

परीक्षेचे नांव : सहायक प्राध्यापक, यंत्र अभियांत्रिकी,

परीक्षेचा दिनांक : 27 जुलै, 2014

अस्वायत्त शासकीय अभियांत्रिकी महाविद्यालय, महाराष्ट्र अभियांत्रिकी महाविद्यालयीन शिक्षक सेवा, गट -अ,

चाळणी परीक्षा-2014

विषय : यंत्र अभियांत्रिकी

महाराष्ट्र लोकसेवा आयोगामार्फत सहायक प्राध्यापक, यंत्र अभियांत्रिकी, अस्वायत्त शासकीय अभियांत्रिकी महाविद्यालय, महाराष्ट्र अभियांत्रिकी महाविद्यालयीन शिक्षक सेवा, गट -अ, चाळणी परीक्षा-२०१४ या परीक्षेच्या प्रश्नपत्रिकेची उत्तरतालिका उमेदवारांच्या माहितीसाठी संकेतस्थळावर प्रसिध्द करण्यात आली आहे. सदर उत्तरतालिकेतील प्रश्न-उत्तरांसंबंधी उमेदवारांना निवेदन करावयाचे असल्यास त्यांनी अधिप्रमाणीत स्पष्टीकरण / संदर्भ देऊन तसेच विषय, परीक्षेचे नाव, प्रश्नसंच, प्रश्नक्रमांक यांच्या उल्लेखासह आपले लेखी निवेदन उपसचिव (गोपनीय), महाराष्ट्र लोकसेवा आयोग, बँक ऑफ इंडिया बिल्डिंग, ३ रा मजला, हुतात्मा चौक, मुंबई ४०० ००१ या पत्त्यावर टपालाने पाठवावे. यासंदर्भात दि. ०८ ऑगस्ट, २०१४ पर्यंत आयोगाकडे प्राप्त झालेल्या निवेदनांचीच दखल घेतली जाईल. तद्नंतर आलेली निवेदने विचारात घेतली जाणार नाहीत, याची कृपया नोंद घ्यावी

**उत्तरतालिका - KEY**

# MPSC

## MPSC 27th July 2014 Shift 1

### Notations :

1. Options shown in green color and with ✓ icon are correct.
2. Options shown in red color and with ✗ icon are incorrect.

<b>Question Paper Name:</b>	Assistant Professor Mechanical ACTUAL
<b>Subject Name:</b>	Assistant Professor Mechanical
<b>Duration:</b>	60

### Group 1

Group Maximum Duration :	0
Group Minimum Duration :	60
Revisit allowed for view? :	No
Revisit allowed for edit? :	No

### Assistant Professor Mechanical

Mandatory or Optional:	Mandatory
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Question Number : 1 Question Type : MCQ

Correct : 2 Wrong : 0

Heat and work are –

Options :

1. ✗ Point functions
2. ✓ Path functions
3. ✗ Intensive properties
4. ✗ Extensive Properties

Question Number : 2 Question Type : MCQ

Correct : 2 Wrong : 0

A heat engine receives heat at the rate of 2000kJ/min and does a work output of 8.5kW. What will be the rate of heat rejection:

Options :

1. ✗ 25.5 KW
2. ✗ 1991.5 kW

3. ✓ 24.83 kW

4. ✗ 26.83 KW

Question Number : 3 Question Type : MCQ

Correct : 2 Wrong : 0

Eight kg of water at 100°C are mixed with 50kg of water at 60°C, while the temperature of the surroundings is 15°C. What will be the decrease in available energy due to mixing?

Options :

1. ✗ 336 kJ

2. ✗ 633 kJ

3. ✓ 236 kJ

4. ✗ 326 kJ

Question Number : 4 Question Type : MCQ

Correct : 2 Wrong : 0

In a convergent divergent nozzle when discharge is maximum the only condition occurs at throat is-

Options :

1. ✗  $M < 1$

2. ✗  $M > 1$

3. ✓  $M = 1$

4. ✗  $M = 0$

Question Number : 5 Question Type : MCQ

Correct : 2 Wrong : 0

If a fluid expands suddenly into vacuum through an orifice of large dimension, then such a process is called-

Options :

1. ✓ free expansion

2. ✗ hyperbolic expansion

3. ✗ parabolic expansion

4. ✗ Throttling

Question Number : 6 Question Type : MCQ

Correct : 2 Wrong : 0

Kelvin Planck's law deals with-

Options :

1. ✗ conservation of heat

2. ✘ conservation of work
3. ✔ conservation of heat into work
4. ✘ conservation of work into heat

Question Number : 7 Question Type : MCQ

Correct : 2 Wrong : 0

Modulus of rigidity is a ratio of-

Options :

1. ✘ Longitudinal stress and longitudinal strain
2. ✔ Shear stress and shear strain
3. ✘ Volumetric stress and volumetric strain
4. ✘ Lateral stress and lateral strain

Question Number : 8 Question Type : MCQ

Correct : 2 Wrong : 0

If the radius of wire stretched by a load is doubled, then its Young's modulus will be

Options :

1. ✘ Doubled
2. ✘ Halved
3. ✔ Remain unaffected
4. ✘ Become one-fourth

Question Number : 9 Question Type : MCQ

Correct : 2 Wrong : 0

The buckling load for a given material depends on

Options :

1. ✘ Slenderness ratio and area of cross-section
2. ✘ Poisson's ratio and modulus of elasticity
3. ✘ Slenderness ratio and modulus of elasticity
4. ✔ Slenderness ratio, area of cross-section and modulus of elasticity

Question Number : 10 Question Type : MCQ

Correct : 2 Wrong : 0

Maximum energy that can be absorbed within the elastic limit, without creating a permanent distortion is known as

Options :

1. ✘ Impact energy
2. ✘ Resilience energy
3. ✔ Proof resilience
4. ✘ Toughness

Question Number : 11 Question Type : MCQ

Correct : 2 Wrong : 0

A beam is loaded as cantilever. If the load at the end is increased, the failure occur

Options :

1. ✔ Any where
2. ✘ In the middle
3. ✘ At the tip below the load
4. ✘ At the support

Question Number : 12 Question Type : MCQ

Correct : 2 Wrong : 0

The torsional rigidity of a shaft is expressed by the

Options :

1. ✘ Maximum torque it can be transmit
2. ✘ Number of cycles it undergoes before failure
3. ✘ Elastic limit upto which it resists torsional, shear and bending stress
4. ✔ Torque required to produced a twist of one radian per unit length of shaft

Question Number : 13 Question Type : MCQ

Correct : 2 Wrong : 0

Which one of the following is represented by the area of the S.F. diagram from one end upto a given location on the beam?

Options :

1. ✘ Bending Moment at the location
2. ✘ Load at the location
3. ✔ Slope at the location
4. ✘ Deflection at the location

Question Number : 14 Question Type : MCQ

Correct : 2 Wrong : 0

For  $\sigma_1 \neq \sigma_2$  and  $\sigma_3 = 0$ , what is the physical boundary for Rankine failure theory?

Options :

1. ✘ A rectangle
2. ✘ An ellipse
3. ✔ A square
4. ✘ A parabola

Question Number : 15 Question Type : MCQ

Correct : 2 Wrong : 0

Recrystallization temperature is one-

Options :

1. ✘ At which crystals first start forming from molten metal when it is cooled.
2. ✔  
At which new spherical crystals first begin to form from the old deformed one when strained metal is heated
3. ✘ At which change of allotropic form takes place
4. ✘ At which crystals grow bigger in size

Question Number : 16 Question Type : MCQ

Correct : 2 Wrong : 0

If a material is subjected to two incremental true strains namely  $\epsilon_1$  and  $\epsilon_2$ , then the total true strain is –

Options :

1. ✘  $\epsilon_1 \times \epsilon_2$
2. ✘  $\epsilon_1 - \epsilon_2$
3. ✔  $\epsilon_1 + \epsilon_2$
4. ✘  $\epsilon_1 / \epsilon_2$

Question Number : 17 Question Type : MCQ

Correct : 2 Wrong : 0

Engineering stress-strain curve and True stress-strain curve are equal up to-

Options :

1. ✘ Proportional limit
2. ✘ Elastic limit
3. ✔ Yield point

4. ✘ Tensile strength point

Question Number : 18 Question Type : MCQ

Correct : 2 Wrong : 0

Materials after cold working are subjected to following process to relieve stresses –

Options :

1. ✘ Hot working
2. ✘ Tempering
3. ✘ Normalizing
4. ✔ Annealing

Question Number : 19 Question Type : MCQ

Correct : 2 Wrong : 0

Manganese in steel increases its-

Options :

1. ✔ Tensile strength
2. ✘ Hardness
3. ✘ Ductility
4. ✘ Fluidity

Question Number : 20 Question Type : MCQ

Correct : 2 Wrong : 0

Bell metal contains-

Options :

1. ✘ 70% copper and 30% zinc
2. ✘ 90% copper and 10% tin
3. ✘ 85-90% copper and rest tin with little lead and tin
4. ✔ 70-75% copper and rest tin

Question Number : 21 Question Type : MCQ

Correct : 2 Wrong : 0

When a low carbon steel is heated upto lower critical temperature

Options :

1. ✔ there is no change in grain size
2. ✘ the average grain size is a minimum
3. ✘ the grain size increases very rapidly

4. ✘ the grain size first increases and then decreases very rapidly

Question Number : 22 Question Type : MCQ

Correct : 2 Wrong : 0

. Value of Poisson's ratio for ionic solids in the range of –

Options :

1. ✘ 0.1

2. ✔ 0.2

3. ✘ 0.3

4. ✘ 0.4

Question Number : 23 Question Type : MCQ

Correct : 2 Wrong : 0

According to Indian standards specifications, a grey cast iron designated by 'FG 200' means that the –

Options :

1. ✘ Carbon content is 2%

2. ✘ Maximum compressive strength is 200 kgf/cm<sup>2</sup>

3. ✔ Minimum tensile strength is 200 N/mm<sup>2</sup>

4. ✘ Maximum shear strength is 200 N/mm

Question Number : 24 Question Type : MCQ

Correct : 2 Wrong : 0

18-4-1 high speed steel contains -

Options :

1. ✘ 18% Nickel

2. ✔ 4% Chromium

3. ✘ 1% Cobalt

4. ✘ 1% Nickel

Question Number : 25 Question Type : MCQ

Correct : 2 Wrong : 0

In free convection heat transfer transition from laminar to turbulent flow is governed by the critical value of the -

Options :

1. ✘ Reynold's number

2. ✘ Grashoff's number
3. ✘ Reynold's number, Grashoff's number
4. ✔ Prandtl number, Grashoff's number

Question Number : 26 Question Type : MCQ

Correct : 2 Wrong : 0

What is the emissivity of a black body

Options :

1. ✘ 0
2. ✔ 1
3. ✘ 0.9
4. ✘ 0.5

Question Number : 27 Question Type : MCQ

Correct : 2 Wrong : 0

In a shell and tube heat exchanger, the shell side fluid velocity cannot be changed by changing the

Options :

1. ✘ tube layout
2. ✘ tube pitch
3. ✔ tube diameter
4. ✘ number of baffles

Question Number : 28 Question Type : MCQ

Correct : 2 Wrong : 0

LMTD in case of counter flow heat exchanger as compared to parallel flow heat exchanger is-

Options :

1. ✔ Higher
2. ✘ Lower
3. ✘ Same
4. ✘ Depends on temperature conditions

Question Number : 29 Question Type : MCQ

Correct : 2 Wrong : 0

Mass transfer co-efficient ( $K$ ) and diffusivity ( $D$ ) are related according to film theory as –

Options :

1. ✓  $K \propto D$
2. ✗  $K \propto D^{\frac{1}{2}}$
3. ✗  $K \propto D^{1.5}$
4. ✗  $K \propto D^2$

Question Number : 30 Question Type : MCQ

Correct : 2 Wrong : 0

A two rectangular blocks, identical in size, mass, and heat capacity, are pressed together, and vigorously rubbed together. One is metal and one is wooden. Immediately following the experiment -

Options :

1. ✗ the wooden block is warmer, due to friction
2. ✓ the metal block is warmer, due to friction
3. ✗ both blocks are warmed by friction, by equal amounts
4. ✗ nothing happens

Question Number : 31 Question Type : MCQ

Correct : 2 Wrong : 0

Maximum principle stress theory is applicable for-

Options :

1. ✗ Ductile material
2. ✓ Brittle material
3. ✗ Elastic material
4. ✗ For every material

Question Number : 32 Question Type : MCQ

Correct : 2 Wrong : 0

The maximum stress due to stress concentration in a bar having circular transverse hole , as compared to its static stress without hole will be-

Options :

1. ✗ Same in both cases
2. ✗ 2 times more
3. ✓ 3 times more
4. ✗ Unpredictable

Question Number : 33 Question Type : MCQ

Correct : 2 Wrong : 0

In spring-mass system, if the mass of the system is doubled with spring stiffness halved, the natural frequency of vibration-

Options :

1. ✘ Remains unchanged
2. ✘ Is doubled
3. ✔ Is halved
4. ✘ Is quadrupled

Question Number : 34 Question Type : MCQ

Correct : 2 Wrong : 0

In a vibrating system, if the actual damping coefficient is 40 N/m/s and critical damping coefficient is 420 N/m/s, then logarithmic decrement is equal to-

Options :

1. ✘ 0.2
2. ✘ 0.4
3. ✔ 0.6
4. ✘ 0.8

Question Number : 35 Question Type : MCQ

Correct : 2 Wrong : 0

Two shafts will have equal strength, if

Options :

1. ✘ Diameter of both the shafts is same
2. ✘ Angle of twist of both the shaft is same
3. ✘ Material of both the shaft is same
4. ✔ Twisting moment of both the shaft is same

Question Number : 36 Question Type : MCQ

Correct : 2 Wrong : 0

The included angle for V-belt is usually-

Options :

1. ✘  $20^\circ - 30^\circ$
2. ✔  $30^\circ - 40^\circ$
3. ✘  $40^\circ - 60^\circ$
4. ✘  $60^\circ - 80^\circ$

Question Number : 37 Question Type : MCQ

Correct : 2 Wrong : 0

A distributed force acting on every element of volume is known as -

Options :

1. ✓ Body force
2. ✗ Traction force
3. ✗ Point force
4. ✗ Total elemental force

Question Number : 38 Question Type : MCQ

Correct : 2 Wrong : 0

By distributing balancing of reciprocating parts between coupled wheels, the hammer blow is;

Options :

1. ✓ Completely eliminated
2. ✗ Reduced to half
3. ✗ Increased continuously
4. ✗ Constant

Question Number : 39 Question Type : MCQ

Correct : 2 Wrong : 0

Spring index is –

Options :

1. ✓ Ratio of coil diameter to wire diameter
2. ✗ Load required to produce unit deflection
3. ✗ Its capability of storing energy
4. ✗ Indication of quality of spring

Question Number : 40 Question Type : MCQ

Correct : 2 Wrong : 0

Equivalent spring stiffness ( $Keq$ ) of a helical spring under axial load is given by-

Options :

1. ✗  $Keq = \frac{\pi EDd}{4l}$  N/mm
2. ✓  $Keq = \frac{GD^4}{8nD^3}$  N/mm
3. ✗  $Keq = \frac{EA}{l}$  N/mm

$$K_{eq} = \frac{EA}{4l} \text{ N/mm}$$

4. ✘

Question Number : 41 Question Type : MCQ

Correct : 2 Wrong : 0

8085 microprocessor is a-

Options :

1. ✔ 8 bit microprocessor
2. ✘ 4 bit Microprocessor
3. ✘ 16 bit Microprocessor
4. ✘ 32 bit microprocessor

Question Number : 42 Question Type : MCQ

Correct : 2 Wrong : 0

The time that the system response takes to reach from 10% to 90% of the final value of output is known as-

Options :

1. ✘ Delay time
2. ✔ Rise time
3. ✘ Settling time
4. ✘ Peak time

Question Number : 43 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following is an undesirable dynamic characteristic of an instrument?

Options :

1. ✘ Reproducibility
2. ✘ Dead zone
3. ✔ Time lag
4. ✘ Static error

Question Number : 44 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following is the best method for determining the stability and transient response?

Options :

1. ✔ Root locus
2. ✘ Bode plot

3. ✘ Nyquist plot

4. ✘ Nichols Plot

Question Number : 45 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following is exhibited by Root locus diagrams?

Options :

1. ✔ The poles of the transfer function for a set of parameter values

2. ✘ The bandwidth of the system

3. ✘ The response of a system to a step input

4. ✘ The frequency response of a system

Question Number : 46 Question Type : MCQ

Correct : 2 Wrong : 0

A.C. servomotor is basically a –

Options :

1. ✘ universal motor

2. ✘ single phase induction motor

3. ✔ two phase induction motor

4. ✘ three phase induction motor

Question Number : 47 Question Type : MCQ

Correct : 2 Wrong : 0

A condenser of refrigeration system rejects heat at the rate of 120 kW, while its compressor consumes a power of 30 kW. The coefficient of performance of the system will be-

Options :

1. ✘  $1/4$

2. ✘  $1/3$

3. ✘ 3

4. ✔ 4

Question Number : 48 Question Type : MCQ

Correct : 2 Wrong : 0

The refrigerant temperature after the expansion device compared to after condenser in the vapor compression refrigeration cycle is –

Options :

1. ✔ Lower

2. ✘ Higher
3. ✘ Same
4. ✘ Zero

Question Number : 49 Question Type : MCQ

Correct : 2 Wrong : 0

The device used to cool the refrigerant in a vapor absorption chiller is a –

Options :

1. ✘ Vacuum pump
2. ✔ Condenser
3. ✘ Vacuum condenser
4. ✘ Receiver

Question Number : 50 Question Type : MCQ

Correct : 2 Wrong : 0

One mm scaling build up in the condenser tube will lead to a percentage increase power consumption –

Options :

1. ✘ 50%
2. ✔ 40%
3. ✘ 10%
4. ✘ 25%

Question Number : 51 Question Type : MCQ

Correct : 2 Wrong : 0

Higher COP can be achieved with –

Options :

1. ✘ Lower evaporator temperature and higher condenser temperature
2. ✔ Higher evaporator temperature and Lower condenser temperature
3. ✘ Higher evaporator temperature and higher condenser temperature
4. ✘ Lower evaporator temperature and Lower condenser temperature

Question Number : 52 Question Type : MCQ

Correct : 2 Wrong : 0

When the two elements of a pair have a surface contact when relative motion takes place and the surface of one element slides over the surface of the other, the pair formed is known as a-

Options :

1. ✔ lower pair

2. ✘ higher pair
3. ✘ self-closed pair
4. ✘ force-closed pair

Question Number : 53 Question Type : MCQ

Correct : 2 Wrong : 0

The gear train usually employed in clocks is a-

Options :

1. ✘ simple gear train
2. ✔ reverted gear train
3. ✘ sun and planet gear
4. ✘ differential gear

Question Number : 54 Question Type : MCQ

Correct : 2 Wrong : 0

The cam follower generally used in automobile engines is-

Options :

1. ✘ knife edge follower
2. ✘ flat faced follower
3. ✔ spherical faced follower
4. ✘ roller follower

Question Number : 55 Question Type : MCQ

Correct : 2 Wrong : 0

The Whitworth quick return motion mechanism is formed in a slider crank chain when the-

Options :

1. ✔ coupler link is fixed
2. ✘ longest link is a fixed link
3. ✘ slider is a fixed link
4. ✘ smallest link is a fixed link

Question Number : 56 Question Type : MCQ

Correct : 2 Wrong : 0

The corolis component of acceleration acts-

Options :

1. ✘ along the sliding surface
2. ✔ perpendicular to the sliding surface
3. ✘ at 45° to the sliding surface
4. ✘ parallel to the sliding surface

Question Number : 57 Question Type : MCQ  
Correct : 2 Wrong : 0

The Klein's diagram is used when-

Options :

1. ✔ crank has uniform angular velocity
2. ✘ crank has non-uniform angular velocity
3. ✘ crank has uniform angular acceleration
4. ✘ crank has non-uniform angular acceleration

Question Number : 58 Question Type : MCQ  
Correct : 2 Wrong : 0

There are six gears  $A, B, C, D, E$  and  $F$  in a compound train. The numbers of teeth in the gears are 20, 60, 30, 80, 25 and 75 respectively. The ratio of angular speeds of the driven ( $F$ ) to the driver ( $A$ ) of the drive is-

Options :

1. ✔ 1/24
2. ✘ 1/8
3. ✘ 4/15
4. ✘ 1/12

Question Number : 59 Question Type : MCQ  
Correct : 2 Wrong : 0

When the relation between the controlling force ( $F_c$ ) and radius of rotation ( $r$ ) for a spring controlled governor is  $F_c = ar + b$ , then the governor will be

Options :

1. ✘ Stable
2. ✔ Unstable
3. ✘ Isochronous
4. ✘ Free

Question Number : 60 Question Type : MCQ  
Correct : 2 Wrong : 0

The height of a Watt's governor is

Options :

- ✘ directly proportional to speed
- ✘ directly proportional to (speed)<sup>2</sup>
- ✘ inversely proportional to speed
- ✔ inversely proportional to (speed)<sup>2</sup>

Question Number : 61 Question Type : MCQ

Correct : 2 Wrong : 0

A spring controlled governor is said to be unstable when the controlling force

Options :

- ✘ increases as the radius of rotation decreases
- ✘ increases as the radius of rotation increases
- ✔ decreases as the radius of rotation increases
- ✘ remains constant for all radii of rotation

Question Number : 62 Question Type : MCQ

Correct : 2 Wrong : 0

A Hartnell governor has its controlling force ( $F_c$ ) given by  $F_c = ar + b$ , where  $r$  is the radius of rotation and  $a$  and  $b$  are constants. The governor becomes isochronous when

Options :

- ✔  $a$  is + ve and  $b = 0$
- ✘  $a = 0$  and  $b$  is + ve
- ✘  $a$  is + ve and  $b$  is - ve
- ✘  $a$  is + ve and  $b$  is also + ve

Question Number : 63 Question Type : MCQ

Correct : 2 Wrong : 0

The rotor of a ship rotates in clockwise direction when viewed from the stem and the ship takes a left turn. The effect of the gyroscopic couple acting on it will be-

Options :

- ✘ To raise the bow and stem
- ✘ To lower the bow and stem
- ✔ To raise the bow and lower the stem
- ✘ To raise the stem and lower the bow

Question Number : 64 Question Type : MCQ

Correct : 2 Wrong : 0

The primary unbalanced force is maximum when the angle of inclination of the crank with the line of stroke is

Options :

1. ✘  $0^\circ$
2. ✘  $90^\circ$
3. ✔  $180^\circ$
4. ✘  $360^\circ$

Question Number : 65 Question Type : MCQ

Correct : 2 Wrong : 0

In a locomotive, the ratio of the connecting rod length to the crank radius kept very large in order to

Options :

1. ✘ Minimize the effect of primary forces
2. ✔ Minimize the effect of secondary forces
3. ✘ Have perfect balancing
4. ✘ Start the locomotive quickly

Question Number : 66 Question Type : MCQ

Correct : 2 Wrong : 0

In vibration isolation system, the transmissibility will be equal to unity, for all values of damping factor, if  $\omega/\omega_n$  is-

Options :

1. ✘ equal to one
2. ✔ equal to  $2^{\frac{1}{2}}$
3. ✘ greater than  $2^{\frac{1}{2}}$
4. ✘ less than  $2^{\frac{1}{2}}$

Question Number : 67 Question Type : MCQ

Correct : 2 Wrong : 0

In under damped vibrating system, the amplitude of vibration-

Options :

1. ✘ decreases linearly with time
2. ✘ increases linearly with time
3. ✔ decreases exponentially with time
4. ✘ increases exponentially with time

Question Number : 68 Question Type : MCQ

Correct : 2 Wrong : 0

The critical speed of a shaft depends upon its -

Options :

1. ✘ Mass
2. ✘ Stiffness
3. ✔ mass and stiffness
4. ✘ stiffness and eccentricity

Question Number : 69 Question Type : MCQ

Correct : 2 Wrong : 0

The reference fuels for knock rating of spark ignition engines would include

Options :

1. ✘ iso-octane and alpha-methyl naphthalene
2. ✘ normal octane and aniline
3. ✘ iso-octane and normal hexane
4. ✔ normal heptane and iso-octane

Question Number : 70 Question Type : MCQ

Correct : 2 Wrong : 0

In a four stroke cycle, the minimum temperature inside the engine cylinder occurs at the -

Options :

1. ✔ beginning of suction stroke
2. ✘ end of suction stroke
3. ✘ beginning of exhaust stroke
4. ✘ end of exhaust stroke

Question Number : 71 Question Type : MCQ

Correct : 2 Wrong : 0

A gas engine has a swept volume of  $300 \text{ cm}^3$  and clearance volume of  $25 \text{ cm}^3$ . Its volumetric efficiency is 0.88 and mechanical efficiency is 0.90. The volume of the mixture taken in per stroke is-

Options :

1. ✘  $248 \text{ cm}^3$
2. ✘  $252 \text{ cm}^3$
3. ✔  $264 \text{ cm}^3$

4. ✘ 286 cm<sup>3</sup>

Question Number : 72 Question Type : MCQ

Correct : 2 Wrong : 0

Advantage of LPG as fuel in automobile-

Options :

1. ✔ Engine has longer life when running on LPG
2. ✘ Less weight of fuel handling system
3. ✘ **More energy content than gasoline**
4. ✘ Low self ignition temperature compared to gasoline

Question Number : 73 Question Type : MCQ

Correct : 2 Wrong : 0

The main purpose of thermostat in an engine cooling system is to

Options :

1. ✔ Allow engine to warm-up quickly
2. ✘ Prevent the coolant from boiling
3. ✘ Pressurize the system
4. ✘ Indicate the driver the coolant temperature

Question Number : 74 Question Type : MCQ

Correct : 2 Wrong : 0

Octane number of iso-octane is-

Options :

1. ✘ 0
2. ✘ 30
3. ✘ 60
4. ✔ 100

Question Number : 75 Question Type : MCQ

Correct : 2 Wrong : 0

For a given compression ratio, as the mixture is made progressively rich from lean the mean effective pressure

Options :

1. ✘ Increases
2. ✘ Decreases
3. ✔ Initially increases and then decreases

4. ✘ Less or more or same

Question Number : 76 Question Type : MCQ

Correct : 2 Wrong : 0

The angle between the face and flank of the single point cutting tool is known as-

Options :

1. ✘ rake angle
2. ✘ clearance angle
3. ✔ lip angle
4. ✘ point angle

Question Number : 77 Question Type : MCQ

Correct : 2 Wrong : 0

The carbide tools operating at very low cutting speeds (below 30 m/min)

Options :

1. ✔ reduces tool life
2. ✘ increases tool life
3. ✘ have no effect on tool life
4. ✘ spoils the work piece

Question Number : 78 Question Type : MCQ

Correct : 2 Wrong : 0

Primary process to manufacture a part through powder metallurgy is-

Options :

1. ✘ Sizing
2. ✘ Coining
3. ✘ Impregnating
4. ✔ Sintering

Question Number : 79 Question Type : MCQ

Correct : 2 Wrong : 0

What will be machining time for drilling of dia. 30mm through hole in a 30mm thick plate at a speed of 30m/s and feed 0.1mm/tooth? (Assume approach and over travel =2mm)

Options :

1. ✔ 0.67 min
2. ✘ 0.97 min

3. ✘ 0.37 min

4. ✘ 0.57 min

Question Number : 80 Question Type : MCQ

Correct : 2 Wrong : 0

A Multiphysics Finite Element Analysis Software formerly known as "Femlab" is-

Options :

1. ✘ ANSYS

2. ✘ NASTRAN

3. ✔ COMSOL

4. ✘ ABACUS

Question Number : 81 Question Type : MCQ

Correct : 2 Wrong : 0

In a single point turning operation with a cemented carbide and steel combination having a Taylor exponent of 0.25, if the cutting speed is halved, then tool life will become-

Options :

1. ✘ half

2. ✘ two times

3. ✘ four times

4. ✔ eight times

Question Number : 82 Question Type : MCQ

Correct : 2 Wrong : 0

Segmental chips are formed during machining

Options :

1. ✘ mild steel

2. ✔ cast iron

3. ✘ high speed steel

4. ✘ high carbon steel

Question Number : 83 Question Type : MCQ

Correct : 2 Wrong : 0

The value of bulk modulus of a fluid is required to determine-

Options :

1. ✘ Reynold's number

2. ✘ Froude's number
3. ✔ Mach number
4. ✘ Euler's number

Question Number : 84 Question Type : MCQ

Correct : 2 Wrong : 0

The discharge over a triangular notch is-

Options :

1. ✘ inversely proportional to  $H^{3/2}$
2. ✘ directly proportional to  $H^{3/2}$
3. ✘ inversely proportional to  $H^{5/2}$
4. ✔ directly proportional to  $H^{5/2}$

Question Number : 85 Question Type : MCQ

Correct : 2 Wrong : 0

A body floating in a liquid is said to be in neutral equilibrium, if its metacentre –

Options :

1. ✔ coincides with its centre of gravity
2. ✘ lies above its centre of gravity
3. ✘ lies below its centre of gravity
4. ✘ lies between the centre of buoyancy and centre of gravity

Question Number : 86 Question Type : MCQ

Correct : 2 Wrong : 0

A flow in which each liquid particle has a definite path, and the paths of individual particles do not cross each other, is called -

Options :

1. ✔ steady flow
2. ✘ uniform flow
3. ✘ streamline flow
4. ✘ turbulent flow

Question Number : 87 Question Type : MCQ

Correct : 2 Wrong : 0

Discharge of a centrifugal pump is-

Options :

- ✘ directly proportional to diameter of its impeller
- ✘ inversely proportional to diameter of its impeller
- ✘ directly proportional to (diameter)<sup>2</sup> of its impeller
- ✔ inversely proportional to (diameter)<sup>2</sup> of its impeller

Question Number : 88 Question Type : MCQ

Correct : 2 Wrong : 0

A Pelton wheel develops 1750 kW under a head of 100 metres while running at 200 r.p.m. and discharging 2500 litres of water per second. The unit power of the wheel is-

Options :

- ✘ 0.25 kW
- ✘ 0.75 kW
- ✔ 1.75 kW
- ✘ 3.75 kW

Question Number : 89 Question Type : MCQ

Correct : 2 Wrong : 0

Geometric similarity is said to exist between the model and the prototype, if both of them-

Options :

- ✘ have identical velocities
- ✘ are equal in size and shape
- ✔ are identical in shape, but differ only in size
- ✘ have identical forces

Question Number : 90 Question Type : MCQ

Correct : 2 Wrong : 0

The specific speed of a hydraulic turbine depends upon –

Options :

- ✘ speed and power developed
- ✘ discharge and power developed
- ✘ speed and head of water
- ✔ speed, power developed and head of water

Question Number : 91 Question Type : MCQ

Correct : 2 Wrong : 0

The routing function in a production system design is concerned with-

Options :

1. ✘ manpower utilisation
2. ✘ quality assurance of the product
3. ✘ machine utilisation
4. ✔ optimising material flow through the plant

Question Number : 92 Question Type : MCQ

Correct : 2 Wrong : 0

The chart which represents the quantitative data about the movement of workers/materials or equipment between various work stations is known as-

Options :

1. ✘ Flow chart
2. ✘ Process chart
3. ✔ Travel chart
4. ✘ Operation chart

Question Number : 93 Question Type : MCQ

Correct : 2 Wrong : 0

The determination of standard time in a complex job system is best done through-

Options :

1. ✘ stop watch time study
2. ✔ analysis of micromotions
3. ✘ grouping timing technique
4. ✘ analysis of standard data system

Question Number : 94 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following statement is correct?

Options :

1. ✘ A-B-C analysis is based on Pareto's principle
2. ✘ Simulation can be used for inventory control
3. ✔ Economic order quantity formula ignores variations in demand pattern
4. ✘ the economic order quantity is lot size corresponding to break-even analysis

Question Number : 95 Question Type : MCQ

Correct : 2 Wrong : 0

Production cost refers to prime cost plus-

Options :

1. ✘ factory overheads
2. ✘ factory and administration overheads
3. ✘ factory, administration and sales overheads
4. ✔ factory, administration, sales overheads and profit

Question Number : 96 Question Type : MCQ

Correct : 2 Wrong : 0

Which of the following wage incentive plan guarantees minimum wage to a worker and bonus is paid for the fixed percentage of time saved?

Options :

1. ✘ Halsey plan
2. ✘ Gantt plan
3. ✔ Rowan plan
4. ✘ Emerson's efficiency plan

Question Number : 97 Question Type : MCQ

Correct : 2 Wrong : 0

The MRP forms a vital link between sales and production as follows:

Options :

1. ✘ The MRP makes possible valid order promises.
2. ✔ The MRP is a plan of what is to be produced and when.
3. ✘ The MRP is a contract between marketing and manufacturing.
4. ✘ The MRP is a estimation of the percentage utilization of resources.

Question Number : 98 Question Type : MCQ

Correct : 2 Wrong : 0

A schedule is satisfactory when:

Options :

1. ✘ Capacity is greater than the production plan
2. ✘ It doesn't specify to the plant when to start production
3. ✔ Capacity is consistent with the production plan
4. ✘ It doesn't specify to the plant when to stop production

Question Number : 99 Question Type : MCQ

Correct : 2 Wrong : 0

Manufacturing capacity can be increased by:

Options :

1. ✘ Using fewer workers
2. ✔ Scheduling overtime
3. ✘ Limiting subcontracting
4. ✘ Rerouting away from other work centers

Question Number : 100 Question Type : MCQ

Correct : 2 Wrong : 0

With reference to NC machines, which of the following statement is wrong?

Options :

1. ✘ Both closed-loop and open –loop control systems are used
2. ✘ Paper tapes, floppy tapes and cassettes are used for data storage
3. ✔ Digitizers may be used as interactive input devices
4. ✘ Post processor is an item of hardware