

INDUSTRIALENGG AND QUALITY CONTROL

(Code : MET-601)

Full Marks : 70

Time : 3 hours

Answer any five questions

Figures in the right-hand margin indicate marks

1. (a) What are the objectives of plant layout ? 2
 (b) Give symptoms of bad layout. 5
 (c) Describe the features of governing plant location. 7
2. (a) Define Operation Research. 2
 (b) Give a comparison between PERT and CPM. 5
 (c) Maximize $Z = 12x + 24y$
 subject to $x + 4y \leq 20$
 $3x + y \leq 15$
 $x + y \leq 6$
 $x, y \geq 0$
 use graphical method. 7
3. (a) Define Inventory. 2
 (b) Explain ABC analysis. 5
 (c) Calculate EOQ, given that
 Annual usage = 100 units
 Procurement cost = Rs. 25/order
 Cost per 10 pieces = Rs. 1000
 Cost of carrying Inventory = 15% 7
4. (a) What is Prime Cost ? 2
 (b) State Advantages and disadvantages of Master Scheduling. 5
 (c) What is preventive maintenance ? Write its objectives. 7
5. (a) What is TQM ? 2
 (b) What are the factors which affect the quality of manufacture ? 5
 (c) Draw the critical path and Final project duration of the following table :

(Turn Over)

<u>Activity</u>	<u>Time in days</u>	
(1-2)P	09	
(2-3)Q	14	
(3-4)R	18	
(3-5)S	12	
(4-6)T	15	
(5-6)U	03	
(6-7)V	02	7

6. (a) What is Time Study ? 2
- (b) What are the characteristics of ISO-9000 ? 5
- (c) What are the different types of control chart ? Explain $\bar{X}$ chart and P-chart. 7
7. (a) What is JIT Technique ? 2
- (b) Describe different types of over heads. 5
- (c) Explain different types of Inspection. 7

VI—Sem/MECH/2019(S)(New)

AUTOMOBILE ENGG

(Code : MET-602)

Full Marks : 70

Time : 3 hours

Answer any five questions

Figures in the right-hand margin indicate marks

- | | |
|--|---|
| 1. (a) What is self-propelled vehicle ? | 2 |
| (b) Write down the technical specifications of Maruti-800. | 5 |
| (c) Explain in detail about sliding mesh gearbox. | 7 |
| 2. (a) Name the different types of differentials. | 2 |
| (b) Name two numbers of friction lining materials. What are the properties of a good clutch lining ? | 5 |
| (c) Explain about torque tube type propeller shaft. | 7 |
| 3. (a) According to method of braking contact, name the different types of brakes. | 2 |
| (b) Write down the advantages of hydraulic brakes. | 5 |
| (c) Explain about air brake with figure. | 7 |
| 4. (a) What is the function of spark plug ? | 2 |
| (b) Explain about flashing indicators ? | 5 |
| (c) Explain about causes and remedies of tyre wear. | 7 |
| 5. (a) Define flange and gutter for tyre. | 2 |
| (b) Explain about tubeless tyre. | 5 |
| (c) Explain about cooling defets and their remedial measures. | 7 |
| 6. (a) Define flash point and fire point. | 2 |
| (b) Why cooling is provided in I.C. engines ? | 5 |
| (c) Explain about dry sump lubrication system. | 7 |
| 7. (a) Name the factors which influence the process of carburetion. | 2 |
| (b) Write down the functions of fuel injection system. | 5 |
| (c) Explain about diesel fuel filter. | 7 |

ADVANCED MANUFACTURING AND CAD/CAM

(Code : MET-603)

Full Marks : 70

Time : 3 hours

Answer any five questions

Figures in the right-hand margin indicate marks

1. (a) Classify the non-traditional machining processes. 2
 (b) What are the advantages and disadvantages of EDM ? 5
 (c) Briefly describe the principle of Electro-discharge machining. 7
2. (a) What are the materials commonly used for making a tool in ECM ? 2
 (b) List advantages, disadvantages and application of ECM. 5
 (c) Explain how Electron-beam machining is carried out. 7
3. (a) List the common abrasive powders used in AJM. 2
 (b) What is LASER ? Differentiate LBM and EBM. 5
 (c) Explain the principle of plasma arc machining with neat sketch. 7
4. (a) Define numerical control. 2
 (b) What are the important components of a NC systems ? Describe in brief. 5
 (c) Differentiate between NC, CNC and DNC system. 7
5. (a) Define 'Robot'. 2
 (b) Explain industrial application of robot. 5
 (c) Describe the important configuration of industrial robot with neat sketch. 7
6. (a) Define automation. Write down the advantages of automation. 2
 (b) Explain different types of automation. 5
 (c) What are the tool positioning modes in NC programming ? Explain them with neat sketch. 7
7. (a) Define FMS. 2
 (b) List advantages and disadvantages of FMS. 5
 (c) Identify different components of FMS. Explain them in brief. 7

VI- SEM COMMON/2019(W)/ (New)
BST - 501-ENVIRONMENTAL STUDIES (COMMON)

Full Marks: 80

Time : 3 Hours

Answer any Five Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

- Q1. Answer all the questions. [2x10]
- (a) What is photochemical smog?
 - (b) Define ecosystem.
 - (c) What is captive breeding?
 - (d) What do you mean by biocides?
 - (e) What is a wasteland?
 - (f) Define Emigration.
 - (g) What is hydrosphere?
 - (h) What is food web?
 - (i) Define alpha diversity.
 - (j) What is mixed cropping?
- Q2. Answer any *six* questions from the following. [5 x 6]
- (i) Discuss in brief 'Ecological pyramid'.
 - (ii) Write a short note on 'acid rain'.
 - (iii) Describe the effects of mining practices on tribal people and on the environment.
 - (iv) Explain how 'Environmental studies' is multidisciplinary in nature.
 - (v) How wild life was conserved in ancient India?
 - (vi) Write a short note on global warming.
 - (vii) Discuss the factors which affect population distribution?
- Q3. What is noise? What are the major causes of noise pollution? How can it be prevented? [2+4+4]
- Q4. Discuss different methods adopted for conservation of biodiversity. [10]
- Q5. Describe different components and functions of forest ecosystem. [10]
- Q6. Discuss different methods and advances of rain water harvesting. [10]
- Q7. Discuss the effects of construction of dams on tribal people and on the environment. [10]

VI- SEM DIP.MECH/MECHANICAL ENGG/2019(W)
MET-601-INDUSTRIAL ENGG & QUALITY CONTROL

Full Marks: 80

Time : 3 Hours

Answer any Five Questions including Q No. 1 & 2

Figures in the right hand margin indicates marks

USE OF CALCULATOR IS ALLOWED		
1.	Answer ALL the questions in brief: (a) What is an ideal plant location? (b) What are the different types of plant layout? (c) Define operation research. (d) What do you mean by optimistic time? (e) What do you mean by Economic order quantity? (f) Write two objectives of maintenance. (g) Define inspection. (h) What is statistical quality control? (i) Define TQM. (j) What is JIT-technique?	2X10
2.	Answer any SIX questions from the following questions: (a) What are the objectives of good plant lay-out. (b) Write comparison between PERT and CPM. (c) What are the objectives of inventory control? (d) Briefly explain preventive maintenance. (e) Write briefly about the factors that influence quality of manufacturing. (f) Briefly explain ISO 9000. (g) What do you mean by control chart and briefly explain why it is used?	5X6
3.	Describe the factors governing plant location.	10
4.	A small projects require activities namely A-B, A-F, B-C, B-D, C-E, D-E, F-G, E-H, G-H with activity completion time as 7, 6, 13, 5, 12, 7, 10, 4, 14 days respectively. Calculate EST, LST. Find the total project duration and mark the critical path.	10
5. (a)	What are the different basic inventory models?	3
(b)	The rate of use of a raw material is 30000 units per year. The cost of placing & receiving an order is Rs.70/-. The cost of each unit is Rs.2/-. The inventory carrying cost is 12% of the unit value per year. Calculate EOQ.	7

6.	Explain the duties, functions and responsibilities of plant maintenance department.	10																																	
7. (a)	What are the different types of inspection?	3																																	
(b)	Calculate UCL and LCL for $\bar{X}$ -Chart and R-chart of the following data. Take $A_2=0.58$, $D_3=0$, $D_4=2.11$	7																																	
<table border="1"> <thead> <tr> <th>Sample No</th><th>$\bar{X}$</th><th>R</th></tr> </thead> <tbody> <tr><td>1</td><td>21</td><td>5</td></tr> <tr><td>2</td><td>23</td><td>4</td></tr> <tr><td>3</td><td>25</td><td>5</td></tr> <tr><td>4</td><td>26</td><td>6</td></tr> <tr><td>5</td><td>24</td><td>4</td></tr> <tr><td>6</td><td>23</td><td>4</td></tr> <tr><td>7</td><td>29</td><td>6</td></tr> <tr><td>8</td><td>25</td><td>4</td></tr> <tr><td>9</td><td>28</td><td>4</td></tr> <tr><td>10</td><td>30</td><td>3</td></tr> </tbody> </table>			Sample No	$\bar{X}$	R	1	21	5	2	23	4	3	25	5	4	26	6	5	24	4	6	23	4	7	29	6	8	25	4	9	28	4	10	30	3
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10	30	3																																	

VI- SEM/MECH/DIP.MECH/2019(W)/(New)**MET-602-AUTOMOBILE ENGINEERING**

Full Marks: 80

Time: 3 Hours

Answer any Five Questions including Q No. 1 & 2

Figures in the right hand margin indicates marks

1	Answer ALL the questions:	2X10
(i)	Define automobile and give one example of it.	
(ii)	What is the purpose of using propeller shaft?	
(iii)	What is the aim of differential in automobiles?	
(iv)	Why air brake is so named?	
(v)	For what purpose spark plug is used?	
(vi)	Why we use flasher circuit?	
(vii)	What is the use of coil spring?	
(viii)	Why engine lubrication is needed?	
(ix)	Define Carburetion and Air Fuel Ratio.	
(x)	What is the use of fuel filter?	
2	Answer any SIX questions:	5X6
(i)	Write down the technical specifications of Indica (petrol).	
(ii)	Explain in brief about the working of single plate clutch with sketch.	
(iii)	Write a short note about vacuum brake.	
(iv)	Write briefly about common ignition system troubles and the remedies for prevention.	
(v)	Describe in short about telescopic shock absorber with sketch.	
(vi)	Write about the necessity of engine cooling.	
(vii)	Explain in short about common rail system for C.I. engines.	
(3)	Explain in detail the constant mesh gear box with clear diagram.	10
(4)	Describe the drum brake and disc brake with proper diagrams.	10
(5)	Write in detail about the tyre wear causes and the remedies.	10
(6)	Explain the pressure lubrication system with figure.	10
(7)	What is the magneto ignition system? Explain with neat sketch.	10

VI- SEM /MECHANICAL/DIP.MECH/2019(W)/ (New)
MET-603-ADVANCED MANUFACTURING AND CAD/CAM.

Full Marks: 80

Time : 3 Hours

Answer any FIVE Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.	Answer ALL the question.	[2x10]
a)	What is EDM?	
b)	Define a Robot?	
c)	What is NC system?	
d)	Define work zero?	
e)	What is the use of sensors?	
f)	What is adaptive control?	
g)	What is CIM?	
h)	What is DNC?	
i)	Define Electro-chemical machining?	
j)	What is the circuit voltage and spark gap in EDM?	
2.	Answer any SIX questions	[5x6]
a)	Explain the working of ultrasonic machining process?	
b)	State the objectives of using an industrial robot?	
c)	Explain various components of NC system?	
d)	List type of automation?	
e)	State the benefits of CAD and CAM?	
f)	Discuss various types of end effectors?	
g)	Write short notes on: Economics of NC system?	
3.	Explain with a neat sketch the working principle of Electron beam machining. State four application?	[10]
4.	Make neat sketch of a robot and show its main parts on it.	[10]
5.	Describe various types of NC Co-ordinate and explain point to point and straight cut NC co-ordinate system.	[10]
6.	Explain preparatory function and G code along with miscellaneous function and M code.	[10]
7.	Explain different components of FMS.	[10]

VI- SEM MECHANICAL/E&M/DME/2019(W)
EMT-604/MET-604 E-(i) POWER PLANT ENGINEERING

Full Marks: 80

Time: 3 Hours

Answer any FIVE Questions including Q No. 1 & 2

Figures in the right hand margin indicates marks

Steam table is permissible. Standard properties of air $C_{p, \text{air}} = 1.005 \text{ kJ/kgK}$, $C_{v, \text{air}} = 0.718 \text{ kJ/kgK}$

1	Answer ALL questions. (a) On which factor of index it is decided a country is developing or developed. (b) What are different sources of energy? (c) Write down two examples of Boiler mountings. (d) Distinguish between central and captive power station. (e) Recognize importance of draught (draft) system in boiler furnace. (f) Applying knowledge of steam power plant define work ratio and back work ratio. (g) State importance of condenser in steam power plant. (h) What is a hot well related to steam power plant? (i) Carbon atom has nuclear symbol $^{12}_6\text{C}$. What is the atomic number and mass number for carbon atom? (j) Define catchment area related to Hydro electric power plant.	2×10
2	Answer any SIX questions : (a) What are renewable and non renewable sources of energy? (b) Draw block diagram and T-s (Temperature- entropy plot) for Reheat regenerative Rankine cycle. One Open fed water heater (OFWH) is used in low pressure side of steam turbine. (c) Distinguish difference between boiler mountings and boiler accessories. (d) Draw pressure and velocity profile for a 3 stage Pressure compounded steam turbine. (e) Explain function of water level indicator and fusible plug used in boiler. (f) Explain nuclear fission reaction.	5×6

(Turn over)

(g)	Draw general layout of a hydro electric power plant.	
3	Steam at 50 bar and 500°C expands in a simple rankine cycle to 1bar pressure. The mass flow rate in steam power plant is 120 kg/sec. Determine (i) Power developed by plant (ii) Thermal efficiency of plant	10
4	Velocity of steam entering a simple impulse turbine is 1000 m/sec and nozzle angle is 20°. The mean peripheral velocity of blade is 400 m/sec. Blades are symmetrical. Steam enters to turbine without shock. Mass flow rate of steam is 0.75 kg/sec. Determine (i) Blade angle at inlet and exit (ii) Tangential force on blades (iii) Power developed by steam turbine	10
5	What is the function of a cooling tower in steam power plant, describe natural draft and mechanical draft cooling tower.	10
6	Describe working principle of a nuclear reactor with all components explained.	10
7	Explain different systems of diesel power plant.	10