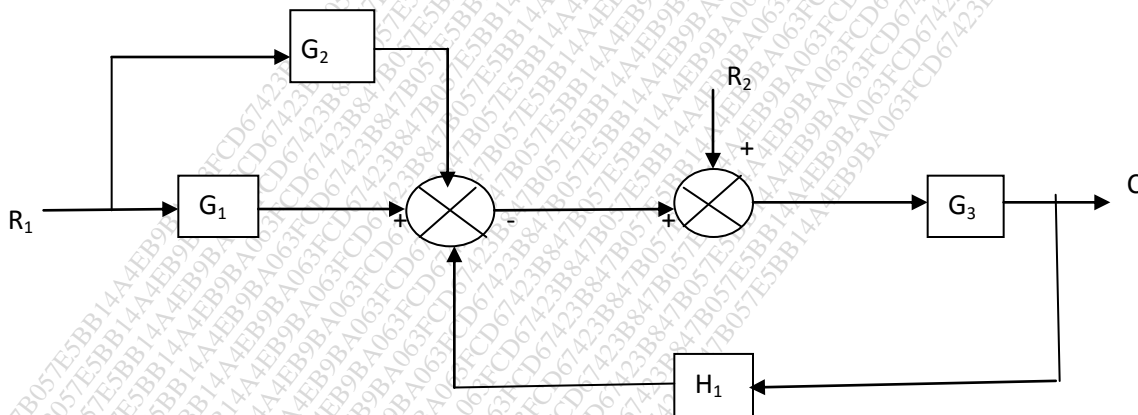
N.B

Please check whether you have got the right question paper.

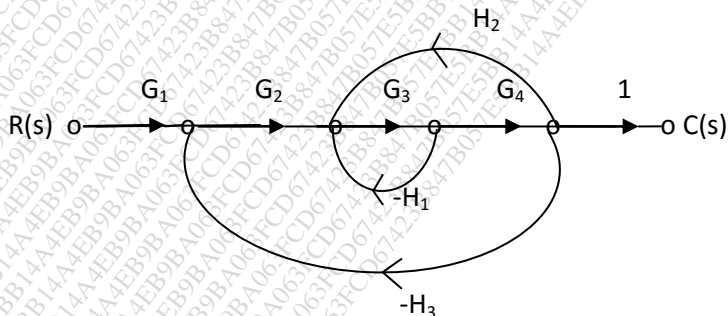
- i) Solve any three questions from each section.
- ii) Draw neat sketches if required.
- iii) Assume suitable data if required.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Define Transfer function of control System and also write the properties of Transfer function. | 07 |
| | b) Write down the Advantages of Automatic Control System. | 06 |
| Q.2 | a) Explain in detail Force-Voltage analogy. | 07 |
| | b) Write a short note on Electrical System. | 06 |
| Q.3 | a) Determine the transfer functions C/R_1 & C/R_2 from the block diagram shown in fig. | 09 |



- | | | |
|-----|---|----|
| | b) Write down the significance of Block diagram reduction technique | 05 |
| Q.4 | a) For the SFG shown in fig. Determine T.F | 07 |



- | | | |
|--|--|----|
| | b) Explain Pneumatic Nozzle – Flapper Amplifier. | 06 |
|--|--|----|

- Q.5 a) Explain Hydraulic Proportional Controller. 07
b) Compare between A.C & D.C servo motor. 06
- Section B
- Q.6 a) Differentiate between Transient and Steady State response. 07
b) Derive the equation for unit step response of First order system. 06
- Q.7 a) Given the T.F $G(s) = \frac{200}{s^2 + 30s + 200}$ 07
Find the Peak time, % overshoot, T_s and T_r .
b) Write a Short Note on Effect of Damping ratio on response of second order system. 06
- Q.8 a) Write a Short Note on Polar Plots. 06
b) A unity feedback system has $G(s) = \frac{K(s+1)}{s^2(s+2)(s+5)}$ using Routh's criteria find range of K for the system to be stable. 07
- Q.9 a) For the system having open loop T.F 10
 $G(s)H(s) = \frac{10}{s(s+1)(s+10)}$. Determine stability of system by plotting Bode Plot.
b) What are log scales? 03
- Q.10 a) Write a Note on Application of MATLAB software in Control System. 05
b) Sketch the root locus diagram for a control system having 09
 $G(S) = \frac{K(s+4)}{s(s^2+6s+13)}$ & $H(S) = 1$

SUBJECT CODE NO:- P-81
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(MECH) Examination May/June 2017
Metrology and Quality Control
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

- N.B
- i) Solve any three questions from each section
 - ii) Figure to the right indicates full marks.
 - iii) Assume suitable data if required.
 - iv) Use of non-programmable calculator is allowed.

Section A

- | | | | |
|-----|------|--|----|
| Q.1 | A | Explain measurement standards with the help of suitable example | 07 |
| | B | Explain autocollimator with neat sketch | 06 |
| Q.2 | A | What is surface finish measurement? Explain any one of the equipment for surface finish measurement in detail. | 07 |
| | B | Draw a neat sketch of NPL flatness interferometer & explain in detail. | 06 |
| Q.3 | A | Discuss the advantages in metrology in detail. | 07 |
| | B | Explain Parkinson's gear tester for measuring gear error. | 06 |
| Q.4 | A | Explain LVDT in detail with neat sketch | 07 |
| | B | Write down different types of gear error | 06 |
| Q.5 | | Write short note on (Any three) | 14 |
| | i. | CMM | |
| | ii. | IS 919-1963 | |
| | iii. | Profile projector | |
| | iv. | Line& End standard. | |

Section B

- | | | | |
|------|------|---|----|
| Q.6 | A | Differentiate between cost of quality & value of quality | 07 |
| | B | Discuss the quality statements in detail. | 06 |
| Q.7 | A | With the help of suitable example, explain quality function deployment. | 07 |
| | B | Explain FMECA in detail. | 06 |
| Q.8 | A | Explain control charts for attributes & variables in detail. | 07 |
| | B | Explain cause & effect diagram with suitable example. | 06 |
| Q.9 | A | Explain OC curve & its characteristic in detail. | 07 |
| | B | Discuss the technique of standardization. | 06 |
| Q.10 | | Write short note on (Any three) | 14 |
| | i. | Value engineering | |
| | ii. | Pareto analysis | |
| | iii. | Kaizan technique | |
| | iv. | TPM | |

SUBJECT CODE NO:- P-114
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Turbo Machines
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Solve three question from each section
2. Figure to the right indicate full marks

Section A

- Q.1 a) Definition a turbo machine. Differentiate between a turbo machine and a positive displacement machine 6
- b) Define specific speed of a turbine derive an expression for specific speed of a turbine from fundamentals 7
- Q.2 a) A jet of water of diameter 80 mm moving with a velocity of 27 m/s strikes a fixed plate in such a way that the angle between the jet and plate is 60° . Find the force exerted by the jet on the plate 7
- i) In the direction normal to the plate
- ii) In the direction of the plate
- b) Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet. 6
- Q.3 a) A jet of water of diameter 53 mm having a velocity of 22 m/s strikes a curved vane which is moving with a velocity of 11 m/s in the direction of the jet. The jet leaves the vane at an angle of 60° to the direction of moving of vane at outlet. Determine 7
- i) The force exerted by the jet on the vane in the direction of motion
- ii) Work done per second by the jet
- b) A nozzle of 48 mm diameter delivers a stream of water at 24 m/s perpendicular to a plate that moves away from the jet at 6 m/s.
- find i) The force on the plate
- ii) The work done
- iii) the efficiency of jet
- Q.4 a) What are the uses of a draft tube? Describe with neat sketches different types of draft tubes 6
- b) A pelton wheel is to be designed for the following specifications: shaft power = 11500 kw; Head = 390 meters; speed = 760 rpm; overall efficiency = 86%; jet diameter is not to exceed one sixth of the wheel diameter. Determine: 7
- i) The wheel diameter
- ii) the number of jets required
- iii) Diameter of the jet
- Q.5 a) A Reaction turbine works at 450 rpm under a head of 125 meters. Its diameter at inlet is 125 cm and the flow area is 0.45 m^2 . The angles made by absolute and relative velocities at inlet are 22° and 62° respectively with tangential velocity. Determine 7
- i) The volume flow rate
- ii) The power development

iii) Hydraulic efficiency Assume whirl at outlet to be zero

b) Draw neat sketches and explain the Kaplan turbine

7

Section B

- Q.6 a) What is the different between single-stage and multistage pumps? Describe multistage pump with impeller 6
in parallel and in series.
- b) A centrifugal pump is running at 1440 rpm the outlet vane angle of the impeller is 45° and velocity of flow 7
at outlet is 2.8 m/s .The discharge through the pump is 210 litres / s when the pump is working against a total
head of 21m. If the manometric efficiency of the pump is 80%. Determine
- i) The diameter of the impeller
- ii) The width of the impeller at outlet
- Q.7 In a single row wheel impulse turbine the mean diameter of the blades 1.1 m and the speed is 300 rpm, the 13
nozzle angle is 20° and the ratio of blade speed to steam speed is 0.46 and the relative velocity and outlet
from the blades to that at inlet is 0.87. The outlet angle is made 3° less than the inlet angle. The steam flow is
12 kg/s. Draw the velocity diagram for the blade and determine the following
- a) Tangential thrust on the blades
- b) Axial thrust on the blade
- c) Power developed in the blades
- d) Blade efficiency
- Q.8 a)Sketch Brayton cycle on p-v plot and derive a relation for its thermal efficiency in terms of pressure ration 6
- b) Discuss the influence of reheating, regeneration and inter-cooling on the performance of the gas turbine 7
cycle
- Q.9 a) Derive an expression for critical pressure in nozzle flow. 6
- b) A nozzle expands steam from 15 bar and 310°C to 5.5 bar. If the flow rate is 1.2 kg/s find the throat and 7
exit area. What should be coefficient of velocity, if exit velocity is 555 m/s?
- Q.10 Write short notes on any three of following 14
- 1) NPSH
- 2) Ericsson cycle
- 3) Nozzles and diffusers
- 4) Characteristics of centrifugal Pump

SUBJECT CODE NO:- P-153
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Elective-I: Energy Conservation and Management
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Attempt any THREE question from each section
- ii) Use separate answer-book for each section
- iii) Figures to the right indicate full marks

Section A

- | | | |
|-----|--|----|
| Q.1 | a) Classify the types of energy available on earth | 4 |
| | b) Describe the scenario of energy pricing in India | 6 |
| | c) Write on global primary energy reserves | 3 |
| Q.2 | a) What are the factors Affecting Furnace Performance? | 4 |
| | b) What is different in combustion system? Explain briefly the different types of draft. | 6 |
| | c) List out the data required for calculation of boiler efficiency using 'indirect method' | 3 |
| Q.3 | a) Energy conservation opportunities in refrigeration system | 4 |
| | b) Why is CHP more efficient than conventional electricity generation? | 3 |
| | c) Discuss the advantages and disadvantages of Reciprocating engine in the cogeneration mode | 6 |
| Q.4 | a) explain flexible mechanism like CDM and its development in India | 3 |
| | b) What are waste heat recovery boilers? Explain their need and benefits? | 4 |
| | c) Briefly explain various types of centrifugal fan and its characteristics and application | 6 |
| Q.5 | Write short notes on any TWO of the following: | 14 |
| | a) Kyoto protocol | |
| | b) steam traps | |
| | c) Energy security | |
| | d) GDP | |

Section B

- | | | |
|-----|--|---|
| Q.6 | a) What are the several types of contracts used in auditing and explain each in brief. | 6 |
| | b) The Avg. PF of an engineering industry is 0.8 with electrical load of 400 KW. Determine the KVAR required if PF improved to 0.9 to avoid penalty and MD reduction | 4 |
| | c) List down any five common system problem and solution in electrical power distribution system of a | 3 |

2017

	typical industry	
Q.7	a) What are the various voltage level at which power is transmitted and distributed and why? How high voltage transmission helps for energy efficiency?	6
	b) How do you assess the performance of PF capacitors?	4
	c) Enumerate the sensitivity analysis in detail	3
Q.8	a) Define under-loading of motor? Mention its 4 causes and possible measures to overcome the under-loading	6
	b) Discuss energy efficient equipment and its necessity for Energy Auditing with case studies	4
	c) What is the significance of an energy policy and what general aims and specific targets does it relate to?	3
Q.9	a) Investment for an energy proposal is Rs.20 lakh Annual savings for the first two year is Rs. 4 lakhs each and subsequent two years Rs. 6 lakhs each and fifth year is Rs 7 lakhs. Considering cost of capital as 10% what is the net present value of the proposal? Is it worth investing in this project?	6
	b) Write the salient feature of NPV simple payback period	3
	c) Explain significance role of ESCO in energy conservation	4
Q.10	Write short notes on any TWO of the following	14
	a) Energy policy	
	b) Global warming	
	c) Detailed energy audit	
	d) Time of day tariff	

SUBJECT CODE NO:- P-154
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Elective-I: Power Plant Engineering
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q. No. 1 and 6 are compulsory
- ii) Solve any two question from remaining in each section A & B
- iii) Assume suitable data

Section A

- | | | |
|-----|--|---|
| Q.1 | a) Explain site selection for thermal power plant | 6 |
| | b) Explain steps in coal handling system | 6 |
| Q.2 | a) Explain ash handling system in detail | 7 |
| | b) Explain how combustion takes place in overfeed and underfeed stoker | 7 |
| Q.3 | a) Explain the factors which are considered for selecting diesel power plant | 7 |
| | b) Explain cooling system in diesel power plant | 7 |
| Q.4 | a) Explain future trends in power industry | 7 |
| | b) Explain different sources of energy | 7 |
| Q.5 | a) Write short notes on | |
| | i) cold dust and its control | 5 |
| | ii) Supercharging of diesel engine | 5 |
| | iii) unit Coal handling | 4 |

Section B

- | | | |
|------|--|---|
| Q.6 | a) Explain construction and working of nuclear power plant | 6 |
| | b) Explain construction and working of BWR reactor | 6 |
| Q.7 | a) What is Kaplan turbine? Explain | 7 |
| | b) Explain water hammering effect and importance of surge tank | 7 |
| Q.8 | a) Explain Dam in detail | 7 |
| | b) Explain spill way and its types | 7 |
| Q.9 | a) Explain Environmental aspects of power generation | 7 |
| | b) Explain tariffs in detail | 7 |
| Q.10 | Write short notes on | |
| | i) Advantages of hydro-electric power plant | 5 |
| | ii) CANDU Reactor | 5 |
| | iii) Effect of Nuclear Radiation | 4 |

2017

SUBJECT CODE NO:- P-155
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Elective-I: Production Planning and Control
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Solve any three questions from each section.
 ii) Figures to the right indicate full marks.
 iii) Assume suitable data if required & state it correction.

Section A

- Q.1 a. Describe the functions of production planning & control in brief. 07
 b. Describe production cycle (production procedure) 06
- Q.2 a. The following are the available data of sales in Lakhs of Rupees:- 09

Year :	1980	1981	1982	1983	1984	1985
Sales :	50	70	60	80	85	90

 Forecast the sales for the year 1990 by applying least square method.
 b. Define forecasting, Explain its importance. 04
- Q.3 a. What are seasonal variations? Why they are importance for sales forecast? 05
 b. Describe exponential smoothing methods of forecasting. State its advantages & limitations. 08
- Q.4 a. A company needs 600 units per month, The procurement cost is Rs. 36 per order. The cost of holding in stock is Rs.1.20/unit/year. Determine economic order quantity. If the consumption increases 40 numbers per day and inventory cost charges to Rs. 6/ unit /year. What will be the revised EOQ. 10
 b. Enlist functions of inventories. 03
- Q.5 Write short notes on (any two) 7*2=14
 i. Material requirement planning (MRP)
 ii. ABC analysis and its application
 iii. Inventory Control systems.
- Section-B
- Q.6 a. Explain how the routing differs inn job order intermittent and continuous production systems. 07
 b. what is machine loading? What are its objectives? 06
- Q.7 a. What is dispatching? State the various activities of dispatching in brief. 07
 b. Define aggregate planning and master production schedule. 06
- Q.8 a. What are the objectives of line of balance? Discuss stages of LOB technique. 07
 b. Explain the concept of bill of materials in connection to MRP. 06
- Q.9 a. Define the term expediting in the process of PPC. 06
 b. Define scheduling and explain in brief various techniques of scheduling. 07
- Q.10 Write short notes (any two) 7*2=14
 i. JIT purchasing techniques
 ii. Lean Production system
 iii. Route sheets

2017

SUBJECT CODE NO:- P-156
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Elective-I: Advanced Materials and Manufacturing
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B	i) Solve any three question from each section ii) Draw a neat section wherever required iii) Assume suitable data if required iv) Figure to right indicate full marks	
Section A		
Q.1	a) What are composite materials? Explain metal matrix composite	7
	b) What is rules & mixture equation state its significance	6
Q.2	a) Explain the following techniques of polymers with example	7
	b) What are elastomers? Explain	6
Q.3	a) State the characteristics and application of ceramic material	7
	b) What is reinforced cement concrete? What are its advantages and properties	6
Q.4	a) Explain the development taking place of cutting tool material	7
	b) What is super alloy? Explain with example	6
Q.5	Write short note on any two	14
	i) Dielectric material	
	ii) Electronic ceramics	
	iii) Hybrid composite	
Section B		
Q.6	a) State the properties of material for good castability and explain flask less molding.	7
	b) What are quality checks for casting? Explain different Defects.	6
Q.7	a) What is CVD? Explain the process	7
	b) How and where electroless coating is used	6
Q.8	a) State the need for nontraditional machining process. Explain chemical machining	7
	b) List and explain the process parameters for Abrasive jet machining	6
Q.9	a) How the repaid proctoring is a different manufacturing process? Explain	6
	b) Explain the SLS process	7
Q.10	Write short note on any two	14
	i) Electron jet machining	
	ii) Thermal spray coating	
	iii) Magneto Abrasive finishing	

SUBJECT CODE NO:- P-157
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Elective-I: Modern Management Techniques
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

- N.B 1) Figure to the right indicate full marks
 2) Attempt any three question from section A and ant three question from section B
 3) Assume suitable data wherever necessary
- Section A
- Q.1 a) What is prioritization matrix? Explain steps to draw a prioritization matrix and why do you consider it to be one of the 7 new QL Tools. 7
- b) Customer focus is the principle of TQM explain 6
- Q.2 a) Explain with illustrative example use of check sheet in following types : 6
 a) study pattern of variability
 b) Quantity defect by location
- b) Explain various types of scatter diagram with illustrative example and their interpretation 7
- Q.3 a) Explain the role of setup time and lot size in JIT 7
- b) Narrate the types of wastes which are likely in a factory 6
- Q.4 a) Explain various steps of a SMED process towards significant reduction of changeover or setup 7
- b) Explain poka-yoke concept and its purpose 6
- Q.5 Write short notes on any two 14
 a) BPR
 b) JIT and its benefits
 c) Evolution of six sigma Approach
- Section B
- Q.6 a) Why QFD process required move time be spent upfront in the development process? 7
- b) Explain how compaction and evaluated in House of Quality? 6
- Q.7 a) What are value analysis and value engineering? How they are related to continuous improvement 7
- b) Define TPM and explain the five TPM development activities 6
- Q.8 a) Describe the stages for introduction of TPM in an organization 7
 b) What are the forth development striving for overall equipment effectiveness? 6
- Q.9 a) Explain the concept of Lateral thinking 7
 b) Define QWL. Explain managerial role for improving QWL 6
- Q.10 Write short notes on any two. 14
 a) fast Analysis
 b) Value and its type
 c) Creativity and Innovation
 d) Parallel thinking

SUBJECT CODE NO:- P-158
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Elective-I: Non-Conventional Energy System
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Solve any three questions Each section
- ii) Assume suitable data Required

Section A

- | | | | |
|-----|---|--|----|
| Q.1 | A | Explain the importance of energy sources. | 06 |
| | B | Explain the Indian energy Scenario & energy pricing | 07 |
| Q.2 | A | Explain the comparison of conventional & non-conventional energy sources. | 06 |
| | B | Explain the methods of solar radiation estimation | 07 |
| Q.3 | | Explain the different types of solar collectors & advantages & disadvantages | 13 |
| Q.4 | A | Explain the performance analysis of flat plate collector | 06 |
| | B | Explain the solar water heater unit suitable diagram | 07 |
| Q.5 | A | Explain the solar Electric power plant | 07 |
| | B | Explain the different types solar cells | 07 |

Section B

- | | | | |
|------|---|--|----|
| Q.6 | A | Explain the wind data & energy estimation | 06 |
| | B | Explain the wind conversion system. | 07 |
| Q.7 | A | Explain the different types wind machines | 07 |
| | B | Explain the Biomass energy resources | 06 |
| Q.8 | | Explain with neat sketches different types of Biogas plants with their applications. | 13 |
| Q.9 | A | Explain the principle of ocean thermal energy conversion. | 06 |
| | B | Explain the tidal power plant | 07 |
| Q.10 | A | Explain the wave energy conversion | 07 |
| | B | Explain the Geothermal at power plant | 07 |

SUBJECT CODE NO:- P-159
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Prod) Examination May/June 2017
Elective-I: Manufacturing System
[OLD]

[Time: Three Hours]**[Max.Marks:100]**

Please check whether you have got the right question paper.

N.B

- 1) Attempt any three questions from each section.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if required.

Section A

- | | | |
|-----|--|----|
| Q.1 | a) What are the types of production? | 8 |
| | b) Explain integrated manufacturing system | 8 |
| Q.2 | a) What are the types of manufacturing systems? | 8 |
| | b) Explain Detroit type automation. | 8 |
| Q.3 | a) Explain automated flow line with storage buffer | 8 |
| | b) What is the need of computer integrated manufacturing | 8 |
| Q.4 | a) Explain Transfer Line High Volume Manufacturing System | 8 |
| | b) What are structural, transformational and procedural aspects of manufacturing system? | 8 |
| Q.5 | Write short notes on any three:- | 18 |
| | a) Integrated Manufacturing and Management System. | |
| | b) Computer Applications in Manufacturing System | |
| | c) Input/ Output of manufacturing | |
| | d) Automation and Robotics | |
| | e) Framework of IMMS. | |

Section B

- | | | |
|------|--|----|
| Q.6 | a) What is group technology? Explain necessity of it. | 8 |
| | b) Explain multi skill operator role in cellular manufacturing. | 8 |
| Q.7 | a) What is FMS? Explain its components | 8 |
| | b) Explain Automated Factory Remote control | 8 |
| Q.8 | a) How inter and intra cell movement of material done is cellular manufacturing? | 8 |
| | b) Give applications of FMS | 8 |
| Q.9 | a) What is Lease Manufacturing System? How it can be implemented? | 8 |
| | b) What is six sigma? | 8 |
| Q.10 | Write short notes on any three:- | 18 |
| | a) FMS planning | |
| | b) Automated Factory Remote Control | |
| | c) Toyota Production System | |
| | d) Concept of zero inventory | |
| | e) Man Machine chart | |

SUBJECT CODE NO:- P-202
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Robotics and Industrial Automation [Elective-II]
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

Answer any three questions from each section.

Section A

- | | | | |
|-----|------------------------------|---|----|
| Q.1 | a) | Compare Hydraulic drive with Pneumatic drive. | 07 |
| | b) | Write about robot application in spray painting. | 06 |
| Q.2 | a) | Explain forward and inverse kinematics. | 07 |
| | b) | Give examples for 2R and 3R manipulator. | 06 |
| Q.3 | a) | What is RPY related to robot kinematics? Explain. | 07 |
| | b) | Write about tools as robot end effectors. | 06 |
| Q.4 | a) | Write about the sensor characteristics. | 07 |
| | b) | What is image conversion? Explain. | 06 |
| Q.5 | Write short note on any two. | | 14 |
| | a) | Robot work envelope. | |
| | b) | Motion control methods. | |
| | c) | Frame buffer. | |

Section B

- | | | | |
|------|------------------------------|---|----|
| Q.6 | a) | What is flexible Automation? Explain. | 07 |
| | b) | Write about designing for Automation. | 06 |
| Q.7 | a) | What is non- contact inspection method? Explain. | 07 |
| | b) | Write about computer process control and its forms. | 06 |
| Q.8 | a) | Compare AS/RS system in detail. | 07 |
| | b) | Write about different types of automated assembly system. | 06 |
| Q.9 | a) | What are Ladder logic diagram? Explain. | 07 |
| | b) | Write about basic PLC programming. . | 06 |
| Q.10 | Write short notes on any two | | 14 |
| | a) | Machine Centre | |
| | b) | Ethics in industrial automation. | |
| | c) | Industrial control application. | |

SUBJECT CODE NO:- P-222
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Mech) Examination May/June 2017
Automobile Engineering
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

- N.B
- i) Question number 1 & Question number 6 are compulsory.
 - ii) Solve any two questions from remaining question from each section A & B.
 - iii) Draw neat sketches wherever necessary.
 - iv) Assume suitable data, if required.
 - v) Figures to the right indicate full marks.

Section A

- Q.1 Enlist the layouts of an Automobile with different engine position and drive arrangement. Explain the four wheel drive arrangement with neat sketch. 10
- Q.2 a) Where and Why do we use multiplate clutches? Explain the construction and working of multiplate clutch with the help of diagram. 08
- b) With the help of suitable diagram, describe the construction and working of diaphragm clutch. 07
- Q.3 a) With the help of suitable diagram, explain how constant mesh gearbox works? Discuss the advantages of a constant mesh Gearbox over sliding Mesh type. 08
- b) Explain the common troubles encountered in the gearbox and suggest suitable remedies. 07
- Q.4 a) What is independent suspension system. Which type of independent suspension is mostly used in Front drive vehicles? Explain with neat sketch. 08
- b) What are the different types of rubber springs? Briefly explain each. 07
- Q.5 Write short note on (Any three) 15
- a) Propeller shaft
 - b) Differential
 - c) Air suspension
 - d) Engine selection criteria
 - e) H Frame twist beam rear suspension.

Section - B

- Q.6 Explain the term: Camber, castor, steering axis inclination, toe-in and toe-out, scrub radius. What are the effect of each on the steering characteristics of vehicle? 10
- Q.7 a) Enlist the types of steering gearboxes. Describe in detail the rack and pinion type manual steering gearbox by means of simple sketch. 08
- b) Describe in detail construction Features of the tubed and tubeless tyres for automobile use. 07
- Q.8 a) What is the purpose of brake? Briefly describe construction and working of disc brake. Compare them with the conventional drum type brake. 08
- b) Explain Air brake system. 07
- Q.9 a) Draw the layout of various components of a charging system and point out the function of each component. 08
- b) Explain with neat sketch Automobile Air-conditioning system. 07
- Q.10 Write short note on (Any three) 15
- a) Hydraulic brake system
 - b) ABS
 - c) Electrical and Electronics in doors of Automobile
 - d) Wheel alignment and wheel balancing.
 - e) Pollution control devices.

SUBJECT CODE NO:- P-252
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Mech.) Examination May/June 2017
Project Management and Operations Research
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

N.B Please check whether you have got the right question paper.

- i) Attempt any three questions from each section.
- ii) Assume suitable data if necessary.
- iii) Figure to the right indicates full marks.

Section A

- Q.1 a) Explain the phase of OR. 08
 b) Solve the following LPP by graphical method 05
 Maximize $z = 5x_1 + 4x_2$
 Subject to constraints,
 $x_1 - 2x_2 \leq 1$
 $x_1 + 2x_2 \geq 3$
 $x_1, x_2 \geq 0$
- Q.2 Solve the following LLP by simplex method. 13
 Maximize $z = 4x_1 + 3x_2 + 6x_3$ subject to constraints,
 $2x_1 + 3x_2 + 2x_3 \leq 440$
 $4x_1 + 3x_3 \leq 470$
 $2x_1 + 5x_2 \leq 430$
 $x_1, x_2, x_3 \geq 0$
- Q.3 Solve the following LLP by big-M method. 14
 Minimize $Z = 4x + 2y$
 Subject to constraints,
 $x + 2y \geq 2$
 $3x + y \geq 3$
 $4x + 3y \geq 6$
 $x, y \geq 0$
- Q.4 Solve the following transportation problem using VAM. Find the optimum solution. 13

	A	B	C	D	E	supply ↓
X	36	16	2	32	-	300
Y	20	-	12	22	8	250
Z	8	6	16	-	14	500
Requirement →	150	400	200	100	150	

Q.5 a) Solve the following assignment model.

		Jobs				
		J ₁	J ₂	J ₃	J ₄	J ₅
workers	W ₁	27	29	30	40	38
	W ₂	32	25	31	28	30
	W ₃	28	30	29	20	26
	W ₄	25	18	27	24	28
	W ₅	19	24	20	21	15

06

b) The data collected in running a machine the cost of which is Rs 60,000/- are given below, Determine the optimum period for replacement of the machine

07

Year	1	2	3	4	5
Maintenance Cost (Rs)	18000	20270	22880	26700	31800

Section B

Q.6 a) A supermarket has two girls serving at the counters. The customers arrive in a Poisson fashion at the rate of 06 12per hour. The service time for each customer is exponential with mean 6 minutes. Find,

1. The probability that an arriving customer has to wait for service.
2. The average number of customers in the system, and
3. The average time spent by a customer in the supermarket.

b) There are five jobs, each of which is to be processed through 03 machins: A,B and C in the order A → B → C processing times in hours are :-

08

Job	1	2	3	4	5
M/C A	3	8	7	5	4
M/C B	4	5	1	2	3
M/C C	7	9	5	6	10

Find the sequence of jobs, total elapsed time and idle time for each machine.

Q.7 A Solve the following game using dominance property and find the game value (v) along with the strategies of 13 each player.

		Player B				
		1	2	3	4	5
Player A	1	3	5	1	-4	2
	2	4	2	2	-3	3
	3	5	-1	-1	0	-1

Q.8 Neon lights in industrial parks are replaced at the rate of 100 units per day. The physical plant orders the Neon lights periodically. It costs Rs. 100 to initiate a purchase order. A neon light kept in storage is estimated to cost about Rs. 0.02 per day. The lead time between placing and receiving an order is 12 days. Determine the optimum inventory policy for ordering the neon lights.

13

Q.9 The table below gives the data about durations and costs, if various activities of the network shown.

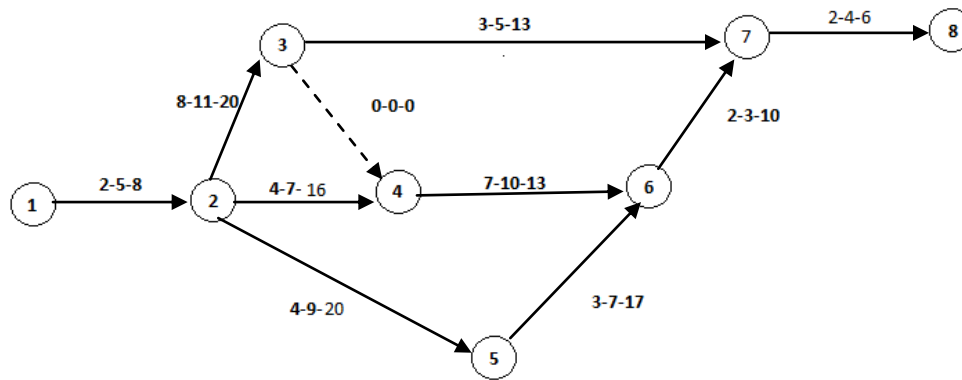
13

Activity	Normal duration (weeks)	Normal cost (Rs.)	Crash Duration (weeks)	Crash cost (Rs.)
1-2	4	4000	2	12000
2-3	5	3000	2	7500
2-4	7	3600	5	6000
3-4	4	5000	2	10000

The project overhead costs are Rs. 2000/ week. Find the optimum duration & the cost associated with it. Also, draw the least cost network.

Q.10 Figure shows the network for a construction project, with the three time estimates of each activity marked. Determine :-

- Critical path and its standard deviation.
- Probability of completion of project in 40 days.
- Time duration (T_s), that will provides 95% probability of its completion in time.



Z	P%
1.744	96%
1.65	95%

SUBJECT CODE NO:- P-319
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Machine Tool Design [Elective-II]
(Revised)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- N.B
- 1) attempt any three question from each section .
 - 2) assume suitable data if required .
 - 3) figure to the right indicates full marks .

Section A

- | | | | |
|-----|-----------------------------|---|----|
| Q.1 | a) | Explain hydraulic transmission and its elements. | 07 |
| | b) | What are the economics of machine tool selections? | 06 |
| Q.2 | a) | What are the trends of development of future machine tool ? | 07 |
| | b) | What are the forces acting on tool in turning process ? | 06 |
| Q.3 | a) | Explain stepless regulation of speed and feed rates . | 07 |
| | b) | What are the various steps for selection of best structural diagram ? | 06 |
| Q.4 | a) | What are the various profiles of machine tool structure ? | 07 |
| | b) | What are the materials of machine tool structure ? | 06 |
| Q.5 | Write short note on any two | | 14 |
| | a) | Acceptance test for machine tools . | |
| | b) | Special cases of gearbox design . | |
| | c) | Design of bed . | |

Section B

- | | | | |
|------|---------------------------------|--|----|
| Q.6 | a) | What are the function and requirements of guideways ? | 07 |
| | b) | What are the methods of adjusting clearances in guideways. | 06 |
| Q.7 | a) | What are the combination guideways and its applications ? | 07 |
| | b) | Explain basic design procedure of machine tool structure . | 06 |
| Q.8 | a) | What are the materials of guideways ? | 06 |
| | b) | What are the effect of machine tool compliance on machining accuracy ? | 07 |
| Q.9 | a) | Explain machine tool elastic system | 06 |
| | b) | What are the dynamic characteristics of elements and systems in machine tools? | 07 |
| Q.10 | Write short notes on any two :- | | 14 |
| | a) | Anti-friction bearings | |
| | b) | Forced vibration of machine tools | |
| | c) | Equivalent elastic system in machine tools | |

SUBJECT CODE NO:- P-283
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Mech.) Examination May/June 2017
Refrigeration and Air Conditioning
(Revised)

[Time: Three Hours]

[Max.Marks:80]

N.B Please check whether you have got the right question paper.

- 1) Solve three questions from each section.
- 2) Figure to the right indicate full marks
- 3) Use of refrigerant table, steam tables and psychrometric charts is allowed.
- 4) Assume suitable data necessary.

Section A

- Q.1 a) Discuss the limitation of Carnot cycle used for refrigeration. 03
b) Explain the Ton of refrigeration and show it is equivalent to 3.5 Kw. 03
c) The capacity of a refrigerator is 300 TOR when working between -10°C and 25°C . Determine the mass of ice produced per day from water at 25°C . Also find the power required to drive the unit. Assume that the cycle operates on reversed Carnot cycle and latent heat of ice is 335 kJ/kg. 06
- Q2 An ammonia ice plant operates on simple saturation cycle at the following temperatures: Condensing tempt. = 40°C , Evaporating tempt. = -15°C . It produces 50 tons of ice per day at -5°C from water at 30°C . Determine a) Capacity of the refrigeration plant, b) Mass flow rate of refrigerant, c) Compressor dimensions if it volumetric is 75% speed is 1500 rpm & L/D ratio is 1.2, e) C.O.P. 12
- Q.3 A two stage R-22 vapour compression system operates under the following conditions: Evaporator temperature -20°C , condenser temperature 50°C . Minimum temperature difference at heat exchanger for effective is 10°C . The capacity of plant is 10 TOR. The system uses flash intercooler. Assume no superheating in the evaporator & no sub cooling in the condenser. The system is designed for maximum efficiency. Determine: 12
- i) Pressure in flash intercooler
 - ii) Mass flow rates of refrigerants in LP and HP circuits
 - iii) Power required
 - iv) C.O.P.
- Q.4 A boot – strap cooling system of 20 TOR capacity is used in an aero plane. The ambient air temperature and pressure are 20°C and 0.85 bar respectively. The pressures of air increases from 0.85 bar to 1 bar due to ramming action of air. The pressure of air discharged from the main compressor is 3 bar. The discharge pressure of air from the auxiliary compressor is 4 bar. The isentropic efficiency of each of the compressor is 80% while that of turbine is 90%. 50% of the enthalpy of air discharged from the main compressor is removed in the first heat exchanger and 30% of the enthalpy of air discharged from the auxiliary compressor is removed in the second heat exchanger using rammed air. Assuming ramming action to be isentropic, the required compressor pressure of 1 bar and temperature of the air leaving the cabin not more than 20°C , 13

Find : 1. The power required to operate the system; and
2. The C.O.P. of the system.

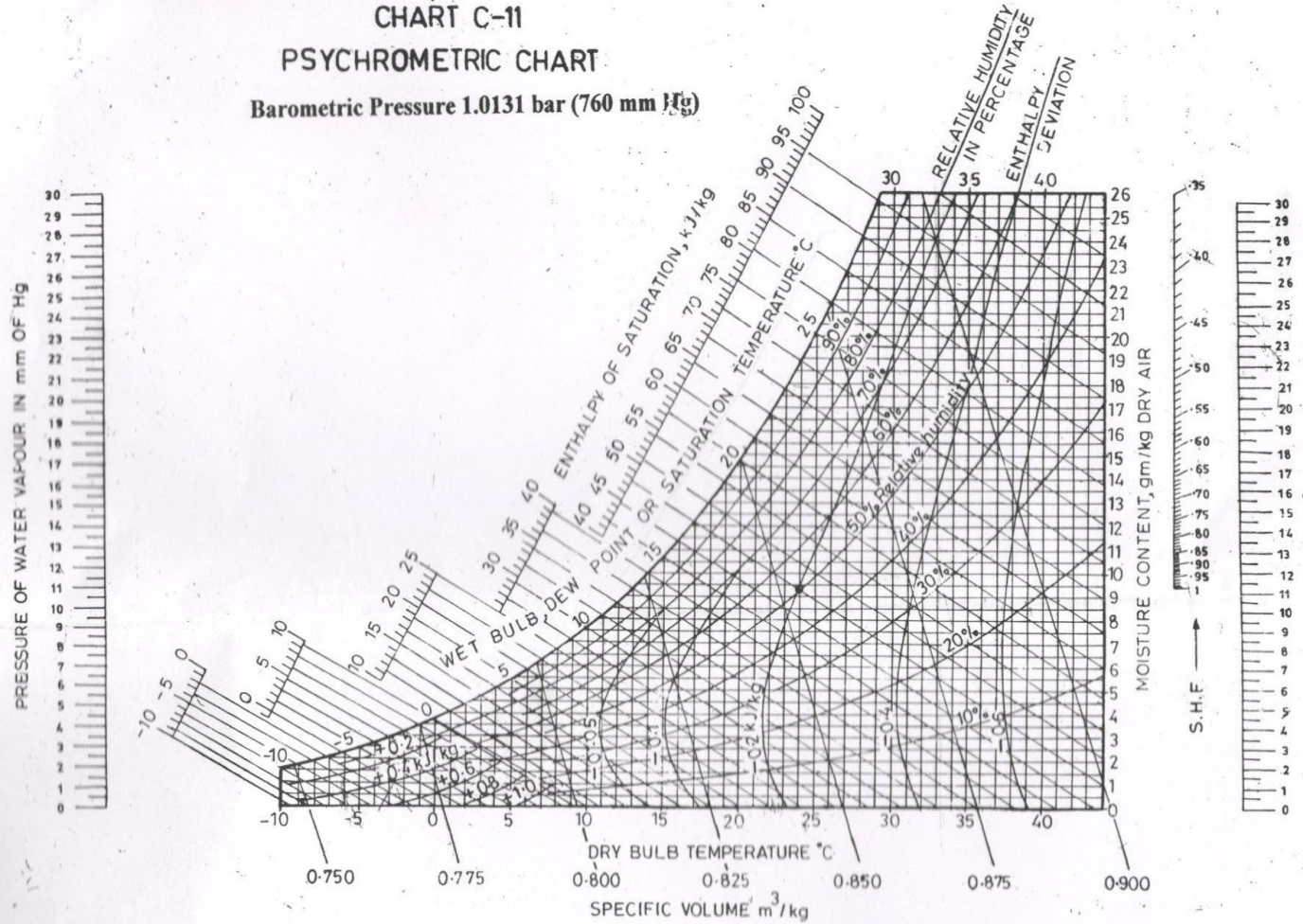
Draw the schematic and temperature – entropy diagram of the system. Take γ and $C_p = 1 \text{ kJ/kgK}$.

- Q.5 Write short note on the following (any three) 15
- Cascade refrigeration system.
 - Necessity of air-cooling in aero plane.
 - Methods to improve C.O.P. of VCC.
 - Bell-Coleman cycle.
 - Limitations of Carnot cycle used for refrigeration.

Section B

- Q.6 a) Distinguish between vapour absorption refrigeration system with vapour compression refrigeration system. 06
b) Explain Lithium – Bromide water vapour absorption system with neat sketch. 06
- Q.7 a) What is secondary refrigerant? Where is it used? Explain its importance in ice manufacturing plant? 06
b) Explain the factors considered for selection of refrigerant? 06
- Q.8 a) Explain sling psychrometer with neat sketch 04
b) The following reading were taken from a single sychrometer. Dry bulb temperature 30°C , WBT 20°C 08
barometer reading 720mm of hg. Using steam table determine.
a) Dew point Temp.
b) Relative humidity
c) Specific humidity
d) Degree of saturation.
- Q.9 An air conditioned hall is to be maintained at 25°C dry bulb temperature and 18°C wet bulb temperature. It has a sensible heat load of 50 KW and latent heat load of 20KW. The air supplied from outside atmosphere at 40°C dry bulb temperature and 28°C wet bulb temperature is $30 \text{ m}^3/\text{min}$ directly in to the room through ventilation and infiltration. Outside air to be conditioned is passed through cooling coil whose apparatus dew point is 15°C . The quantity of recalculated air from the hall is 60%. This quantity is mixed with conditioned air after the cooling coil. Determine, 1. Conditions of air after the coil and before the recirculated air mixes with it. 2. Conditions of air entering the hall i.e. after mixing recirculated air, 3. Mass of fresh air entering the cooler, 4. Bypass factor of the cooling coil and refrigerating load on the cooling coil. 13
- Q.10 Write short note on the following (any three): 15
- GWP and ODP.
 - Central air conditioning
 - Ice plant.
 - Steam jet air conditioning system.
 - Window air conditioning system.

CHART C-11
PSYCHROMETRIC CHART
Barometric Pressure 1.0131 bar (760 mm Hg)



SUBJECT CODE NO:- P-320
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech) Examination May/June 2017
Computational Fluid Dynamics [Elective-II]
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B

- i) attempt any three questions from each section (section A and B)
- ii) Figures to the right indicate full marks.
- iii) Draw diagrams or graphs wherever required.
- iv) Assume suitable data if necessary.

Section A

- Q.1 a) Consider the function $\phi(X, Y) = e^X + e^Y$ and the point $(x, y) = (1, 1)$. Calculate (a) the exact values of $\partial\phi/\partial x$ and $\partial\phi/\partial y$ at this point, (b) use second order central differences, with $\Delta X = \Delta Y = 0.1$, to calculate approximate values of $\partial\phi/\partial x$ and $\partial\phi/\partial y$ at point $(1, 1)$. calculate the percentage difference, when compared with exact values from part (a). 08
- b) Explain parabolic equations to steady inviscid supersonic flow and unsteady inviscid flow. 05
- Q.2 a) Show that the Laplace's equation $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0$ is an elliptic equation. 08
- b) Derive the discretized form of the generic integral form of the momentum equation. 05
- Q.3 a) Differentiate between structured and unstructured grid. 07
- b) Explain the stability properties of explicit and implicit method. 06
- Q.4 a) What are the merits and demerits of finite element technique? Explain. 07
- b) Formulate a model boundary value problem for two dimensional. 06
- Q.5 Write short note on (any two) 14
- a) Implicit time dependent method for viscous flow.
 - b) Conservative upwind discretization.
 - c) Weak formulations of a boundary value problem.

Section B

- Q.6 a) Explain cell centered formulation. 06
- b) What is Runge-kutta time –stepping? Explain with an example. 07
- Q.7 Consider a cylindrical fin with uniform cross-sectional area A. the base is at a temperature of $100^\circ\text{C}(T_b)$ and the end is insulated. The fin is exposed to an ambient temperature of 20°C . One –dimensional heat transfer in this situation is governed by $d/dx\{kA(dT/dx)\} - hp(T - T_\infty) = 0$ 13
- Where, 'h' is convective heat transfer coefficient, 'P' is perimeter, 'k' is thermal conductivity of the material and T_∞ is ambient temperature. Calculate the temperature distribution along the fin using five equally placed control volumes. Take $hP/KA = 30\text{m}^{-2}$ (note : KA is constant)
- Q.8 a) Explain the method of incorporation of boundary condition is heat conduction problem. 07
- b) Explain the finite volume formulation for 2 and 3 dimensional conduction problems. 06
- Q.9 a) Discuss the properties of discretization schemes and explain upwind discretization applied to FVM. 07
- b) Explain the discretization equations for two dimensional convection. 06
- Q.10 Write short note on (any two) 14
- a) implicit/semi implicit schemes.
 - b) Linearization in heat conduction.
 - c) Power law schemes in convection.

SUBJECT CODE NO:- P-321
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech.) Examination May/June 2017
Industrial Engineering [Elective-II]
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B

- i) Solve any three questions from each section.
- ii) Q.NO.5 and Q.NO.10 are compulsory.
- iii) Figures to the right indicate full marks.
- iv) assume suitable data wherever necessary & state it clearly

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Define work study, state its scope & applications. | 07 |
| | b) Explain the concept of work content. what are the techniques to reduce the work content? | 06 |
| Q.2 | a) Explain the relation of work study with productivity. | 07 |
| | b) What are the functions and qualities of work study man? | 06 |
| Q.3 | a) Define method study. State its objectives. Explain the procedure of method study. | 07 |
| | b) What are string diagram & multiple activity chart? State its significance. | 06 |
| Q.4 | a) Explain in detail the principles of motion economy. | 07 |
| | b) "Critical examination forms the basis for methods improvement" explain. | 06 |
| Q.5 | Write short note on any two. | 14 |
| | a) Job analysis , job description and job specification . | |
| | b) Merit rating methods. | |
| | c) Various allowances considered while building the standard time. | |

Section B

- | | | |
|------|---|----|
| Q.6 | a) Define PMTS also explain factors to be considered while using PMTS . | 07 |
| | b) Explain the Westinghouse method of performance rating . | 06 |
| Q.7 | a) Explain different techniques of job evaluation and merit rating . | 07 |
| | b) Explain the significance of job evaluation /merit rating with work measurement . | 06 |
| Q.8 | a) Explain the kaizen umbrella for quality improvement. | 07 |
| | b) Explain kaizen and innovation . | 06 |
| Q.9 | a) Explain concept , scope & objectives of JIT. | 07 |
| | b) What are the basic assumptions of TOYOTA production system ? | 06 |
| Q.10 | Write short note on <u>any two</u> | 14 |
| | a) SMED | |
| | b) MOST | |
| | c) Push & pull system | |

SUBJECT CODE NO:- P-323
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech.) Examination May/June 2017
Piping System Engineering [Elective-II]
(Revised)

[Time: Three Hours]**[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B Attempt Any Three questions from each section.

Section A

- | | | |
|-----|--|----------|
| Q.1 | a) Differentiate amongst Pipe & Tube
b) Explain the use of ASME B31 series in Piping. | 07
06 |
| Q.2 | a) With neat sketch explain any rigid coupling
b) Explain the relationship between Piping Layout and valve Orientation | 07
06 |
| Q.3 | a) Explain with neat sketch control valve
b) Present a detailed classification of valves & discuss some of standards used for valves. | 07
06 |
| Q.4 | a) Discuss the properties that a high temperature service piping material should have
b) What is Pressure – Temperature rating used in flanges? | 07
06 |
| Q.5 | Write Notes on (<u>Any two</u>)
i) Valve selection Criteria
ii) Pipe Specification
iii) Pipe presentation
iv) Weld cap | 14 |

Section – B

- | | | |
|------|--|----------|
| Q.6 | a) Discuss how Elevation, Sections in piping are useful.
b) Give typical layout considerations for pumps | 07
06 |
| Q.7 | a) Explain use of Computer Aided Design & Drafting (CADD) in piping
b) Sketch & discuss Engineering flow diagram for piping networks | 07
06 |
| Q.8 | a) Explain in detail system P& ID used in piping.
b) Sketch common symbols of equipment, valves, accessories used in piping Diagrams. | 07
06 |
| Q.9 | a) Explain what is Material Take off (MTO) & its significance of Centrifugal Pumps
b) Explain with sketch piping of Centrifugal pumps | 07
06 |
| Q.10 | Write Notes on (<u>Any Two</u>)
i) Fatigue Failure of Piping Systems
ii) Causes of Water Hammer
iii) Sustained & Occasional Loads
iv) Piping Isometrics. | 14 |

SUBJECT CODE NO:- P-324
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech.) Examination May/June 2017
Automotive Technology (Open Elective - II)
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q.No.1 and Q.No.6 are compulsory.
- ii) Solve any two questions from the remaining questions in each section
- iii) Support your answer with figures.
- iv) Assume suitable data if necessary.

Section A

- Q.1 The coefficient of rolling resistance for a truck weighing 62293.5N, is 0.018 & coefficient of air resistance is 0.0276 in the formula $R = C_r \cdot W + K_a \cdot A \cdot V^2$, N, where 'A' in 'm²' the frontal area & 'V' vehicle speed in 'km/hr'. The transmission efficiency in top gear of 6:2:1 is 90% & That in the second gear of 15:1 is 80%. The frontal area is 5.574 m². If the truck has to have maximum speed of 88 KM/hr in top gear calculate:- 10
- i. The engine brake power required.
 - ii. The engine speed if the driving wheel have an effective diameter of 0.8125m.
 - iii. The maximum grade the truck can negotiate at above engine speed in second gear.
 - iv. The maximum drawbar pull available on level at above engine speed in second gear.
- Q.2 a. Explain the practical significance of the front engine four wheel drive vehicle. 08
 b. What is vehicle drag? Explain the rolling resistance of the vehicle. 07
- Q.3 a. Define motor vehicle. Explain the indirect systems of the vehicle in brief. 07
 b. Explain the exhaust system of the vehicle in detail for turbocharger engine. 08
- Q.4 a. What is maximum acceleration of the vehicle? Solve:- A motor car with a wheel base of 2.9m with a centre of gravity 0.86 m above the ground & 1.25m behind the front axle has a coefficient of adhesion 0.62 between the tyre & ground. The vehicle is negotiating 12° of Gradient. Estimate the maximum acceleration of following vehicle. 08
- i) Front wheel drive ii) Rear wheel drive iii) All wheel drive.
- b. What is drawbar pull? Explain directional stability of vehicle for over steer condition. 07
- Q.5 a. Explain the purchase of cooling system in engine. 06
 b. Explain the constructional details of connecting rod & Gudgeon pin with a neat sketch. 09
- Section-B
- Q.6 Explain electronic brake force distribution system in detail with a neat sketch. 10
- Q.7 a. Define automotive safety? Explain the types of safety systems with the examples. 07
 b. Explain 3 point seat belt with coiler in detail 08
- Q.8 a. What is HVAC system? Explain the working of air conditioning system in details. 09
 b. What is the purpose of vehicle security system? Explain smart access key in detail. 06
- Q.9 a. Explain the working of air suspension system in detail. 09
 b. What is hybrid vehicle? Explain about the parallel hybrid vehicle in detail. 06
- Q.10 a. What are the benefits of electric vehicle? Explain electric vehicle. 08
 b. Explain the working of starting system of the vehicle in detail. 07

2017

SUBJECT CODE NO:- P-325
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Mech.) Examination May/June 2017
Elective-II: Advanced Vibrations & Noise Control
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- 1) Solve any three questions from each section
- 2) Use of non-programmable electronic calculator is permitted.
- 3) Assume suitable data wherever necessary.

Section A

- | | | |
|-----|---|----------------|
| Q.1 | a) Show that for an eccentric mass m_o at eccentricity e , the following equation holds true $\frac{mX}{m_o e} = \frac{r^2}{\sqrt{[1-r^2]^2 + [2\zeta r]^2}}$, where $r = \frac{w}{w_n}$ is the frequency ratio.
Hint: Use force polygon to derive equation | 09 |
| | b) What is the difference between free and forced vibrations? | 04 |
| Q.2 | a) Briefly discuss the vibration terminology: mass, spring and natural frequency | 03 |
| | b) With different values of damping ratio ζ (from 0 to > 1) discuss the 4 different cases that arise | 05 |
| | c) What is meant by impulse response function? Discuss briefly | 05 |
| Q.3 | a) Briefly discuss Dunkerley's method. | 05 |
| | b) With the help of an example discuss modal analysis used for uncoupling of 2 or more differential equations. | 08 |
| Q.4 | a) What is importance of studying continuous vibration type of problems? | 04 |
| | b) Set up a Vibrating string type of problem and show that :
$y = A \sin \frac{\omega}{c} x + B \cos \frac{\omega}{c} x$
$G = C \sin \omega t + D \cos \omega t$
Such that, $y(x, t) = Y(x)G(t)$ | 09 |
| Q.5 | Write short notes on
(a) Holzer method
(b) Vibration of beams
(c) Tuned absorbers | 04
05
05 |

Section B

- | | | |
|-----|---|----|
| Q.6 | a) Describe procedure of modeling a cantilever beam in finite element analysis. | 08 |
| | b) Comment on Ansys versus Matlab Finite Element Modeling | 05 |

Q.7	a) With the help of neat diagram discuss a photocell used for vibration phase measurement.	06
	b) With the help of example describe the process of experimental modal analysis	07
Q.8	a) Discuss working principle of accelerometer with a neat sketch. Also point out advantages and limitations of using an accelerometer for making vibration measurements.	06
	b) Describe the procedure to perform Matlab FEA analysis with any suitable example	07
Q.9	a) Sound pressure levels at four points around a machine are 85, 88, 92 and 86 dB when the machine is on. The ambient SPL at the four points (when machine is off) is 83 dB. Calculate the average SPL of the machine by itself.	06
	b) Discuss control of noise at the source.	07
Q.10	Write short notes on:	
	(a) Eddy current transducer – proximity probe	04
	(b) Control of noise at path	05
	(c) Finite element analysis	05