PROVISIONAL ANSWER KEY

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Question1:-When a series *RC* circuit is connected to a dc voltage of V, the final steady-state current is

A:-zero

B:-infinity

C:-V/R

D:-V/RC

Correct Answer:- Option-A

Question2:-What happens when a steady potential difference is applied across the ends of a conducting wire?

A:-all electrons move with a constant velocity

B:-the electrons move with a constant acceleration

C:-the random electron motion will, on average, be equivalent to a constant velocity of each electron

D:-equivalent to a constant acceleration of each electron

Correct Answer:- Option-C

Question3:-The self-inductance of a very long solenoid with a 2 × 2 cm cross section has an iron core is 8 H/m. The energy per meter stored in its field, if it carries a current of 500 mA, is

A:-0.04 J/m

B:-0.5 J/m

C:-1 J/m

D:-4 J/m

Correct Answer:- Option-C

Question4:-A balanced Δ-connected circuit of Z_Δ Ω/phase is equivalent to a balanced Y-connected circuit of Z_Y Ω/phase if

A:-$Z_Y = 1/3\ Z_\Delta$

B:-$Z_Y = 3\ Z_\Delta$

C:-$Z_Y = 2/3\ Z_\Delta$

D:-$Z_Y = 3/2\ Z_\Delta$

Correct Answer:- Option-A

Question5:-In case of a series resonant circuit, a change in supply voltage will change

A:-the resonance frequency

B:-the bandwidth of the circuit

C:-the Q of the circuit

D:-the current drawn

Correct Answer:- Option-D

Question6:-Assertion (A) : If the voltage across R, L, C elements connected in series in an ac circuit is 30 V, 10V and 50V respectively then the voltage applied will be 50 V
Reason (R) : The applied voltage is equal to the maximum voltage existing across any of the three elements

A:-both A and R true and R is the correct explanation of A

B:-both A and R are individually true but R is not the correct explanation of A

C:-A is true, R is false

D:-A is false, R is true

Correct Answer:- Option-C

Question7:-A sinusoidal voltage is expressed as v = 20 sin (314 t + π/6) V, its frequency and phase angle are

A:-314 Hz, 30°

B:-314 Hz, –30°

C:-50 Hz, 30°

D:-50 Hz, –30°

Correct Answer:- Option-C

Question8:-A 4 μFcapacitor is connected in series with a 0.5 MΩ resistor across a 200 V dc supply. The initial charging current and time constant are

A:-400 $\mu A, 2s$

B:-147 $\mu A, 1s$

C:-800 $\mu A, 0.5s$

D:-1600 $\mu A, 4s$

Correct Answer:- Option-A

Question9:-Kirchhoff's laws can be applied to a network solution by

A:-direct application to the network in conjunction with Ohm's law

B:-indirect application to the network in conjunction with the manipulation of the component resistances

C:-direct application to the network, resulting in a solution by simultaneous equations

D:-all the above

Correct Answer:- Option-D

Question10:-Match the following

Column A	Column B
a. Thevenin's theorem	I. A number of sources
b. Norton's theorem	II. An equivalent source of emf
c. Superposition theorem	III. An equivalent current source
d. Maximum power transfer theorem	IV. A circuit or source with low output impedance

A:-a-II, b-I, c-III, d-IV

B:-a-II, b-III, c-I, d-IV

C:-a-II, b-III, c-IV, d-I

D:-a-IV, b-I, c-II, d-III

Correct Answer:- Option-B

Question11:-The EMF induced in a four pole DC generator having 1000 conductor lap-connected windings, the flux per pole of 10 mwb and rotated at 600 rpm is

A:-1000 V

B:-500 V

C:-250 V

D:-100 V

Correct Answer:- Option-D

Question12:-A four pole, 50 Hz, 400 V, three-phase induction motor is running at 1440 rpm. The frequency of rotor induced emf is

A:-2 Hz

B:-4 Hz

C:-1 Hz

D:-50 Hz

Correct Answer:- Option-A

Question13:-Which of the following statement is not true for a synchronous motor?

A:-An over-excited synchronous motor draws leading power factor current

B:-An over-exited synchronous motor draws lagging power factor current

C:-At normal excitation the current drawn by synchronous motor is minimum

D:-At normal excitation the power factor of current drawn is unity

Correct Answer:- Option-B

Question14:-In alternator, damper windings are used to

A:-reduce eddy current

B:-reduce armature reaction

C:-prevent hunting

D:-reduce hysteresis loss

Correct Answer:- Option-C

Question15:-A transformer has hysteresis loss of 30 W at 240V, 60Hz. The hysteresis loss at 200 V, 50 Hz will be

A:-28 W

B:-25 W

C:-30 W

D:-36 W

Correct Answer:- Option-B

Question16:-The iron loss in a 100 kVA transformer is 1 kW and full-load copper losses are 2 kW, then maximum efficiency occurs at a load of

A:-141.4 kVA

B:-70.7 kVA

C:-282.8 kVA

D:-30.5 kVA

Correct Answer:- Option-B

Question17:-In a 3-phase induction motor, the starting torque will be maximum when

A:-$R_2 = \frac{1}{X_2}$

B:-$R_2 = X_2$

C:-$R_2 = X_2^2$

D:-$R_2 = \sqrt{X}_2$

Correct Answer:- Option-B

Question18:-At nearly what percentage of full load is the distribution transformers designed to have maximum efficiency

A:-100

B:-70

C:-25

D:-10

Correct Answer:- Option-B

Question19:-Synchronous capacitor is

A:-an ordinary static capacitor bank

B:-an over excited synchronous motor driving mechanical load

C:-an over excited synchronous motor without mechanical load

D:-none of the above

Correct Answer:- Option-C

Question20:-Induction motor, when directly switched on across their normal rated supply voltage, the torque developed at starting is about _____ of their full load torque

A:-half

B:-1.5 to 2.5 times

C:- 5 times

D:- 10 times

Correct Answer:- Option-B

Question21:-An equilaterally spaced three phase transmission line has a corona loss of 2 KW/phase/KM at 60 Hz. The corona loss on the same system with supply frequency of 50 Hz will be

A:-3 KW/Phase/KM

B:-1.8 KW/Phase/KM

C:-2.7 KW/Phase/KM

D:-3.5 KW/Phase/KM

Correct Answer:- Option-B

Question22:-In a 110 KV, three phase, 50 Hz power system the line to ground capacitance is $2_{\mu F}$ and the inductance is 4 H. In order to eliminate the transient critically the value of resistance the circuit breaker contacts required is

A:-707Ω

B:-717KΩ

C:-706KΩ

D:-70KΩ

Correct Answer:- Option-A

Question23:-Assertion (A) : Differential protection can not be used for inter-turn faults.
Reason (R) : In inter-turn fault currents at the two ends of the winding are not same.

A:-Both A and R are true and R is not the correct explanation of A

B:-Both A and R are true but R is the correct explanation of A

C:-A is true but R is false

D:-A is false but R is true

Correct Answer:- Option-C

Question24:-Power station A has 2 identical generator sets each rated 50 MVA and having an inertia constant of 6 MJ/JVA whereas the station B has 3 generators rated 100 MVA and having inertia constant of 4 MJ/MVA. The inertia constant of a single equivalent machine on a base of 50 MVA will be

A:-65 MJ/MVA

B:-63 MJ/MVA

C:-24 MJ/MVA

D:-36 MJ/MVA

Correct Answer:- Option-D

Question25:-The base KV and Base MVA of a three phase transmission line is 25 KV

and 40 MVA respectively. The base current and base impedences are respectively

A:-932.8A, 65.1Ω/phase

B:-923.8A, 15.6Ω/phase

C:-823.9 A, 16.5Ω/phase

D:-932.8A, 61.5Ω/phase

Correct Answer:- Option-B

Question26:-A 50 Hz bar primary CT has a secondary with 450 turns. The secondary supplies 6A current into a purely resistive burden of 1.5Ω. The core flux in the CT under the given operating condition is

A:-85 µWb

B:-58 µWb

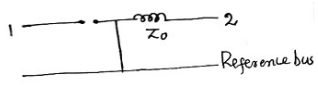
C:-48 µWb

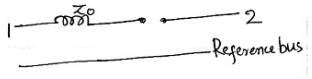
D:-90 µWb

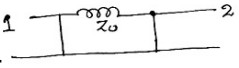
Correct Answer:- Option-D

Question27:-The primary side of a 3 phase transformer is star connected with neutral grounded and secondary side is delta connected, its zero sequence network is

A:- 

B:- 

C:- 

D:- 

Correct Answer:- Option-A

Question28:-The boundary condition in double line to ground fault is

A:-Ia=0, Ib+Ic=0, Vb=Vc

B:-Ib=0, Ic=0, Va=0

C:-Ia+Ib+Ic=0, Va=Vb=Vc=0

D:-Ia=0, Vb=0, Vc=0

Correct Answer:- Option-D

Question29:-For the stable operation of a power system

A:-The actual clearing angle is larger than critical clearing angle

B:-The actual clearing angle and critical clearing angle are same

C:-The actual clearing angle is smaller than critical clearing angle

D:-None of the above

Correct Answer:- Option-C

Question30:-A string insulator has 4 units. The voltage across the unit near the powr conductor is 33.33% of the total voltage and the voltage across the unit nearest to the tower is 30.33% of total voltage. Its string efficiency is

A:-57%

B:-75%

C:-82.4%

D:-84.2%

Correct Answer:- Option-B

Question31:-An analog PMMC (0-10) A ammeter is provided with no controlling mechanism and the moving parts are free to rotate, the reading of the instrument if a current of 1 A DC passed through the moving coil

A:-The pointer will remains stationary

B:-1 A

C:-10A

D:-The pointer will continuously rotate

Correct Answer:- Option-D

Question32:-Energy meter is an example of _____ type of instruments

A:-indicating

B:-recording

C:-integrating

D:-primary instruments

Correct Answer:- Option-C

Question33:-(0-1) mA ammeter has its internal resistance of 4 ohm. It's range is to be extended to 100A. The value of shunt resistance required is

A:-40 micro ohm

B:-40 milli hom

C:-40 ohm

D:-40 kilo ohm

Correct Answer:- Option-A

Question34:-Which type of the instrument has the higher power consumption?

A:-Moving iron

B:-PMMC

C:-Hot wire

D:-All instruments have identical power consumption

Correct Answer:- Option-C

Question35:-In an electrodynamometer, moving coil has an area A, turn N carries a current I producing a magnetic flux B. The torque on the moving coil is proportional to

A:-I

B:-I^2

C:-BI^2

D:-$NABI^2$

Correct Answer:- Option-B

Question36:-A wattmeter has a range of 1000 W with an error of ±1% of full scale deflection, if the true power passed it is 100 w, then relative error would be

A:-±10%

B:-±5%

C:-±1%

D:-±0.5%

Correct Answer:- Option-A

Question37:-The brake magnet of an error free electromechanical induction type energy meter is shifted from its position and moved a small distances towards the edge of the disc. Then the meter will

A:-Continue to work correctly without any change in its characteristics

B:-Continue to work, but registers a lower kWhr

C:-Stop working

D:-Continue to work, but registers a higher kWhr

Correct Answer:- Option-B

Question38:-In two wattmeter method of power measurement, one of the wattmeter will show negative reading when load power factor angle is strictly

A:-< 30 degree

B:-< 60 degree

C:-Between 30 degree and 60 degree

D:-> 60 degree

Correct Answer:- Option-D

Question39:-Which of the following measuring devices has minimum loading effect on the quantity under measurement?

A:-PMMC

B:-CRO

C:-Hot wire

D:-Electrodynamometer

Correct Answer:- Option-B

Question40:-The sine wave output of a function generator is fed to both the horizontal (X) and vertical (Y) inputs of a CRO. What will be the pattern on the cathode ray screen?

A:-A circle

B:-An ellipse

C:-A straight line with 45 degree slop

D:-Sinsoidal

Correct Answer:- Option-C

Question41:-Which of the following statements are true?
i. Transducers which require external power source for their operation are called passive transducers
ii. Passive transducers produce an output signal in the form of variation of resistance, capacitance or any other electrical parameter and have high resolution.
iii. Thermocouple is an example of active transducer

A:-i only

B:-i and ii only

C:-all are true

D:-none is true

Correct Answer:- Option-C

Question42:-Which of the following statements about Hall effect transducer is correct?
i. it can be used to measure power
ii. it can be used to measure current in a conductor without physical connection between the conductor and meter
iii. it is used to measure displacement of a structural element
iv. it measures the magnetic field by converting it to a voltage

A:-i, ii, iii are correct

B:-ii, iii, iv are correct

C:-iii, iv are correct

D:-All are correct

Correct Answer:- Option-D

Question43:-An alkaline cell is discharged at a steady current of 5A for 10 hours, the average terminal voltage being 1.2 V. A steady current of 4A for 15 hours is required to bring it to original state of charge, the average terminal voltage being 1.44 V. The ampere-hour efficiency of the cell is

A:-83.33%

B:-73.33%

C:-63.33%

D:-80%

Correct Answer:- Option-A

Question44:-The watt-hour efficiency of the cell in the above question is

A:-69.44%

B:-59.44%

C:-80.33%

D:-70.33%

Correct Answer:- Option-A

Question45:-Which of the following statements are incorrect?
i. Constant voltage charging allows the full current of the charger to flow into the battery until the power supply reaches its preset voltage with the current tapering to a minimum once that voltage level is reached
ii. Current level is set at approximately 10% of the maximum battery rating in constant current charging
iii. Constant voltage charging is comparatively fast and suitable for lead acid batteries.
iv. Constant current charging is relatively slow with the disadvantage that battery may overheat if overcharged

A:-i, ii are incorrect

B:-ii, iii are incorrect

C:-iii, iv are incorrect

D:-none of the statements are incorrect

Correct Answer:- Option-D

Question46:-The system of earthing in which all parts are insulated from earth or one point is connected to earth through sufficiently high impedance is

A:-TT system

B:-TN system

C:-TN-C system

D:-IT system

Correct Answer:- Option-D

Question47:-The feature of TN-C system of earthing is that

A:-functions of neutral and protective earth (PE) conductor are combined in a single conductor

B:-one separate protective earth conductor is used throughout the system

C:-In one part of the system, functions of neutral PE conductor are combined in a single conductor and separate in others parts

D:-None of the above

Correct Answer:- Option-A

Question48:-The lamp for which efficacy is 135 lumens per watt for rating of 35 W and 183 lumens per watt for a rating of 180 W and has long and reliable life of about 18000 hours is

A:-Fluorescent lamp

B:-Mercury vapour lamp

C:-Low pressure sodium vapour lamp

D:-High pressure sodium vapour lamp

Correct Answer:- Option-C

Question49:-The illuminance at a point 5 metres away from a point light source producing 3000 candela and with angle of incidence 30° with respect to the vertical is

A:-63.92 lux

B:-83.92 lux

C:-103.92 lux

D:-120.92 lux

Correct Answer:- Option-C

Question50:-The number of luminaries required for an illumination level of 300 lux in a room 6.5 m × 8m, considering coefficient of utilization 0.7365, light loss factor of 0.7, initial lamp lumens as 4000 is

A:-6

B:-7

C:-8

D:-9

Correct Answer:- Option-C

Question51:-Which of the following represents a group incentive plan?

A:-Bedaux plan

B:-Halsey premium plan

C:-Scanlon plan

D:-Rowan plan

Correct Answer:- Option-C

Question52:-If the earliest start time for an activity is 8 weeks, the latest finish time is 37 weeks and the duration time of the activity is 11 weeks, then the total float is equal to

A:-18 weeks

B:-14 weeks

C:-56 weeks

D:-40 weeks

Correct Answer:- Option-A

Question53:-One disadvantage of using North-West Corner Rule to find initial solution to the transportation problem is that

A:-It is complicated to use

B:-It does not take in to account cost of transportation

C:-It leads to degenerate initial solution

D:-All of the above

Correct Answer:- Option-B

Question54:-The dealer for washing machines forecasts the demand at the rate of

600 units per month, for the next four months. The actual demand is found to be 500, 680, 800 and 900 units. The mean absolute deviation (MAD) is found to be

A:-170

B:-120

C:-240

D:-340

Correct Answer:- Option-A

Question55:-Ogive curves are

A:-Frequency charts

B:-Cumulative frequency charts

C:-Bar charts

D:-Cumulative bar charts

Correct Answer:- Option-B

Question56:-Match List I with List II and select the correct answer using the codes given below the lists :

List-I	List-II
a. Trend	1. R-Chart
b. Dispersion	2. C-chart
c. Number of defects	3. $\bar{x}-chart$
d. Number of defective	4. np-chart
	5. u-chart

A:-a-5, b-3, c-2, d-4

B:-a-3, b-1, c-4, d-2

C:-a-3, b-1, c-2, d-4

D:-a-3, b-4, c-5, d-2

Correct Answer:- Option-C

Question57:-Which type of layout is preferred in order to avoid excessive multiplication of facilities

A:-Process layout

B:-Product layout

C:-Fixed position layout

D:-Cellular layout

Correct Answer:- Option-A

Question58:-In performing a task, motion economy refers to the manner in which

A:-Human energy can be conserved

B:-Electrical energy can be conserved

C:-Machine movements can be reduced

D:-Material movements can be reduced

Correct Answer:- Option-A

Question59:-For a positively skewed distribution

A:-Median is greater than mean

B:-Mean is greater than median

C:-Mode is greater than median and median is greater than mean

D:-Mean is greater than median and median is greater than mode

Correct Answer:- Option-B

Question60:-The following is the general policy for 'A' class items in ABC analysis :
1. Very strict control
2. Frequent review of their consumption
3. Safety stock kept

Which of the above statements is/are correct?

A:-1 only

B:-1 and 2 only

C:-2 only

D:-1, 2 and 3

Correct Answer:- Option-D

Question61:-Identify the wrong statement/s with respect to Schaeffler diagram for stainless steels.
1. High Ni equivalent stabilizes Ferrite
2. High Cr equivalent stabilizes Martensite

A:-Both 1 and 2

B:-Neither of 1 and 2

C:-Only 1

D:-Only 2

Correct Answer:- Option-A

Question62:-The closest distance (centre-to-centre) between two atoms in a BCC crystal structure is ('a' is lattice parameter)

A:-$\frac{\sqrt{2}a}{3}$

B:-$\frac{a}{\sqrt{2}}$

C:-$\frac{2a}{\sqrt{3}}$

D:-$\frac{\sqrt{3}a}{2}$

Correct Answer:- Option-D

Question63:-Excessive hardness after tempering operation may be observed due to

A:-High pearlite concentration

B:-Low tempering temperature

C:-Slow rate of cooling

D:-Long holding period

Correct Answer:- Option-B

Question64:-Which of the following processes will NOT reduce the chance of hydrogen induced cracking?

A:-Preheating

B:-Post heating

C:-High speed welding

D:-Slow cooling

Correct Answer:- Option-C

Question65:-In the Gas Tungsten Arc welding of thin Aluminium alloys (uncleaned), which of the following polarities are suitable?

1. Direct current straight polarity
2. Direct current reverse polarity
3. Alternating current

A:-1, 2 and 3

B:-1 and 2

C:-1 and 3

D:-2 and 3

Correct Answer:- Option-D

Question66:-Identify the correct statement/s

1. Compound rest method can only provide, small taper angles over short lengths
2. Tail stock set-over method can only provide, taper over complete span of the job

A:-both 1 and 2

B:-only 1

C:-only 2

D:-neither of 1 and 2

Correct Answer:- Option-D

Question67:-In grinding operation, loading occurs when

A:-There is excessive friction, causing load on motor

B:-Grinding ratio become more than 100

C:-Metal particles clog space between abrasive particles

D:-Grinding cracks are generated due to heating

Correct Answer:- Option-C

Question68:-Match the machine parts with the movement direction generated, with reference to a column and knee type milling machine

PART	MOVEMENT
1. Table	A. Parallel to spindle
2. Knee	B. Up and Down (parallel to column)
3. Saddle	C. Perpendicular to spindle and column

A:-1-A, 2-B, 3-C

B:-1-B, 2-C, 3-A

C:-1-C, 2-B, 3-A

D:-1-B, 2-A, 3-C

Correct Answer:- Option-C

Question69:-Identify the correct statement/s
1. Reaming is an operation of enlarging a hole with a tool having only one cutting edge.
2. Trepanning is the process of making internal threads in an already existing hole

A:-both 1 and 2

B:-neither of 1 and 2

C:-only 1

D:-only 2

Correct Answer:- Option-B

Question70:-Identify wrong statement/s
1. A positive rake angle is preferred in case of interrupted cutting.
2. A negative rake angle provides increased cutting resistance.

A:-both 1 and 2

B:-neither of 1 and 2

C:-only 1

D:-only 2

Correct Answer:- Option-C

Question71:-Mercury is used in barometers because of which of the following properties
i. Mercury has high density
ii. Mercury has high vapour pressure
iii. Mercury has low vapour pressure

A:-i and ii are correct

B:-i and iii are correct

C:-only i is correct

D:-only ii is correct

Correct Answer:- Option-B

Question72:-In a shear stress vs velocity gradient graph, ideal fluid is represented by

A:-A line drawn at 45° to x axis

B:-The y axis

C:-The x axis

D:-A parabolic curve in the graph

Correct Answer:- Option-C

Question73:-A peizometer is connected to a pipe containing water. Water rises to a

height of 15 m in the piezometer. If the value of g is taken as 10 m/s^2, the value of absolute pressure of water in the pipe will approximately be

A:-1.5 bar

B:-1 bar

C:-0.15 bar

D:-2.5 bar

Correct Answer:- Option-D

Question74:-For a soap bubble of diameter D and surface tension, S, the excess pressure inside the bubble is given by

A:-2S/D

B:-4S/D

C:-8S/D

D:-S/D

Correct Answer:- Option-C

Question75:-Which of the following statements are correct with respect to an air vessel fitted to a reciprocating pump?
i. Water enters air vessel during second half of the suction stroke
ii. Water enters air vessel during first half of the suction stroke
iii. Water enters air vessel during first half of the delivery stroke

A:-i and iii are correct

B:-ii and iii are correct

C:- only i is correct

D:-only ii is correct

Correct Answer:- Option-A

Question76:-Which of the following statements are correct with respect to a draft tube fitted to a turbine
i. Draft tube increases the net head but decreases the overall efficiency of the turbine
ii. A draft tube creates vacuum pressure at the outlet of the runner
iii. Cavitation occurs at the outlet of the draft tube

A:-(i) and (iii) are correct

B:-None of these

C:-only (i) is correct

D:-only (ii) is correct

Correct Answer:- Option-D

Question77:-A jet of velocity V is impinging on a series of vanes moving at speed u then the condition for maximum efficiency is

A:-V = u/2

B:-V = u

C:-V = 2u

D:-V = 3u/2

Correct Answer:- Option-C

Question78:-Which of the following statements are correct with respect to multistage centrifugal pumps?
i. For producing high head a number of impellers are to be connected in series.
ii For producing high head a number of impellers are to be connected in parallel.
iii. If there are n impellers and head developed by each impeller is H. total head developed is given by n×H

A:-(i) and (iii) are correct

B:-(ii) and (iii) are correct

C:-Only (iii) is correct

D:-Only (ii) is correct

Correct Answer:- Option-A

Question79:-On which of the following principles does a hydraulic ram work?

A:-Centrifugal action

B:-Water hammer

C:-Reciprocating action

D:-Cavitation

Correct Answer:- Option-B

Question80:-The percentage of work saved per stroke by fitting an air vessel in a single acting reciprocating pump is nearly

A:-25

B:-40

C:-85

D:-90

Correct Answer:- Option-C

Question81:-A 1.2 m long column is fixed at both ends. It buckeles at 150 kN. What would be the buckling load if it were pinned at both ends?

A:-37.5 kN

B:-75.0 kN

C:-100.0 kN

D:-120.0 kN

Correct Answer:- Option-A

Question82:-A composite bar consists of a steel core of diameter d surrounded by a copper sleeve of inner diameter d and outer diameter 2d. The bar is subjected to an axial compressive force P. If the two materials are perfectly bonded and deform together, what is the ratio of load carried by copper to that carried by steel? (Given : $E_2=2E_c$)

A:-4/3

B:-5/3

C:-3/2

D:-3/4

Correct Answer:- Option-C

Question83:-A 1000 N block is placed on a 30º inclined rough surface with coefficient of friction μ=0.3. What is the friction force acting on the block?

A:-500 N, down the incline

B:-260 N, up the incline

C:-300, down the incline

D:-0, since the block is in equilibrium

Correct Answer:- Option-B

Question84:-In a lap joint with 2 rivets in double shear, if shear strength of rivet is 250 MPa and rivet diameter is 16 mm, what is total shear strength?

A:-50 kN

B:-101 kN

C:-75 kN

D:-201 kN

Correct Answer:- Option-D

Question85:-A fillet weld is subjected to an external force of 60 kN, applied at an eccentricity of 100 mm from the weld group centroid. The total throat area of the weld is 800 mm^2. Assume the weld group is symmetric and the maximum distance from centroid to any weld element is 100 mm. If the polar moment of the throat area about the centroid is approximately $J = 8 \times 10^6 mm^4$, what is the maximum resultant shear stress in the weld?

A:-75.0 MPa

B:-106 MPa

C:-93.4 MPa

D:-130.0 MPa

Correct Answer:- Option-B

Question86:-The shear stress in a square thread of mean diameter equal to 30 mm and pitch equal to 6 mm under 12 kN axial load is
(Assume only one thread is engaged in carrying the load)

A:-56.3 MPa

B:-38 MPa

C:-42.5 MPa

D:-50 MPa

Correct Answer:- Option-C

Question87:-A shaft is manufactured to an H7/f8 fit. If the shaft size increases within its tolerance, what is the most likely effect on the clearance or interference

between the shaft and hole

A:-Clearance increases

B:-Clearance decreases and may lead to interference

C:-Fit becomes looser

D:-Shaft always remains smaller, so no change in clearance

Correct Answer:- Option-B

Question88:-In a cam-follower mechanism with a roller follower, which of the following factors primarily determine the variation of pressure angle during the cam rotation

A:-Cam base circle radius, follower spring stiffness and follower mass

B:-Cam displacement law, base circle radius, roller radius and can rotation angle

C:-Camshaft material, follower hardness and lubrication

D:-Pressure angle is constant and indepedent of cam design

Correct Answer:- Option-B

Question89:-In a hydrodynamic journal bearing, which of the following statements is correct when the Sommerfeld number is decreased, assuming all geometric parameters (radius, clearance, length) remain unchanged?

A:-The lubricant film becomes thicker, improving load capacity

B:-The bearing operates more stably due to reduced eccentricity

C:-The eccentricity ratio increases, leading to a thinner minimum film thickness

D:-The coefficient of friction decreases due to improved lubrication

Correct Answer:- Option-C

Question90:-In an epicyclic gear train, the sun gear has 30 teeth, planet gear 20 teech and ring gear 70 teeth. If the arm is fixed and the sun rotates at 100 rpm clockwise, what is the speed of the ring gear?

A:-33 rpm (clockwise)

B:-101 rpm (anticlockwise)

C:-43 rpm (anticlockwise)

D:-70 rpm (clockwise)

Correct Answer:- Option-C

Question91:-The efficiency of a ideal Diesel cycle

A:-Depends on compression ratio alone

B:-Depends on cut off ratio alone

C:-Depends on both compression ratio and cut off ratio

D:-Independent of both compression ratio and cut off ratio

Correct Answer:- Option-C

Question92:-A very low value of Prandtl number indicates

A:-A dominance in heat transfer by conduction

B:-A dominance in heat transfer by convection

C:-A dominance in heat transfer by radiation

D:-Conduction and convection are equally dominant

Correct Answer:- Option-A

Question93:-Work done on air is minimum in which of the following compression processes?

A:-Isentropic

B:-Isothermal

C:-Polytropic

D:-None of the above

Correct Answer:- Option-B

Question94:-The COP of Reverse Carnot System (RCS) is greater than Vapour Compression Refrigeration System (VCRS) because
i. The refrigeration effect in VCRS is reduced due to throttling
ii. The compression work required in VCRS is more than RCS
iii. Heat rejected by VCRS is more than RCS

A:-i and ii are correct

B:-i and iii are correct

C:-only iii is correct

D:-i, ii and iii are correct

Correct Answer:- Option-A

Question95:-Dew point temperature is the temperature at which condensation starts when air is cooled at constant

A:-Enthalpy

B:-Entropy

C:-Pressure

D:-Volume

Correct Answer:- Option-C

Question96:-The equivalence ratio of mixture entering the spark ignition will be

A:-Less than 1 for both idling and maximum power conditions

B:-Greater than 1 for both idling and maximum power conditions

C:-Less than 1 for idling and greater than 1 for maximum power conditions

D:-Greater than 1 for idling and less than 1 for maximum power conditions

Correct Answer:- Option-B

Question97:-The work output of a heat engine operating in Carnot cycle is one fourth of the heat transferred to the sink. The efficiency of the engine will be

A:-0.8

B:-0.5

C:-0.2

D:-0.4

Correct Answer:- Option-C

Question98:-Which refrigerants given below has lowest Ozone Depletion Potential

A:-R-11

B:-R-12

C:-R-13

D:-R-22

Correct Answer:- Option-D

Question99:-The maximum possible effectiveness of a parallel flow heat exchanger is around

A:-100%

B:-80%

C:-25%

D:-50%

Correct Answer:- Option-D

Question100:-In axial flow compressors, stalling of blades is related to

A:-Motion of air at sonic speeds

B:-Unsteady periodic flows

C:-Air stream not following blade contours

D:-Blockage of passage by air stream

Correct Answer:- Option-C