ME 4th/ Lib.

Roll No. ..... Total Pages : 2

BT-4/M-26 **44176**

MATERIALS ENGINEERING

Paper–ES-204A

Time : Tree Hours] [Maximum Marks : 75

Note : Attempt only *five* questions, selecting at least *one* question from each unit.

UNIT–I

1. (a) What is Atomic Packing factor, evaluate Atomic Packing factor for BCC and FCC crystal lattice.

   (b) What is coordination number (CN)? Show that CN for FCC and HCP structure is 12 while it is 8 for BCC. 15

2. (a) Describe crystal imperfections and their classifications.

   (b) Explain Indian Standard Specifications for steels as per BIS based of ultimate tensile strength. 15

UNIT–II

3. (a) Explain the Hume Rothary rule, Gibbs Phase Rule and Lever Rule for formation of solid solution.

   (b) Explain Binary phase diagrams. 15

4. (a) Differentiate between Annealing and Hardening processes.

   (b) Describe application of stress relieving. 15

UNIT–III

5. (a) What is difference between Elastic and Plastic deformations.

   (b) Explain the Mechanisms of plastic deformations. 15

6. What is fatigue; explain the various theories of fatigue failures. 15

UNIT–IV

7. Explain :

   (a) Metallography.

   (b) Phase Analysis.

   (c) Dendritic Growth. 15

8. Write a note on the following material characterization technique :

   (a) X-Ray Diffraction.

   (b) Scanning Electron Microscopy. 15

Roll No. ..... Total Pages : 2

BT-4/M-26 **44177**

APPLIED THERMODYNAMICS

Paper–MEC-202A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions, selecting at least *one* question from each unit.

UNIT–I

1. Explain the construction and working of locomotive Boiler with a neat sketch. 15

2. Name various types of Boiler Mountings used for the safety of Boilers and explain them in detail. 15

UNIT–II

3. A steam power plant operates on a theoretical reheat cycle. Steam at boiler at 150 bar, 550°C expands through the high pressure turbine. It is reheated at a constant pressure of 40 bar to 550°C and expands through the low pressure turbine to a condenser at 0.1 bar. Draw T-s and h-s diagrams. Find :

   (a) Quality of steam at turbine exhaust.

   (b) Cycle efficiency.

   (c) Steam rate in kg/kWh. 15

4. Explain binary vapour cycles and types of feed water heaters used in regenerative cycles. 15

UNIT–III

5. Explain the concept of critical pressure ratio and its importance for maximum discharge in steam nozzles. 15

6. The steam is supplied to a nozzle at a rate of 3 kg/s from an inlet condition of 15 bar, dry saturated and exit at 1 bar pressure. The efficiency of the nozzle for the convergent portion is 97 per cent and that of the divergent portion is 93 per cent. Determine :

   (a) Throat and exit diameters of nozzle.

   (b) Length of nozzle, if divergent cone angle of the nozzle is 12°.

   (c) The power in kW corresponds to exit velocity of the steam. 15

UNIT–IV

7. Draw and explain the velocity diagram of a single-stage impulse turbine and derive the expression for work done. 15

8. At a stage in a reaction turbine, the mean blade ring diameter is 1.5 m. The turbine runs at 3500 rpm. The blades are designed for a degree of reaction of 50% with exit angles of 32° and inlet angles of 55°. The turbine is supplied with a steam at 20000 kg/h and the stage efficiency is 87%. Determine :

   (a) Power output of the stage.

   (b) Specific enthalpy drop in kJ/kg.

   (c) Percentage increase in relative velocity of steam over moving blades, the specific steam consumption. 15

Roll No. ..... Total Pages : 3

44178

BT-4/M-26

FLUID MECHANICS AND FLUID MACHINES

Paper : MEC-204A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions, selecting at least *one* question from each unit. Assume any missing data suitably.

UNIT–I

1. (i) Define a fluid. Explain the types of fluid. (7)

   (ii) A pipe carrying water branches into three pipes at a junction. The main pipe has a diameter of 30 cm and carries water at a velocity of 4 m/s. The first branch pipe has a diameter of 20 cm and velocity 3 m/s, and the second branch pipe has a diameter of 15 cm and velocity 2.5 m/s. Find the velocity in the third branch pipe if its diameter is 10 cm. Also verify the continuity equation at the junction. (8)

2. Derive Euler's equation of motion along a streamline. Starting from Euler's equation, derive Bernoulli's equation stating all assumptions. Explain three practical applications of Bernoulli's equation. (15)

UNIT–II

3. (i) Define Reynolds number and explain its physical significance. Describe the flow regimes–laminar, transitional, and turbulent–with sketches of the velocity profile. (8)

   (ii) Explain the concept of boundary layer separation and its control. (7)

4. Two reservoirs are connected in parallel by two pipes. One pipe is 5000 m long and the diameter is 100 mm. $f_1 = 0.02$ and the other pipe is 4000 m long and its diameter is 120 mm. The friction factor is 0.025. If the flow rate through the first pipe is 60 *l*/s, determine the flow rate through the second pipe. (15)

UNIT–III

5. (i) Using Buckingham's theorem, show that power P delivered to a fluid by a pump depends on :

   $$P = \rho N^3 D^5 \cdot f(Q/ND^3, gH/N^2D^2).$$

   Define specific speed of a pump. (10)

   (ii) Explain the construction and working of a reciprocating pump. (5)

6. A centrifugal pump has the following data : Outer diameter of impeller = 400 mm, Inner diameter of impeller = 200 mm, Speed = 1450 rpm, Vane angle at outlet = 35°, Vane angle at inlet = 25°, Width of impeller at outlet = 20 mm, Width of impeller at inlet = 40 mm. The flow is radial at

inlet. Find : (i) Velocity of flow at inlet and outlet, (ii) Work done per kg of water, (iii) Manometric head if manometric efficiency = 82%, (iv) Power required to drive the pump if overall efficiency = 75%, (v) Specific speed of the pump. (15)

UNIT–IV

7. Describe the construction and working of a Kaplan turbine. Explain why a reaction turbine uses the draft tube. (15)

8. A Francis turbine works under a net head of 80 m at 300 rpm. The flow rate is 4.5 m^3/s. The runner outer diameter = 1.5 m, inner diameter = 0.75 m. The guide vane angle at inlet = 20°, and the runner vane is radial at inlet. Find : (i) velocity of flow at inlet, (ii) runner vane angle at inlet, (iii) work done per kg, (iv) hydraulic efficiency. (15)

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BT-4/M-26 **44179**

MECHANICS OF SOLIDS-II

Paper–MEC-206A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt only *five* questions, selecting at least *one* question from each unit.

UNIT–I

1. Deduce the expression for strain energy stored in body when load is applied (i) gradually, (ii) suddenly. 15

2. Explain various theories of failure with graphical representation. 15

UNIT–II

3. A cylinder of diameter D and wall thickness t is wound with a single layer of wire under tension σ_w. Derive the expression for hoop stress developed in cylindrical shell. 15

4. Derive the expression for lame's equation. 15

UNIT–III

5. Deduce an expression for hoop stress induces in rotating ring. 15

6. What are the applications of a plane spiral spring? Make a simple sketch and mark the point where bending stress is maximum. 15

UNIT–IV

7. Figure 1 shows a section of a beam subjected to shear force F. Locate the position of the shear centre as defined by e.

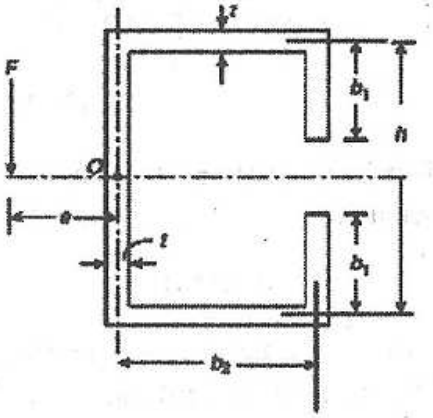

Figure 1

8. Determine the diameter d of a round steel rod that is used as a hook to lift a 9-kN load acting through the centre of curvature of the centroidal axis of the hook. Assume that R/d = 2, and the maximum stress permitted is 125 N/mm. 15

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BT-4/M-26 **44180**

INSTRUMENTATION AND CONTROL

Paper–MEC-208A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from Unit-I to IV. All questions carry equal marks.

UNIT–I

1. Two resistances R_1 and R_2 are given as $1000 \pm 25\ \Omega$ and $500 \pm 10\ \Omega$. Determine the equivalent resistance when these two are connected in a) parallel and b) series. Also determine the uncertainties in these two cases. 15

2. The friction factor Reynolds number product fRe for laminar flow in a rectangular duct is a function of the aspect ratio A = h/w, where h is the height and w is the width of the rectangle. Use the following tabulated data to obtain a suitable fit. 15

A	0	0.5	0.1	0.125	0.167
fRe	96	89.81	84.68	82.34	78.81
A	0.25	0.4	0.5	0.75	1
fRe	72.93	65.47	62.19	57.87	56.91

UNIT–II

3. A big seismic instrument is constructed with M = 100 kg, $c/c_c = 0.7$ and a spring of spring constant K = 5000 N/m. Calculate the value of linear acceleration that would produce a displacement of 5 mm on the instrument. What is the frequency ratio ω/ω_n such that the displacement ratio is 0.99? What is the useful frequency of operation of this system as an accelerometer? 15

4. A cantilever beam made of spring steel (Young's modulus 200 GPa) 25 mm long has a width of 2 mm and thickness of 0.8 mm. Determine the spring constant. If all lengths are subject to measurement uncertainties of 0.5% determine the percent uncertainty in the estimated spring constant. What is the force if the deflection of the free end of the cantilever beam under a force acting there is 3 mm? What is the uncertainty in the estimated force if the deflection itself is measured with an uncertainty of 0.5%? 15

UNIT–III

5. (a) A U tube manometer employs special oil having a specific gravity of 0.82 as the manometer liquid. One limb of the manometer is exposed to the atmosphere at a pressure of 740 mm Hg and the difference in column heights is measured as 20 cm ± 1 mm when exposed to an air source at 25° C. Calculate the air pressure in Pa and the uncertainty.

   (b) The above manometer was carelessly mounted with an angle of 3° with respect to the vertical. What is the error in the indicated pressure due to this, corresponding to the data given above ? 15

6. (a) Discuss about the humidity measuring devices in details. 8

   (b) Discuss about the Density measuring devices in details. 7

UNIT–IV

7. (a) Sketch the Torque speed characteristics of AC servo meters. 10

   (b) Explain synchro transmitter. 5

8. (a) Write a note on multistack variable reluctance stepper motor. 7

   (b) Write a note on hydraulic controller. 8

ME 6th/ Library

Roll No. ..... Total Pages : 02

BT-6/M-26 46203

MANUFACTURING TECHNOLOGY

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Explain the solidification process in casting. Derive Chvorinov's rule for prediction of solidification time and discuss its importance. **15**

2. With neat sketches, describe the construction and working of a gating system. Discuss the role of risers and risering aids in casting design. **15**

Unit II

3. Derive the expression for rolling load in flat rolling. Explain the factors affecting rolling force and torque. **15**

4. Explain the mechanics of sheet metal drawing. Discuss common defects in drawn products and their remedies. **15**

Unit III

5. Compare consumable and non-consumable electrode arc welding processes with suitable examples. **15**

6. Explain the principles of friction welding and ultrasonic welding. Discuss their applications and limitations. **15**

Unit IV

7. Explain the process of powder compaction and sintering in powder metallurgy. Discuss design considerations for powder metallurgy components. **15**

8. Describe the injection molding process for plastics. Explain its advantages, limitations and applications. **15**

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BT-6/M-26 46204

DESIGN OF MACHINE ELEMENTS

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (i) Enumerate the basic procedure of the design of machine elements standard in machine design.

   (ii) Explain the BIS system for designation of steels. **15**

2. (i) Describe various modes of failure, Also explain factor of safety, stress concentration causes and mitigation.

   (ii) Explain Soderberg and goodman lines. **15**

Unit II

3. (i) What are eccentrically loaded bolted joints and riveted joints for boiler shell according to IBR.

   (ii) Describe in brief types of welded joints and welds under eccentric loading. **15**

4. (i) Explain the steps in design of Helical spring.

(ii) What is surge in springs ? 15

Unit III

5. (i) Explain the hollow shaft design on strength and torsional rigidity basis. 9

(ii) Explain cone and centrifugal clutches. 6

6. Describe the Block brake with short shoe and Long shoe. 15

Unit IV

7. Explain types of rolling contact bearing; Also discuss static and dynamic load carrying capacity. 15

8. Write short notes on the following : 15

(i) Basic modes of lubrication

(ii) Bearing failure causes and remedies.

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BT-6/M-26 46186

ORGANIZATIONAL BEHAVIOUR

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all. Selecting at least *one* from each Unit. All questions carry equal marks (15).

Unit I

1. How attitude is formed ? Discuss the types of attitude and explain the impact of values on individual's attitude.

2. Explain the stages of learning. Also discuss the cognitive and behavioural theory of learning.

Unit II

3. How perception and individual decision making are interrelated ? Discuss the factors influencing perception.

4. Different leadership styles exist among leaders in different times and in different situations'. Discuss and give the important leadership styles with their merits and demerits.

Unit III

5. How MBO s significant in business organization ? Explain the process of MBO and its relationship with goal setting theory.

6. How group is different from team ? Explain the types of groups and stages of group development.

Unit IV

7. How the different types of stress have an impact on organizations ? Explain the stress management techniques.

8. Why is organizational change often resisted by individuals in organization ? How can this resistance to change be managed ?

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Roll No. ..... Total Pages : 03

BT-6/M-26 46250

INTERNAL COMBUSTION ENGINES

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Section A

1. (a) In a S.I engine working on the ideal Otto cycle, the compression ratio is 6. The pressure and temperature at the beginning of compression are 1 bar and 27°C respectively. The peak pressure is 30 bar. Determine the pressure and temperatures at the salient points, the air standard efficiency and the mean effective pressure. Assume ratio of specific heats to be 1.4 for air. **10**

(b) Draw P-V and T-S diagram of Stirling and Ericsson Cycles. **5**

2. A compression-ignition engine has a compression ratio of 10 and 2/3 of heat of combustion is liberated at constant volume and the remainder at constant pressure. The

pressure and temperature at the beginning are 1 bar and 27°C and the maximum pressure is 40 bar. Find the temperatures at the end of compression and expansion, if it follows the law $pV^{1.35}$ = constant and $\gamma = 1.4$. **15**

Section B

3. (a) Define knocking in I.C. Engines. Explain in detail effects of engine variables on detonation. **8**

(b) Describe in brief Octane and Cetane rating of fuels. Also discuss various stages of combustion in CI engines. **7**

4. (a) Explain in detail working of Carburetor with neat sketch. **8**

(b) Discuss in detail types of ignition systems with regards to SI engine. **7**

Section C

5. The following observations were made during a test on a single cylinder four stroke oil engine : **15**

Displacement volume = 3 litre; speed of the engine = 600 rpm; fuel consumption = 2.9 kg/h; calorific value of fuel = 42,500 kJ/kg; difference in tension on either side of the brake pulley = 450 N; arm length = 0.35 m; length of indicator diagram = 60 mm; area of positive loop of indicator diagram = 580 mm^2; area of negative

loop = 30 mm^2; spring constant = 0.85 bar per mm. Calculate (a) bp (b) ip (c) Mechanical efficiency (d) brake thermal efficiency (e) bsfc.

6. Discuss in detail on alternate fuels for IC engines. Also Write a technical note on current scenario on the pollution front. 15

Section D

7. (a) Discuss in detail working of single stage reciprocating air compressor. 8

   (b) Describe two stage compressors with intercooling. 7

8. (a) Discuss in detail Brayton cycle. Also write the various components of gas turbine plant. 8

   (b) With neat sketch explain the multistage compression with intercooling with regards to gas turbine plant. 7

Roll No. ..... Total Pages : 03

BT-6/M-26 46209

REFRIGERATION AND AIR CONDITIONING

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Describe with a neat sketch simple air refrigeration system. 8

   (b) Explain the thermo-electric cooling. 7

2. In a refrigeration plant working on Bell Coleman cycle, air is compressed to 5 bar from 1 bar. Its initial temperature is 10°C. After compression, the air is cooled up to 20°C in a cooler before expanding to a pressure of 1 bar. Determine the theoretical C.O.P of the plant and net refrigerating effect. Take C_p = 1.005 KJ/Kg K and C_v = 0718 KJ/Kg K. 15

Unit II

3. Describe the working of a vapour absorption refrigeration system with the help of a neat sketch. 15

4. An ammonia refrigerator produces 30 tonnes of ice at 0°C from water at 20°C. The temperature range of working cycle is 25 to -15°C. The vapour is dry saturated at the end of compression. Assuming actual COP is 60% of theoretical COP, calculated the power required to drive the compressor. Latent heat of ice = 335 kJ/kg. **15**

Unit III

5. What are various psychrometric processes ? Represent all the psychrometric process in psychrometric chart. **15**

6. Air at 20°C, 40% relative humidity is mixed adiabatically with air at 40°C, 40% RH in the ratio of 1 kg. of former with 2 kg. of latter (on dry basis). Find the final condition (humidity and enthalpy) of air. **15**

Unit IV

7. Explain the need of a cooling tower used in refrigeration system and also list the various types of cooling towers. **15**

8. A laboratory having an unusually large latent heat gain is required to be air conditioned. The design conditions and loads are as follows: Summer design conditions: 40°C DBT, 27°C WBT. Inside design conditions: 25°C DBT, 50% RH. Room sensible heat: 34.9 kW. Room latent heat: 18.6 kW. The ventilation air requirement is 85 cmm. Determine the following : **15**

(i) Ventilation load.

(ii) Room and effective sensible heat factors.

(iii) Apparatus dewpoint and amount of reheat for economical design.

(iv) Supply air quantity.

(v) Condition of air entering and leaving coil and supply air temperature.

(vi) Grand total heat. Assume 0.05 bypass factor.

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Roll No. ..... Total Pages : 03

BT-6/M-26 46210

PRODUCT ENGINEERING

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. Describe the principles of motion economy. Describer why and how method study is carried out. 15

2. (a) Briefly describe various ergonomic factors affecting design of a workplace. 5
   (b) Explain the term, 'Anthropometry'. 5
   (c) Concept of normal time and standard time. 5

Unit II

3. A company uses 3600 castings per month. Each casting costs rupees 5,200 and inventory carrying cost is 8 percent while ordering cost is rupees 1500 per order. Calculate EOQ, number of orders per year and order interval. Also discuss the concept of ABC system of inventory control. 15

4. Discuss basic elements of waiting line situations. Also discuss queue parameters and applications of queuing theory. **15**

Unit III

5. Make a sales forecast for year 2026 for given data using time series analysis method : **15**

Year	Quarter	Sales (kg)
	1	155
	2	165
2023	3	170
	4	130
	1	140
	2	155
2024	3	160
	4	115
	1	152
	2	167
2025	3	175
	4	148

6. Describe the concept of project management. Also compare the application and working of PERT and CPM techniques. **15**

Unit IV

7. What is 'Value Engineering' and discuss different steps of value engineering ? How is cost reduction achieved through value engineering ? **15**

8. Briefly describe :

   (a) Quality function deployment. **7**

   (b) Concurrent Engineering. **8**

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ME 7th/ Library

Roll No. ..... Total Pages : 5

47338

BT-7/M-26

SMART MATERIALS

Paper : MEO-401A

Time : Three Hours] [Maximum Marks : 75

Note : The paper has a total of *nine* questions. Question No. 1, which is compulsory, shall be Objective Type and carry 12 marks. All questions carry equal marks (12 marks each). The student shall attempt a total of *five* questions by selecting *one* question from each unit.

SECTION–A

(Compulsory Question)

1. Answer all objective questions :

1. Smart materials are defined as materials that :
   (a) Change shape permanently
   (b) Respond to external stimuli and revert to original state
   (c) Conduct electricity only
   (d) Are used in aerospace only.
2. Which of the following is NOT a type of smart material?
   (a) Piezoelectric material
   (b) Shape memory alloy

(c) Cast iron

(d) Magnetostrictive material.

3. Biomimetics involves :

(a) Studying only bacteria

(b) Mimicking biological systems in engineering design

(c) Creating synthetic blood

(d) None of these.

4. Actuators in smart structures are responsible for :

(a) Sensing changes

(b) Producing a response/action

(c) Storing energy

(d) Transmitting data.

5. MEMS stands for :

(a) Micro Electro Mechanical Systems

(b) Multi-functional Electronic Machine Systems

(c) Macro Energy Management Systems

(d) None of the above.

6. The shape memory effect in SMAs involves:

(a) Elastic deformation only

(b) A phase transformation between austenite and martensite

(c) Plastic deformation

(d) Thermal expansion only.

7. In a lithium-ion battery, the anode is typically made of :

(a) Lithium metal

(b) Carbon (graphite)

(c) Olivine oxide

(d) Spinel oxide.

8. The critical temperature at which SMA transforms is called :

(a) Curie temperature

(b) Transformation temperature/Transition temperature

(c) Melting point

(d) Glass transition temperature.

9. Carbon nanotubes were discovered by :

(a) Richard Feynman

(b) Sumio Iijima

(c) Albert Einstein

(d) Marie Curie.

10. The electrical conductivity of carbon nanotubes depends on :

(a) Length only

(b) Diameter and chirality

(c) Weight only

(d) None of the above.

11. Passive sensory smart structures :

(a) Actively respond to damage

(b) Only detect but do not respond

(c) Have no sensing capability

(d) Use SMA actuators.

12. Spinel oxide cathodes in Li-ion batteries have the general formula :

(a) $LiCoO_4$

(b) $LiMn_2O_4$

(c) $LiFePO_4$

(d) $LiNiO_2$. (1×12=12)

SECTION–B

UNIT–I

2. Define smart materials. Explain the basic principles behind smart properties and classify smart materials according to their production technologies. (12)

OR

3. What are intelligent materials? Discuss the primitive functions of intelligent materials and explain the concept of intelligence inherent in materials with examples. (12)

UNIT–II

4. Differentiate between active sensing, passive sensory, and reactive actuator-based smart structures. Give one example of each. (12)

OR

5. Explain the role of microsensors in intelligent systems. Describe hybrid smart materials and their applications in passive and active smart structures. (12)

UNIT–III

6. Discuss the shape memory effect and superelasticity in shape memory alloys (SMAs). How are SMA fiber/metal matrix composites fabricated and used? (12)

OR

7. Explain the electrochemical concepts involved in a battery. Describe the working principle of a lithium-ion battery and compare layered oxide, spinel oxide, and olivine oxide cathode materials. (12)

UNIT–IV

8. Describe the geometric structures of carbon nanotubes. Differentiate between single-walled and multi walled carbon nanotubes with their designations. (12)

OR

9. Discuss the mechanical and electrical properties of carbon nanotubes. How does chirality influence the electrical conductivity of carbon nanotubes? (12)

Roll No. ..... Total Pages : 2

BT-7/M-26 **47348**

INDUSTRIAL ROBOTICS

Paper–(MEP 409A)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt any *five* questions; selecting at least *one* from each unit.

UNIT–I

1. What is robot anatomy? Name the important specifications of an industrial robot. 15

2. Using a sketch; explain the four basic robot configurations classified according to the coordinate. 15

UNIT–II

3. Discuss various types of end effectors. Write briefly on various elements of end-of-arm tooling. 15

4. Write briefly on:

   (a) Machine vision sensors. 07

   (b) Force and torque sensors. 08

UNIT–III

5. Discuss in detail the selection and design consideration of grippers in robots. 15

6. With neat sketch explain any three mechanical grippers. 15

UNIT–IV

7. Write briefly on:

   (a) Multiple robots and machine interface. 08

   (b) Interlocks and work cell controller. 07

8. Describe the concept of manipulator kinematics. Write briefly on manipulator path control. 15

Roll No. ..... Total Pages : 2

BT–8/M-26 **48368**

SUPPLY CHAIN MANAGEMENT

Paper–MEO–402A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Discuss the goal of Supply chain and explain the impact of Supply chain decision on success of the Firm. 15

2. Discuss the major challenges that must be overcome to manage Supply chain successfully. 15

UNIT–II

3. What are the major drivers of Supply chain performance; discuss. 15

4. What type of distribution network is typically best suited for commodity items? 15

UNIT–III

5. Write briefly on 'decision tree analysis' and how it can be integrated into making a network decision? 15

6. Describe, how network design decisions are made and describe a framework for these network design decisions? 15

UNIT–IV

7 Write briefly on role of IT on Inventory management. 15

8. Explain how to manage supply chain cycle inventory? 15

Roll No. ..... Total Pages : 2

BT–8/M-26 **48372**

TOTAL QUALITY MANAGEMENT

Paper–MEO–410A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) State the need for a Quality evolution in modern industry. 6

   (b) "Customer satisfaction is the foundation of TQM." – Justify with examples. 9

2. (a) Explain the difference between Quality vision and Quality policy. 5

   (b) How do mission and policy statements support quality improvement? Support you answer with suitable examples. 10

UNIT–II

3. (a) Explain the role of Teamwork in continuous process improvement. 7

   (b) Discuss the elements of Strategic quality planning and its impact on performance. 8

4. (a) Explain supplier partnering and its benefits. 5

(b) Discuss the role of cross-functional teams in sustaining continuous improvement. 10

UNIT–III

5. (a) What are the key stages in FMEA ? 6

(b) Describe how Poka-Yoke techniques prevent Human errors in Manufacturing? 9

6. (a) Define "Voice of Customer" and explain its role in QFD. 8

(b) Discuss reliability analysis and its integration with FMEA. 7

UNIT–IV

7. Explain the benefits of Quality certification. Explain how ISO certification enhances customer confidence and competitiveness. 15

8. (a) What are the key elements of a Quality management system (QMS)? 8

(b) Explain the role of top management in establishing a Quality system. 7

Roll No. ..... Total Pages : 3

BT-8/M-26 **48375**

AUTOMOBILE ENGINEERING

Paper–MEP–404A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks. Assume suitable data where necessary and draw neat sketches.

UNIT–I

1. (a) Discuss the reasons why single-cylinder, two-stroke, air-cooled petrol engines are preferred for two-wheelers. Compare them with four-stroke engines in terms of thermal efficiency and maintenance. 10

   (b) List the main parts of a Clutch and explain the specific function of the pressure plate and diaphragm spring. 5

2. (a) Describe the construction and working of a multi-plate dry clutch with the help of a neat diagram. Mention its advantages over a single-plate clutch. 10

   (b) Classify automobile engines based on Cylinder arrangement and explain the merits of a vertical engine over a horizontal engine. 5

Roll No. ..... Total Pages : 3

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WELDING TECHNOLOGY

Paper–MEP–408A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Illustrate the Historical development of different welding processes. 15

2. (a) Explain the working principle of oxy-fuel cutting. What are the key parameters that influence the quality of the cut? 8

   (b) Describe the process of Plasma arc cutting. How does it differ from other thermal cutting methods in terms of Temperature and Material compatibility. 7

UNIT–II

3. (a) Illustrate different methods to control output current through welding transformer. 7

(b) Define open circuit voltage, welding voltage, static characteristic curve, current rating and duty cycle. Explain how these parameters influence bead profile and penetration? 8

4. Illustrate with neat sketches the working of following special welding power sources : 15

(a) Multi operator type welding power source.

(b) Inverter based multi-process power source.

UNIT–III

5. (a) Explain the Oxy-acetylene gas welding process detailing flame types, mechanism of Metal fusion and factors affecting heat input. 7

(b) Describe the Gas welding equipment (cylinders, regulators, hoses, torch, tips) and give step-by-step procedure for lighting, adjusting and shutting off an equal-pressure oxy-acetylene torch. 8

6. Explain with neat sketches, the construction of Oxygen and Acetylene cylinders used in Gas welding. 15

UNIT–IV

7. Explain the following NDT processes with neat sketches :

(a) Magnetic Particle Inspection. 8

(b) Ultrasonic Inspection. 7

8. (a) Describe TIG welding of Aluminum : equipment features, surface preparation (including cleaning), common problems (Aluminum arcing, balling tungsten) and procedural steps for a sound TIG aluminum weld. 7

(b) Explain MIG welding of Carbon steel and Stainless Steel covering metal transfer modes, Wire selection, shielding issues for stainless steel and practical tips to minimize distortion and residual stresses. 8